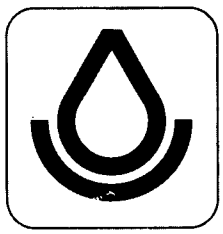
SOIL SURVEY OF

Montgomery County, Tennessee



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

Major fieldwork for this soil survey was done in the period 1966–70. Soil names and descriptions were approved in 1971. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. It is part of the technical assistance furnished to the Montgomery County Soil Conservation District.

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

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

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

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

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in this publication. This guide lists all the soils of the county in alphabetic order by map symbol. It shows the capability unit and woodland group for each soil. It also shows the page where each kind of soil and each capability unit is described.

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

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

Foresters and others can refer to the section "Woodland," for information useful in the management of woodland.

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

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

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

Students and teachers can find information about the soils and their management in various parts of the survey, depending on their particular interest.

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

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Issued August 1975

SOIL SURVEY OF MONTGOMERY COUNTY, TENNESSEE

BY EUGENE T. LAMPLEY, JOHN B. COTHRAN, LINCOLN E. DAVIS, ROBERT B. HINTON, OLIN L. NORTH, AND PAUL T. STEELE, SOIL CONSERVATION SERVICE

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

MONTGOMERY COUNTY is a rolling, productive highland in north-central Tennessee (fig. 1). It is near the center of the Highland Rim and Pennyroyal major land resource area. The elevation ranges from about 325 to 825 feet above sea level. The total land area of the county is about 344,960 acres, or about 539 square miles.

Farming is the main economic enterprise. It is of the general type. Most farmland is in pasture, small grain, corn, hay, and tobacco, which is the main cash crop.

The county changes from a gently rolling plain in the extreme northern part to choppy hills in the extreme southern part. Between these two extremes is a rolling to hilly upland that covers the larger, central part of the county. In most places the sloping soils on the hills are cherty and deep to limestone rock, from which they formed. On the broad hilltops throughout the county, and especially on the gently rolling plain in the northern part, the soils formed in loess about 2 to 3 feet thick; here the soils are silt loam, are relatively free of chert, and are easy to work. Soils that have a fragipan are common in the more nearly level parts of the upland. Some of the most productive soils on uplands in the State are in the northern third of Montgomery County.

General Nature of the County

This section discusses settlement and population, markets and industries, farming, drainage, and climate of Montgomery County. The figures for population and the statistics on agriculture are from reports b U.S. Bureau of the Census.

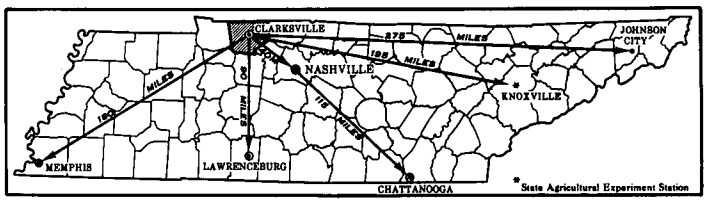

Figure 1.—**Location of Montgomery County in Tennessee.**

Settlement and Population

Montgomery County was formed from Tennessee County on April 6, 1796 (*1*).[1] It was named for John Montgomery, a native of southwest Virginia who commanded the territorial soldiers and who helped to protect the Cumberland settlement from attack. The present Montgomery County was a part of the Cumberland settlement. Early settlers came from North Carolina, Virginia, and eastern Tennessee. The town of Clarksville was established in 1785 and was made the seat of Tennessee County in 1788.

In 1960 Montgomery County had a population of 55,645. Clarksville, the largest town, had a population of 22,021. In 1967 the population of Clarksville had increased to 35,657.

Markets and Industries

Clarksville is the main trading center in Montgomery County and is one of the leading tobacco markets in the country. Since 1950, more manufacturing plants have come into Clarksville, and many of those that existed before 1950 have expanded. The income from trade and industry is increasing, though the main source of income in the county is the sale of farm products.

A part of the Fort Campbell Military Reservation is in northwestern Montgomery County. Austin Peay State University is in Clarksville.

Farming

Farms make up 65.9 percent of Montgomery County. In 1964, 1,676 farms were in the county. The average size of the farms was 135.5 acres. About 83 percent of the farms were operated by owners, but only 60 percent of the owners were classified as full-time farmers.

The largest acreage of farms is used for row crops, hay, and pasture, and these crops are grown on most general farms. More acreage is used for corn and small grain than for tobacco, but tobacco is the main cash crop (fig. 2). Mostly dark fire-cured tobacco is grown, but a sizable acreage of dark air-cured tobacco and burley is also grown. A considerable acreage of wheat and oats is grown for grain.

The acreage in both hay and improved pasture has

[1] Italic numbers in parentheses refer to Literature Cited, p. 61.

Figure 2.—Tobacco ready for curing and corn in the background on a Pembroke silt loam.

increased in recent years. The hay crops, in order of decreasing acreage, are annual lespedeza, red clover, mixtures of grass and clover, and alfalfa. Most pastures consist of tall fescue or orchardgrass mixed with white clover or ladino clover. Red clover, annual lespedeza, tall fescue, and orchardgrass are commonly grown for seed.

Drainage

All of Montgomery County is drained by the Cumberland River, which meanders through the center of the county. Parts of the county have numerous limestone sinks. In such places the drainage is into these sinks and into underground channels.

Climate [2]

Montgomery County, located in the Northern Highland Rim area of middle Tennessee, normally receives adequate precipitation and has relatively mild winters and warm summers. Weather sometimes differs between various parts of the county, but altitude differences are not large enough to cause significant differences in the climate. Consequently, the climatological data in tables 1 and 2 for Clarksville, located near the center of the county, are generally applicable to the whole county.

The climate of the area is primarily influenced by two types of air masses (*9*). One first overruns the Gulf of Mexico and brings warm moist air over Tennessee; the other consists of generally cool, dry continental air from north and west of the State. Frequent changes between these two types of airmass over the area in spring and in fall, and less frequent changes in other seasons, provide invigorating changes in the weather.

The average annual precipitation is about 48 inches. Daily variations in rainfall over the county are rather frequent, especially during thunderstorms in summer. The largest precipitation is in winter, and the smallest is early in fall. This sometimes causes a water surplus in winter that results in excessive runoff and a moisture deficiency in summer that results in drought.

A recent statistical study for this area of heavy precipitation in short periods of time indicates a 20 percent probability that, in any year, as much as 1.9 inches of precipitation will fall in 1 hour, 3.2 inches in 6 hours, and 3.7 inches in 12 hours.

The average annual temperature at Clarksville is 60° F. Temperature extremes have been 110° and −22° between 1931 and 1965. Temperatures are more than 90° on about 71 days each year and are below 32° on about 79 days. In an average winter, the ground is frozen to a depth of about 5 inches.

Long periods of very cold or very hot weather are unusual. Occasional periods of very mild temperatures occur almost every winter. In the peak summer season occasional periods of cool, dry weather break up stretches of hot, humid weather. The greatest change in average daily maximum and minimum temperatures occurs from October to November and February to March, when cold air moves south across the State.

Table 2 indicates that the average dates of the last freeze in spring and the first in fall at Clarksville are April 4 and October 29, respectively, giving an average

[2] By JOHN VAIKSNORAS, climatologist for Tennessee, National Weather Service, U.S. Department of Commerce.

TABLE 1.—*Temperature and precipitation*

[Data from Clarksville, Montgomery County, Tenn., 1931–65]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Days with snow cover of 0.1 inch or more	Average depth of snow on days with snow cover
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—		
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*	*Number*	*Inches*
January	49	30	68	24	5.6	1.8	10.8	21	1.6
February	53	32	70	28	4.5	2.0	6.6	24	1.2
March	61	38	78	31	5.6	3.4	7.3	13	1.1
April	72	48	86	39	4.2	2.4	5.4	0	0
May	81	56	92	50	3.7	1.8	6.0	0	0
June	89	65	98	61	3.5	1.4	4.6	0	0
July	92	68	99	66	3.7	1.8	6.9	0	0
August	91	67	100	64	3.4	1.3	5.7	0	0
September	85	59	97	54	3.0	1.0	4.8	0	0
October	74	48	88	40	2.5	.8	4.2	0	0
November	60	38	76	30	3.9	1.8	6.0	8	.9
December	50	31	68	24	4.3	2.2	7.2	12	.8
Year	71	48	[1] 101	[2] 4	47.9	39.3	54.1	78	1.2

[1] Average annual highest temperature.

[2] Average annual lowest temperature.

growing season of 207 days. Elsewhere in the State, average days of freezing temperatures differ by about a week in both the cooler northeast and the milder west from those in the immediate area of Clarksville.

Severe storms are infrequent in Montgomery County. From 1916 to 1965, only seven tornadoes were reported in the county (*10*). Hailstorms at a given locality occur about once or twice a year. Thunderstorms occur about 56 days each year. Minor windstorms, often associated with thunderstorms, cause some local damage in the county a few times each year. Heavy snowstorms are infrequent, and snow in winter seldom remains on the ground for more than a few days.

The following climatological data for Montgomery County are based on data from surrounding weather stations.

Relative humidity throughout the day usually varies inversely with the temperature, and it is therefore highest early in the morning and lowest late in the afternoon. Also, an annual variation exists in the relative humidity: average daily values are higher in winter and are lower in spring.

The prevailing wind direction for each month of the year is south, and the average windspeed is about 6 miles per hour. The wind direction changes frequently and is from the south about 15 percent of the time. The average monthly windspeed varies from about 6 miles per hour in August to about 10 miles per hour in March. Windspeed is 3 miles per hour or less about 27 percent of the time; 4 to 12 miles per hour, 57 percent; 13 to 24 miles per hour, 15 percent; and 25 miles per hour or higher, about 1 percent. Winds are generally lighter early in the morning and stronger early in the afternoon.

On an average, clouds cover less than 60 percent of the sky between sunrise and sunset. Cloud cover varies annually from about 70 percent in January to about 50 percent in October. As a result, sunshine is abundant, especially during the growing season, when it averages slightly more than 63 percent of the possible amount.

How This Survey Was Made

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

TABLE 2.—*Probability of last freezing temperatures in spring and first in fall*

Probability	Dates for given probability and temperature				
	16° F or lower	20° F or lower	24° F or lower	28° F or lower	32° F or lower
Spring:					
1 year in 10 later than	March 12	March 18	March 25	April 8	April 20
2 years in 10 later than	February 28	March 9	March 16	March 31	April 12
5 years in 10 later than	February 14	February 25	March 6	March 22	April 4
Fall:					
1 year in 10 earlier than	November 27	November 15	November 5	October 28	October 17
2 years in 10 earlier than	December 5	November 23	November 13	November 3	October 23
5 years in 10 earlier than	December 16	December 2	November 22	November 9	October 29

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

The soil scientists made comparisons among the profiles 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 nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey (*7*).

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. Crider and Pembroke, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Baxter cherty silt loam, 5 to 12 percent slopes, is one of several phases within the Baxter series.

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

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

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Montgomery County: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Urban land-Arents complex is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Baxter soils and Rock outcrop is an undifferentiated soil group in this county.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Rock outcrop is a land type in this county.

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

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or a high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

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

A map showing soil associations is useful to people who want a general idea of the soils in a county, who

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

The eight soil associations in Montgomery County are discussed in the following pages.

1. *Pembroke-Crider association*

Gently rolling, well-drained soils; on uplands

Some of the most productive soils in the State are in this association. Large, nearly level areas are bordered by gently rolling ones. The surface is mainly gently rolling or slightly wavy (fig. 3). In some places shallow depressions collect water from the surrounding gently sloping soils. Water seeps down rapidly in most of these depressions, and in only a few places does it stand for more than a few hours. Shallow, meandering drainageways have formed over much of the association.

This association covers about 10 percent of the county. Pembroke soils make up about 60 percent of the association, Crider soils 8 percent, and minor soils the remaining 32 percent.

The major soils are many feet deep and are loamy to a depth of 2 feet or more. Except for small wet spots in some depressions, the soils have good drainage. Almost all of this association is covered by 2 or 3 feet of loess. Beneath the loess is reddish clay, which generally is old alluvium. All the association is underlain by limestone at a depth of more than 10 feet.

Pembroke soils are well-drained silt loams. They have a dark-brown surface layer and a dark-red subsoil. Crider soils are similar to Pembroke soils but are browner in the upper part of the subsoil.

Among the minor soils in this association are the well drained Baxter and Cumberland soils, which have a reddish, clayey subsoil; the moderately well drained Bedford soils, which have a fragipan; the somewhat poorly drained Taft soils and the poorly drained Guthrie soils, which are in small areas in depressions; and the well drained, dark-brown, fertile Arrington soils, which are also in depressions.

About 95 percent of the association has been cleared, and the rest is in small woodlots. Farms average about 200 acres. Most of the acreage is used for small grain, soybeans, corn, red clover, and pasture, but almost every farm has a small acreage of tobacco. Varieties of dark fire-cured burley and of dark air-cured tobacco are grown on most farms, but most of the acreage is in dark fire-cured tobacco and burley. Most farms raise a few beef cattle, and a few farms raise a large number of hogs. More large dairy farms are in this association than in any other in the county.

This association has high potential for farming and for other uses. Almost all of it is suited to the crops commonly grown in the county. Some fields are so nearly level that row crops can be grown every year. In the other fields row crops can be grown in a short-term cropping system that includes close-growing crops.

Very few permanent streams are in this association, because much of the water runs off into depressions and underground channels. Consequently, most farms obtain water from wells and ponds. Permeability is

Figure 3.—**Corn and wheat on the large, gently rolling fields of the Pembroke-Crider association.**

moderate in most of the soils, and chemical treatment is generally needed for successful impoundment of water. The best sites are in the small basins occupied by the slowly permeable Taft and Guthrie soils. Homesites of high quality are plentiful in this association; the dominant soils are gently rolling and moderately permeable, and operation of septic-tank filter fields is successful.

2. *Baxter-Mountview-Pembroke association*

Rolling to hilly, well-drained soils, some of which are cherty; on uplands pitted by limestone sinks and depressions

This association dominantly is rolling and hilly. In most places the surface is pitted by numerous limestone sinks and depressions (fig. 4). This type of topography is commonly called karst. In a few places, especially bordering permanent streams, a system of meandering, fairly deep drainageways begins on uplands and terminates at the permanent streams.

This association covers about 15 percent of the county. Baxter soils make up about 65 percent of the association, Mountview soils 5 percent, Pembroke soils 5 percent, and minor soils the remaining 25 percent.

The soil pattern in the association is commonly that of reddish cherty soils around sinks and on hillsides adjacent to drainageways and of brownish soils relatively free of chert in broad, smooth areas on hilltops and between sinks. Some sinks have level bottoms and are large enough to allow laying out a 2- to 3-acre field; others are almost funnel shaped. Generally, the smoothest areas are on broad tops of low hills, and the steepest are along permanent streams.

Baxter soils are deep, well drained, and cherty. They have a reddish clayey subsoil. These soils generally are in areas around sinks and on hillsides adjacent to drainageways. Mountview and Pembroke soils are deep and well drained. They are free of chert fragments. Mountview soils have a yellowish subsoil, and Pembroke soils have a reddish subsoil.

The most extensive of the minor soils are the well-drained Pickwick soils on uplands adjoining areas of Mountview and Pembroke soils. Other minor soils are the well-drained Arrington and Statler soils and the moderately well drained Lindside soils on bottom lands and low terraces of permanent streams, especially the Red River.

About 80 percent of the association is cleared, and the rest is in woodlots, few of which are larger than 50 acres. The largest wooded areas are on the steeper soils that flank permanent streams, such as the Red River. Farms average about 175 acres and are mainly of the general type. Tobacco is grown on almost every farm and is the main cash crop. Several dairy farms are in the association, and most farms raise a few beef cattle. A fairly large acreage is used for corn, soybeans, and small grain. Much of this acreage is on narrow bottom land along the Red River and Big West Fork Creek. The more hilly areas are used mainly for pasture.

This association has a fairly high potential for grassland farming. Most grasses and legumes grown for hay and pasture are productive. The potential for grain crops is low because most areas are small and generally are irregular. The most suitable areas for growing grain crops every year are on the narrow, level bottom land along the larger streams. Some slopes are long and smooth enough for contour tillage, contour stripcropping, and terracing, but these practices are not feasible in areas that are broken by limestone sinks.

Red River, Big West Fork Creek, and their few tributaries meander through this association and furnish a good supply of water to a part of it. Most farms, however, depend on ponds and wells for water. Pond failures are common because of moderate soil permeability and the cavernous limestone that underlies all

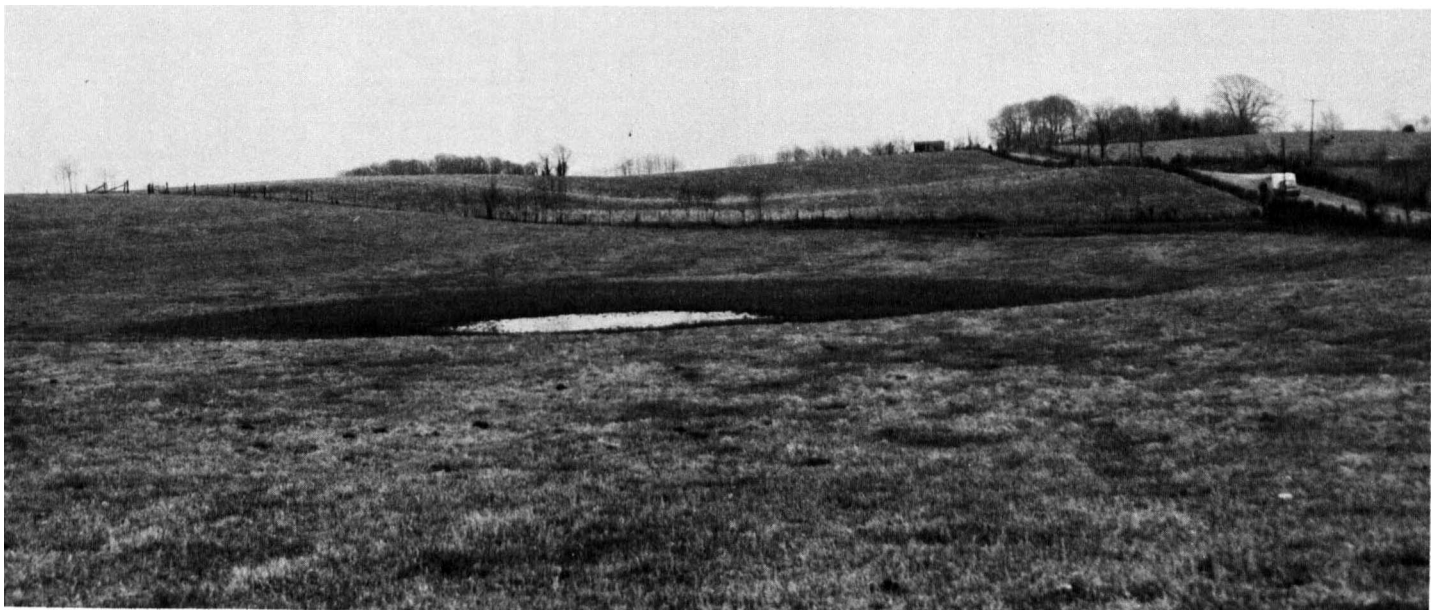

Figure 4.—**Limestone sinks, depressions, and irregular topography are features of the Baxter-Mountview-Pembroke association.**

the association. Suitable sites for homes requiring on-site sewage disposal are plentiful. Care is necessary in the selection of sites, because many, small, level areas of soils on uplands have a fragipan and slow permeability.

3. *Guthrie-Taft association*

Level, poorly drained and somewhat poorly drained soils that have a fragipan; in small basins and on upland flats

This association mainly consists of numerous shallow basins and intervening, nearly level plains that separate the basins. Some of the basins are large enough to allow laying out a 5- to 10-acre field, but other basins contain only an acre or less. Some basins lack drainage outlets, and in others water flows slowly down sluggish, meandering drainageways. Almost all of the basins are wet in winter and in spring, but they commonly dry out in summer and in fall. Because the nearly level plains, or upland flats, are 10 to 20 feet higher than the basins, soils in these areas are moderately well drained and well drained.

This association covers about 3 percent of the county. Guthrie soils make up about 40 percent of the association, Taft soils about 30 percent, and minor soils the remaining 30 percent.

All of the association is covered with 2 to 3 feet or more of loess. Beneath the loess is old alluvium or residuum of limestone, both of which are parent material for the soils in this association.

Guthrie soils are gray and wet. Taft soils are mottled gray, brown, and yellow. Both of these soils have a fragipan. Minor soils are mainly the well drained Pembroke soils and the moderately well drained Dickson soils, both of which are on plains between the basins.

About 70 percent of the association has been cleared, and much of the rest consists of small wooded areas. A few wooded tracts, as large as 50 acres, are in the lowest, wettest parts of the basins. Farms average about 100 acres and are mainly of the general type. Only a few farms are entirely within the association, because most extend into adjacent associations. Small grain, corn, soybeans, tall fescue, white clover, lespedeza, and tobacco are the most commonly grown crops.

This association has a fairly high potential for farming. The main limitation is poor drainage in the low areas. Because many areas dry out slowly late in spring, planting is delayed and the choice of crops is limited. Open ditches remove excess surface water in some places. In some basins outlets are not available for the removal of surface water, and little can be done to improve drainage in these areas. Tile drainage is not practical, because of the lack of suitable outlets in many places, the fragipan, and slow permeability.

Very little, if any, running water is in the association. The water supply for farms is from ponds and wells. Suitable pond sites are plentiful because most soils in low areas have a fragipan and slow permeability. Suitable sites for homes are not plentiful, because of soil wetness and slow permeability. The most suitable sites are the small areas of Pembroke soils on the highest parts of the plains between the basins.

4. *Dickson-Mountview association*

Gently rolling, moderately well drained and well drained soils, most of which have a fragipan; on uplands

This association appears as a gently rolling plain (fig. 5). The few drainageways are shallow, and a few shallow basins occur where water collects after heavy rains. The slope is dominantly less than 10 percent, and broad upland flats are common. Most of this association is in the Fort Campbell Military Reservation.

This association covers about 15 percent of the county. Dickson soils make up about 40 percent of the

Figure 5.—Typical landscape of the Dickson-Mountview association.

association, Mountview soils about 25 percent, and minor soils the remaining 35 percent.

The major soils in this association formed in loess. The loess cover is about 2 or 3 feet thick on upland flats, but it is considerably thicker in shallow basins and along sluggish, meandering drainageways. The loess is underlain by reddish clay that is old alluvium in some places and limestone residuum in others. Limestone bedrock underlies all of the association at a depth of more than 10 feet.

Dickson soils are brown and yellowish brown and moderately well drained. They are loamy to a depth of more than 2 feet. They have a fragipan at a depth of about 2 feet. These soils are on the more nearly level parts of the plains. Mountview soils are on the more rolling parts of the plains. These soils are well drained and loamy. The minor soils are mainly the reddish, well-drained Pickwick soils; the somewhat poorly drained Taft soils; and the poorly drained Guthrie soils.

Since the major part of this association is in the Fort Campbell Military Reservation, it is of minor importance to farming. Much of the association that is within the military reservation has been planted to pine trees. The parachute landing area is established in white clover and tall fescue. A considerable acreage is occupied by buildings serving the military complex. The small part of this association outside of the military reservation is used for pasture and hay and small acreages of corn, small grain, and tobacco. Farms average about 160 acres and are mainly of the general type.

The main limitation of this association is drainage. On the smoother parts of the plains, the soils have a fragipan that decreases permeability and causes the lower part of the subsoil to be waterlogged during periods of heavy rain. This drainage condition reduces, to some extent, the number of plants that can be grown and affects their response to management. Most of the common plants, except deep-rooted legumes such as alfalfa, are fairly well suited.

Sites for homes and other accommodations requiring septic-tank filter fields are scarce in the area because of unfavorable permeability. Suitable sites are the higher, more sloping, small tracts occupied by the well-drained Mountview and Pickwick soils.

5. *Arrington-Lindside-Beason association*

Level, well-drained to somewhat poorly drained soils; on bottom lands of the Cumberland River

This association is the broad, nearly flat flood plain of the meandering Cumberland River (fig. 6). The association is slightly more than 1 mile wide, and this width is fairly uniform throughout as the association meanders in an east-west direction through the approximate center of the county. The association consists of broad, nearly flat areas and narrow, shallow sloughs that meander through the flats much as river channels do.

This association covers about 5 percent of the county. Arrington soils make up about 45 percent of the association, Lindside soils about 20 percent, Beason soils about 5 percent, and minor soils the remaining 30 percent.

The association is flooded once every several years; the last time was in 1962. Almost every year the low places and sloughs are flooded by overflowing tributary streams. Generally, the flooding does not last more than a few days and does not prevent the growing of crops.

The soils in this association formed in sediment deposited by the Cumberland River. The coarser textured and better drained soils are in the higher areas adjacent to the river, and, as the distance from the river

Figure 6.—**Arrington-Lindside-Beason association on the Cumberland River flood plain. Arrington soils occupy the strip in row crops. Lindside soils are between the row crops and the wooded area, and Beason soils are in the wooded area to the extreme left. The loamy Staser soils are in the narrow strip between the row crops and the river channel.**

increases, the soils are progressively more clayey and more poorly drained.

Arrington soils are well-drained, dark-brown silt loam. They are in long, narrow strips parallel and adjacent to the river. Lindside soils are moderately well drained, brown silt loam that has grayish mottles at a depth below about 18 inches. These soils are adjacent to Arrington soils but are farther from the river. Beason soils are somewhat poorly drained and are mottled below the surface layer. These soils are on low second bottoms or low terraces.

The minor soils are mainly the well-drained Staser soils, the moderately well drained Wolftever soils, and the poorly drained Forestdale soils.

All of this association has been cleared, except for a few wooded tracts on the poorly drained soils. More than half of the cleared acreage is cultivated every year. Corn, soybeans, and small grain are the main crops. Many areas are planted to tall fescue and white clover for pasture and lespedeza for pasture and hay. Farms average about 300 acres, and many are operated by tenants.

The soils in this association are among the most fertile in the county. The well drained and moderately well drained soils are well suited to most crops, but the choice of crops is limited on the somewhat poorly drained and poorly drained soils. Susceptibility to flooding and wetness are the main limitations. Late planting is generally necessary, but in most years a crop can be grown.

Most areas of this association are subject to flooding and have severe limitations of such engineering uses as highway construction.

6. *Baxter-Mountview association*

Rolling to hilly, well-drained soils that are cherty on hillsides and chert-free on hilltops

This association consists of broadly rounded hills, the tops of which have gently rolling plateaulike areas. A well-defined network of crooked drainageways forms hollows. These hollows are almost V-shaped along lateral drainageways, but they range to nearly level valleys about one-half mile wide along permanent streams.

This association covers about 26 percent of the county. Baxter soils make up about 65 percent of the association, Mountview soils about 10 percent, and minor soils the remaining 25 percent.

The common soil pattern in the association is that of cherty soils on hillsides; chert-free soils on hilltops; and dark-brown, fertile soils on the narrow bottoms. Because almost all of the broad hilltops have a 2- to 3-foot cover of loess, the soils are loamy to a depth of 2 feet or more and are relatively chert free in these places. Below the loess layer is reddish cherty clay.

Baxter soils are deep, have a reddish clay subsoil, and contain a large amount of chert. They are mainly on hillsides. Mountview soils are deep and have a yellowish, loamy subsoil. They are on broad hilltops and on low rolling hills.

Some of the minor soils in the association are the well drained Pickwick soils and the moderately well drained Dickson soils on the smoother hilltops. Other minor soils are the well drained Arrington, Cannon, and Humphreys soils and the moderately well drained Lindside and Lobelville soils that are in small areas in narrow valleys.

About 70 percent of the association is cleared. The wooded tracts are mainly on the steeper hillsides, and only a few are more than 60 acres. The potential for timber is good because the steep valley sides are better suited to trees than to pasture or crops. Farms average about 175 acres, and most of them are of the general type. Tobacco is grown on almost every farm and is the main cash crop. Most farmers sell a few beef cattle, and a few sell milk.

The soils of this association are well suited to pasture and hay crops. The association has a good potential for livestock farming. Areas that are suitable for frequent cultivation are in small fields on broad hilltops and in narrow valleys.

More permanent streams are in this association than in any other in the county. Many farms have access to one of these streams for livestock water, but others depend on wells and ponds for water. Not all attempts at impounding water have been successful, because of the moderate permeability of the soils and because the underlying limestone is cracked and channeled. Limitations for such engineering works as highway construction are severe; deep cuts and fills are required, and in some places the cuts are in limestone rock.

7. *Baxter-Brandon association*

Rolling to steep, well-drained soils that are cherty on hillsides and chert-free on hilltops

This association consists of massive, rounded hills and winding ridges. Hilltops are broad and smooth in many places, and some form gently rolling, plateaulike areas large enough to allow a 5- to 20-acre field. A network of winding drainageways dissects most of the association. These drainageways are almost V-shaped at the head, but they widen into narrow strips of fertile bottom land adjacent to the larger streams. The hillside slopes dominantly range from 12 to 20 percent, but some are as much as 45 percent.

This association covers about 25 percent of the county. Baxter soils make up about 60 percent of the association, Brandon soils about 15 percent, and minor soils the remaining 25 percent.

The common soil pattern in the association is that of cherty soils on hillsides and of soils that are almost free of chert on the hilltops. The smoother hilltops and plateaulike areas have a 2- to 3-foot cover of loess that is underlain in most places by a gravelly layer about 1 foot thick. The gravelly layer is underlain by reddish clay that formed in material weathered from limestone. The mantle of loess and the gravelly layer are not present on the hillsides, and in these locations cherty soils that formed in material weathered from the underlying limestone are exposed.

Baxter soils are cherty because they formed in material weathered from cherty limestone. These soils are on most hillsides and on narrow, winding ridgetops. Brandon soils are loamy and free of rock fragments to a depth of about 2 feet. They are underlain by a gravelly layer that averages about 1 foot in thickness. These soils are on broad hilltops and plateaulike areas.

The most extensive of the minor soils are the well

drained Arrington, Cannon, and Humphreys soils and the moderately well drained Lindside and Lobelville soils. All these soils are in narrow valleys along permanent streams such as Yellow Creek and East Fork Yellow Creek. Small areas of the moderately well drained Lax soils and the well drained Mountview soils are on hilltops.

About 50 percent of this association is cleared, and the rest is mainly in oak and hickory trees. Wooded areas are on hillsides. Almost all areas of the soils on the broad hilltops and in the valleys are used for crops and pasture. Farms average about 175 acres, and most are of the general type. Tobacco is the main cash crop, and nearly every farm grows a small acreage of it. Beef cattle are raised on most farms, and milk is sold from a few farms. Several landowners work in Clarksville and on the Fort Campbell Military Reservation.

This association has a moderate potential for farming. Suitable areas for pasture and hay are fairly plentiful. Areas suitable for row crops are in small tracts on the smoother hilltops and in the narrow valleys. Food and cover for wildlife are available. The value of areas for wildlife is enhanced by several permanent streams that furnish a good supply of running water to much of the association.

The strong slopes and deep hollows are severe limitations to use of this association for engineering works. Road construction requires deep cuts and fills, and in some places the cuts are in limestone rock.

8. *Pembroke-Crider-Baxter association*

Gently rolling to hilly, well-drained soils, some of which are cherty; on uplands

This association consists of low, rolling and gently rolling hills that are pitted in a few places with limestone sinks or depressions. Most of the association is fairly smooth and easy to farm (fig. 7). Very few permanent streams are in this association.

This association covers less than 1 percent of the county. Pembroke soils make up 35 percent of the association, Crider soils 15 percent, Baxter soils 15 percent, and minor soils the remaining 35 percent.

Loamy soils that formed in loess cover about two-thirds of the association, and cherty soils that formed in material weathered from limestone account for most of the rest.

Pembroke, Crider, and Baxter soils are well drained. Pembroke and Crider soils are silt loams that occupy the smoothest parts of the association. Pembroke soils are dark brown to dark red, and the Crider soils are similar in color, but they are browner in the upper part of the subsoil. Baxter soils are cherty and have a reddish, clayey subsoil. These soils are in hilly areas.

The minor soils are the dark-brown, well drained Arrington soils, mainly in small areas in depressions; the well drained Mountview and Pickwick soils on some of the broad hilltops; and the moderately well drained Dickson soils, which have a yellowish subsoil and a fragipan at a depth of about 2 feet. Dickson soils are in small, smooth areas on uplands.

About 85 percent of this association is cleared, and the rest is in small woodlots. Farms average about 135 acres, and most are of the beef-cattle or general type. Because permanent streams are few, ponds supply most of the water for livestock. Small acreages of tobacco, the main cash crop, are grown on almost all farms. Practically all of the association can produce hay and pasture, and much of it can produce grain crops in short-term cropping systems. The potential for farming is good.

Descriptions of the Soils

This section describes the soil series and mapping units in Montgomery County. Each soil series is de-

Figure 7.—Area of the Pembroke-Crider-Baxter association.

scribed in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the soil series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in the description of the mapping unit, or they are differences that are apparent in the name of the mapping unit. The description of each mapping unit contains suggestions on how the soil can be managed. Colors are for a moist soil, unless otherwise specified.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Urban land, for example, does not belong to a series, but nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed. The page for the description of each capability unit can be learned by referring to the "Guide to Mapping Units" at the back of this survey.

The approximate acreage and proportionate extent of each mapping unit are shown in table 3. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*7*).

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

Soil	Acres	Percent
Arrington silt loam	22,320	6.5
Baxter cherty silt loam, 5 to 12 percent slopes	26,275	7.6
Baxter cherty silt loam, 12 to 20 percent slopes	45,400	13.2
Baxter cherty silt loam, 20 to 35 percent slopes	21,765	6.3
Baxter cherty silty clay loam, 5 to 12 percent slopes, eroded	14,100	4.1
Baxter cherty silty clay loam, 12 to 25 percent slopes, eroded	32,800	9.5
Baxter soils, 12 to 25 percent slopes, severely eroded	1,495	.4
Baxter soils and Rock outcrop, 20 to 45 percent slopes	6,410	1.8
Beason silt loam	1,375	.4
Bedford silt loam, 2 to 5 percent slopes	1,235	.4
Bodine cherty silt loam, 15 to 45 percent slopes	1,380	.4
Brandon silt loam, 2 to 5 percent slopes	1,250	.4
Brandon silt loam, 5 to 12 percent slopes	8,300	2.4
Brandon silt loam, 10 to 20 percent slopes, eroded	2,745	.8
Cannon cherty silt loam	4,000	1.2
Crider silt loam, 2 to 8 percent slopes	3,270	.9
Cumberland silty clay loam, 5 to 12 percent slopes, eroded	3,600	1.0
Cumberland soils, cherty variant, 10 to 25 percent slopes, eroded	1,885	.5
Dickson silt loam, 1 to 4 percent slopes	21,000	6.1
Dickson silt loam, 4 to 8 percent slopes	2,900	.8
Egam silt loam	680	.2
Forestdale silt loam	1,250	.4
Guthrie silt loam	5,170	1.5
Humphreys cherty silt loam, 3 to 10 percent slopes	2,830	.8
Lax silt loam, 1 to 4 percent slopes	2,015	.6
Lax silt loam, 4 to 8 percent slopes	1,355	.4
Lindside silt loam	12,775	3.7
Lobelville cherty silt loam	575	.2
Melvin silt loam	600	.2
Mountview silt loam, 2 to 5 percent slopes	5,900	1.7
Mountview silt loam, 5 to 12 percent slopes	10,000	2.9
Mountview silt loam, 5 to 12 percent slopes, eroded	9,100	2.6
Newark silt loam	4,600	1.3
Pembroke silt loam, 2 to 5 percent slopes	17,555	5.1
Pembroke silt loam, 5 to 12 percent slopes	9,975	2.9
Pickwick silt loam, 2 to 5 percent slopes	4,445	1.3
Pickwick silt loam, 5 to 12 percent slopes	7,230	2.1
Pickwick silt loam, 5 to 12 percent slopes, eroded	7,800	2.3
Pickwick silt loam, 12 to 20 percent slopes	985	.3
Staser fine sandy loam	600	.2
Statler silt loam, 2 to 5 percent slopes	2,000	.6
Statler silt loam, 5 to 12 percent slopes	965	.3
Taft silt loam	4,690	1.4
Urban land-Arents complex	2,180	.6
Wolftever silt loam	1,190	.3
Fort Campbell Military Reservation (not mapped)	4,990	1.4
Total	344,960	100.0

Arents

Arents consists mostly of filled areas, some of which are excavated. In most areas the original soil material has been disturbed to such an extent that its identification is no longer feasible. Soil material ranges from loam to clay and is generally quite variable within short distances. Depth of excavations or fill material ranges from a few feet to many feet. Most areas are nearly level, but in places slopes are as much as 20 percent.

This land type is mapped only in a complex with Urban land. Capability unit unassigned; woodland group unassigned.

Arrington Series

The Arrington series consists of deep, well-drained soils on flood plains and on bottoms of limestone sinks on uplands. Slopes are less than 2 percent.

In a representative profile the surface layer is dark-brown silt loam about 8 inches thick. The subsoil is dark-brown, friable silt loam about 12 inches thick. Below, and extending to a depth of 52 inches, is very dark grayish-brown and dark-brown, friable silt loam.

These soils are medium acid to neutral in reaction throughout. Permeability is moderate, and available water capacity is high. These soils are subject to occasional flooding for very brief periods late in winter and early in spring.

All areas of these soils, except a few small areas along narrow flood plains of intermittent streams, have been cleared. Most areas are used for high-value cash crops such as tobacco, soybeans, and corn. A few, small, irregularly shaped areas or areas of difficult access are wooded or are used for pasture.

Representative profile of Arrington silt loam:

Ap—0 to 8 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, granular structure; friable; many fine roots; common worm casts; slightly acid; clear, smooth boundary.

B2—8 to 20 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, subangular blocky structure; friable; common fine roots; slightly acid; clear, smooth boundary.

A1b—20 to 32 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

Bb—32 to 52 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, subangular blocky structure; friable; slightly acid.

Depth to bedrock is more than 8 feet. The B horizon is generally brown or dark brown, but in a few places it is silty clay loam. In some places thin subhorizons of pale brown are at a depth below 24 inches.

Arrington silt loam (Ar).—This nearly level soil is on flood plains, along drainageways, and in limestone sinks and depressions on uplands.

Included with this soil in mapping are a few small areas of soils that have gray mottles beginning at a depth of about 18 inches. Also included are some small areas of soils that have a subsoil of silty clay and a few places where the soils have a surface layer of fine sandy loam.

The root zone is deep. Fertility is high. Some areas are flooded or ponded for very brief periods, mostly late in winter and early in spring.

This soil is well suited to row crops commonly grown in the county. It can be cultivated every year (fig. 8). The response to management is very good. Capability unit I-1; woodland group 2o7.

Baxter Series

The Baxter series consists of deep, well-drained, rolling to steep soils on hills. Chert fragments are on the surface and throughout the soil. The soils formed in material weathered from cherty limestone. Many areas are pitted by limestone sinks and depressions. Slopes range from 5 to 45 percent.

In a representative profile (fig. 9) the surface layer is brown cherty silt loam about 6 inches thick. The subsoil extends to a depth of 65 inches or more. The upper 6 inches is yellowish-red, friable cherty silty clay loam. The lower 53 inches is firm cherty clay that is yellowish-red in the upper part and red in the lower part.

These soils are mainly strongly acid or very strongly acid; where the surface layer is limed, however, it is less acid. Permeability is moderate, and available water capacity is medium to low.

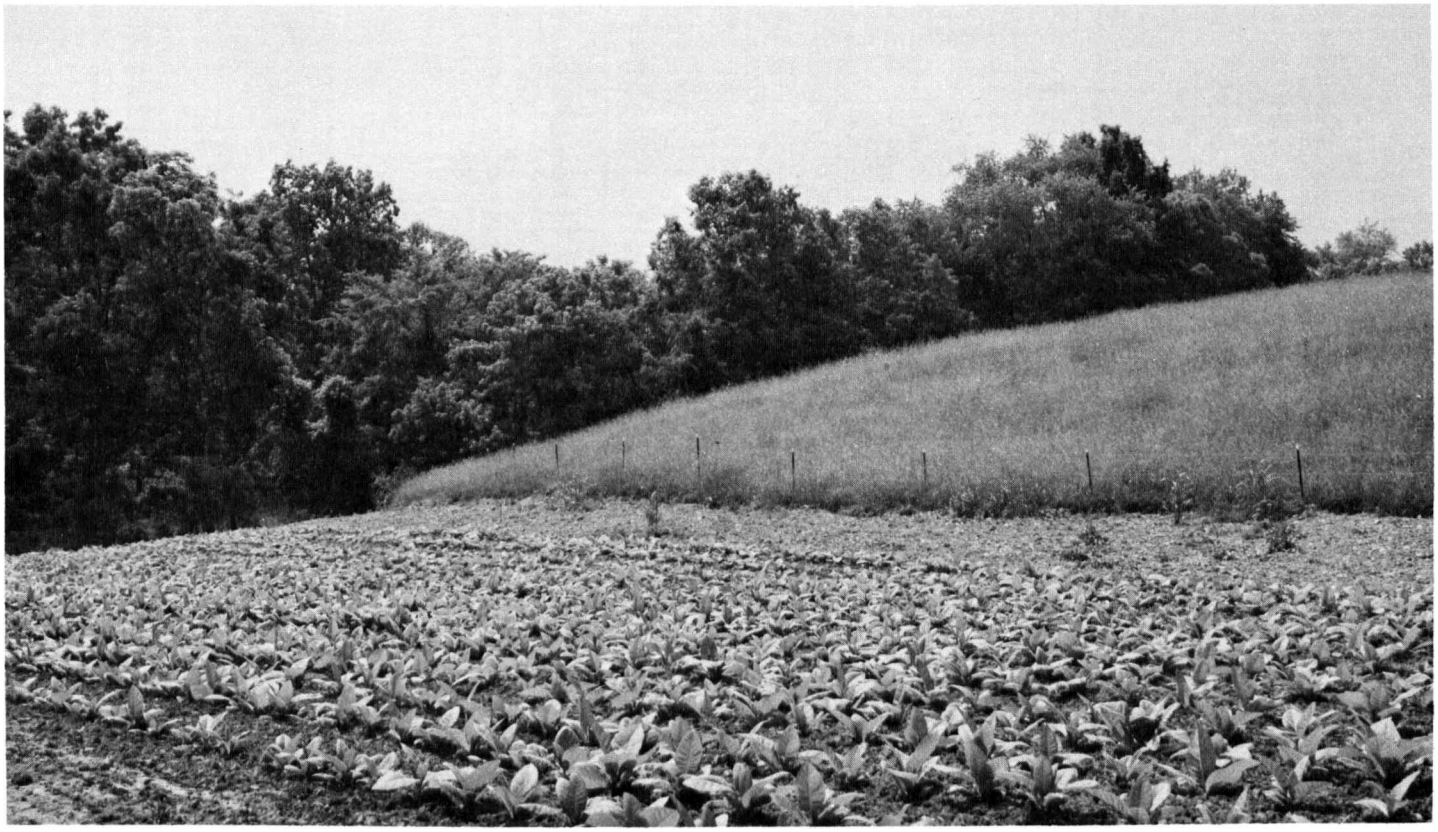

Figure 8.—Tobacco on Arrington silt loam. Baxter soils are on the adjacent hillsides.

Figure 9.—**Road cut showing profile of Baxter cherty silt loam.**

Most areas of these soils are used for pasture and trees. Some acreage of the less sloping soils is used for corn, tobacco, small grain, and hay.

Representative profile of Baxter cherty silt loam, 5 to 12 percent slopes:

Ap—0 to 6 inches, brown (10YR 4/3) cherty silt loam; weak, medium, granular structure; friable; about 20 percent, by volume, is chert fragments as much as 3 inches in diameter; strongly acid; clear, smooth boundary.

B1t—6 to 12 inches, yellowish-red (5YR 5/6) cherty silty clay loam; weak, fine and medium, subangular blocky structure; friable; about 20 percent, by volume, is chert fragments as much as 3 inches in diameter; few, thin, discontinuous clay films on peds; strongly acid; clear, smooth boundary.

B21t—12 to 24 inches, yellowish-red (5YR 4/6) cherty clay; few, medium, distinct, olive-yellow (2.5Y 6/6) mottles; moderate, medium, angular and subangular blocky structure; firm; about 20 percent, by volume, is chert fragments as much as 3 inches in diameter; discontinuous clay films on peds; strongly acid; clear, wavy boundary.

B22t—24 to 48 inches, red (2.5YR 4/6) cherty clay; common, medium, distinct, olive-yellow (2.5Y 6/6) and yellow (2.5Y 7/6) mottles; moderate, medium, subangular blocky structure; firm; about 20 percent, by volume, is chert fragments as much as 4 inches in diameter; thick clay films on ped faces; strongly acid; gradual, wavy boundary.

B23t—48 to 65 inches, red (2.5YR 4/6) cherty clay; common, medium and coarse, yellow (2.5Y 7/6) and olive-yellow (2.5Y 6/6) mottles; strong, medium and coarse, angular blocky structure; firm; about 25 percent, by volume, is chert fragments as much as 4 inches in diameter; thick clay films; strongly acid.

The content of chert fragments in each horizon ranges from about 15 to 35 percent, by volume. Most of the fragments range from ¼ inch to about 4 inches in diameter. Depth to limestone bedrock is more than 8 feet. The A horizon ranges from brown cherty silt loam to strong-brown, yellowish-brown, and yellowish-red cherty silty clay loam in eroded areas. It ranges from 3 to 9 inches in thickness. The B1t horizon is yellowish brown, strong brown, or yellowish red and is 6 to 12 inches thick.

Baxter cherty silt loam, 5 to 12 percent slopes (BaC).—This soil is mainly on hilltops. Areas range from 5 to 25 acres in size. This soil is cherty throughout; chert fragments range from ¼ inch to 4 inches in diameter and make up 15 to 35 percent of the soil volume. The profile of this soil is the one described as representative of the series.

Included with this soil in mapping are a few small spots of eroded soils that have a surface layer of reddish cherty silt loam or cherty silty clay loam. Also included are several small areas of soils that do not have chert fragments in the upper 18 inches; these areas are mostly on hilltops.

If this soil is fertilized and otherwise well managed, it is suited to tobacco, small grain, annual lespedeza, and many other crops. Alfalfa can be grown under high-level management that includes adequate applications of lime, complete fertilizers, and boron. Because available water capacity is medium, this soil is fairly well suited to corn. Capability unit IIIe-3; woodland group 3o7.

Baxter cherty silt loam, 12 to 20 percent slopes (BaD).—This soil is mostly on hillsides in the highly dissected part of the county. Many areas are on the rim of limestone sinks. The plow layer is brown cherty silt loam about 4 to 8 inches thick. The upper 8 to 10 inches of the subsoil is strong-brown or yellowish-red, friable cherty silty clay loam. The lower part is yellowish-red or red, firm cherty clay that is several feet thick.

Included with this soil in mapping are a few areas of severely eroded soils that have a surface layer of reddish silty clay loam. Also included are a few small areas of soils that have slopes of slightly more than 20 percent. A few small areas of soils on hilltops that do not have chert fragments in the upper 12 inches and are capped with a thin layer of loess are included.

The rooting zone is deep. Available water capacity is medium.

Because of steepness of slope, this soil is only fairly suited to row crops, even if they are grown in a long-term cropping system. Steepness of slope, chert fragments, and limited available water capacity make this soil better suited to pasture and occasional small grain or hay crops than to most other uses. If this soil is limed, fertilized, and otherwise well managed, it is suited to pasture plants commonly grown in the county. Response to management is fair to good. Capability unit IVe-1; woodland group 3o7.

Baxter cherty silt loam, 20 to 35 percent slopes (BaE).—This soil is on hillsides in the highly dissected parts of the Highland Rim. Some areas are deeply pitted by limestone sinks. This soil is cherty throughout; chert fragments range from 1 inch to 4 inches or more in diameter and make up 15 to 35 percent of the soil volume. The surface layer is brown cherty silt loam about 5 to 8 inches thick. The upper 10 inches of the subsoil is yellowish-red, friable cherty silty clay loam. Below this, to a depth of several feet, it is red, firm cherty clay.

Included with this soil in mapping are a few small spots of soils that have a surface layer of reddish cherty silt loam or cherty silty clay loam. Also included are a few spots of soils that have slopes of more than 35 percent, a few areas that are more than 35 percent chert

fragments, and a few areas on hilltops that have a chert-free surface layer.

The root zone is deep. Available water capacity is medium.

Because of steepness of slope, this soil is poorly suited to row crops, even if they are grown in a long cropping system. Steepness of slope, chert fragments, and limited available water capacity make this soil better suited to pasture and woodland than to most other uses. Tall fescue, white clover, and lespedeza are commonly grown pasture plants. Capability unit VIe-1; woodland group 3r8.

Baxter cherty silty clay loam, 5 to 12 percent slopes, eroded (BcC2).—This soil is mainly on winding ridgetops. Areas range from 5 to 25 acres. Some areas are pitted by sinks or depressions. This soil is cherty throughout; chert fragments range from ¼ inch to 4 inches in diameter and make up 15 to 35 percent of the soil volume. Erosion has removed much of the original surface layer and, in some places, has cut into the subsoil. The plow layer is strong-brown or yellowish-brown cherty silty clay loam about 4 to 7 inches thick. The upper few inches of the subsoil is yellowish-red, firm cherty silty clay loam; below this, it is several feet of yellowish-red or red, firm cherty clay.

Included with this soil in mapping are a few spots of soils that are less eroded than this soil. They have a surface layer of brown cherty silt loam. A few small areas that have slopes of 12 to 20 percent, and a few areas that have a surface layer that is more than 35 percent chert fragments are included. Also included are a few 1- to 2-acre tracts of soils on hilltops. These soils do not have chert fragments in the upper 12 to 15 inches, and they have a thin covering of loess.

Available water capacity is low to medium. This soil is difficult to work, because of the high content of chert fragments and clay in the surface layer. The plow layer is sticky when wet and hard and cloddy when dry.

This soil is poorly suited to row crops because of its high content of chert fragments, steepness of slope, and moderately fine textured surface layer. Also, moisture is lowest when plants generally make most of their growth. This soil is moderately well suited to small grain, pasture, and hay crops, and it is well suited to tall fescue, white clover, and lespedeza. Capability unit IVe-1; woodland group 3o7.

Baxter cherty silty clay loam, 12 to 25 percent slopes, eroded (BcD2).—This soil is on hillsides in highly dissected parts of the county. Some areas are deeply pitted by limestone sinks. Erosion has removed much of the original surface layer, and in most places the present surface layer consists mainly of material formerly in the subsoil. The surface layer, about 3 to 6 inches thick, is strong-brown or yellowish-red cherty silty clay loam. The upper part of the subsoil, about 4 to 10 inches thick, is yellowish-red, firm cherty silty clay loam. The lower part of the subsoil is several feet of reddish, firm cherty clay.

Included with this soil in mapping are a few areas of soils that have slopes of more than 25 percent and a few small areas that are more than 35 percent chert fragments throughout. Also included are some areas of soils that have a few small gullies or scars where deep gullies have been filled. A few areas of soils that have the original surface layer of brown cherty silt loam are included.

The root zone is deep. Available water capacity is low to medium.

Because of steepness of slope, a clayey surface layer, and chert fragments, this soil is poorly suited to row crops, even if they are grown in a long-term cropping system. If this soil is limed, fertilized, and otherwise well managed, it is moderately well suited to pasture plants commonly grown in the county. The response to fertilizer and other management practices is fair. Capability unit VIe-1; woodland group 3r8.

Baxter soils, 12 to 25 percent slopes, severely eroded (BgE3).—These soils are on short hillsides. Areas range from 3 to 10 acres. Erosion has cut numerous shallow gullies and a few deep ones in each area. The surface layer ranges from brown cherty silt loam to yellowish-red cherty clay within a few feet, and color and texture depend on the amount of erosion. The subsoil is yellowish-red or red cherty clay several feet thick.

Available water capacity is low to medium.

Because of the gullies, land smoothing is needed before pasture can be established on these soils. If the areas are smoothed, these soils are fairly suited to this use. Capability unit VIIe-1; woodland group 4c3e.

Baxter soils and Rock outcrop, 20 to 45 percent slopes (BkF).—Areas of this complex are scattered throughout the county, and most areas are in narrow bands that run parallel to streams. Areas range from 5 to 20 acres.

Baxter soils make up about 80 percent of this complex, and Rock outcrop about 20 percent. The surface layer of the Baxter soils is brown and yellowish-brown, friable cherty silt loam about 4 to 8 inches thick. The upper 5 inches of the subsoil is yellowish-red, friable cherty silty clay loam. Below this, to a depth of several feet, it is red, very firm cherty clay. The Rock outcrop is limestone that ranges from 1 foot to several feet in diameter.

Included with this unit in mapping are a few spots of soils that have bedrock exposed on more than 20 percent of the area, some areas where the depth to bedrock is less than 5 feet, and a few small areas that are free of chert fragments. Also included are a few spots of eroded soils that have a surface layer of yellowish-red cherty silty clay loam and a few areas of soils that have a subsoil of dark-red cherty clay.

Most of this unit is wooded, but a few areas are cleared and are in native pasture or are reverting to woodland. This complex is not suited to tilled crops, because of steepness of slope and Rock outcrop. It is fairly to poorly suited to pasture plants because management is difficult. Capability unit VIIs-1; woodland group 4x3.

Beason Series

The Beason series consists of deep, somewhat poorly drained soils. These soils are on low terraces, mainly on the Cumberland River flood plain. They formed in alluvium. Slopes are less than 2 percent.

In a representative profile the surface layer is brown silt loam about 10 inches thick. The subsoil extends to a depth of 65 inches or more. It is light yellowish-brown,

friable silty clay loam in the upper 10 inches; yellowish-brown, firm silty clay that has gray and brown mottles in the next 20 inches; and mottled gray and brown, firm silty clay loam in the lower 25 inches.

In unlimed areas, these soils are strongly acid or very strongly acid throughout. Permeability is moderate in the surface layer and moderately slow in the subsoil. Available water capacity is medium or high. Surface runoff is moderately slow or slow. A water table is near the surface for several days late in winter and early in spring. These soils are subject to occasional flooding for brief periods late in winter or early in spring.

Nearly all areas of these soils have been cleared and are used for row crops, hay, and pasture.

Representative profile of Beason silt loam:

Ap—0 to 10 inches, brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable; many fine roots; slightly acid; clear, smooth boundary.

B1t—10 to 13 inches, light yellowish-brown (10YR 6/4) silty clay loam; few, fine, distinct, strong-brown mottles and few, fine, faint, grayish-brown and pale-brown mottles; moderate, fine and medium, subangular blocky structure; friable; few patchy clay films; common roots; few, small, black concretions; strongly acid; clear, smooth boundary.

B21t—13 to 20 inches, light yellowish-brown (10YR 6/4) silty clay loam; common, medium, distinct, light brownish-gray (10YR 6/2), pale-brown (10YR 6/3), and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; patchy clay films; few roots; many, fine, black and reddish-brown concretions; strongly acid; clear, smooth boundary.

B22t—20 to 40 inches, yellowish-brown (10YR 5/6) silty clay; common, medium, distinct, light brownish-gray (10YR 6/2), light yellowish-brown (10YR 6/4), gray (10YR 6/1), and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; patchy clay films; common, fine, black and reddish-brown concretions; strongly acid; clear, smooth boundary.

B3g—40 to 65 inches, mottled light brownish-gray (10YR 6/2), light yellowish-brown (10YR 6/4), and gray (10YR 6/1) silty clay loam; weak, medium, subangular blocky structure; firm; plastic and sticky when wet; few patchy clay films; common black concretions; strongly acid.

The A horizon ranges from 6 to 12 inches in thickness and from brown to dark grayish brown in color. At a depth below about 36 to 40 inches, the grayish color of the mottles becomes dominant.

Beason silt loam (Bm).—This nearly level soil is on low terraces, mainly on the Cumberland River flood plain. Areas range from 5 to 50 acres.

Included with this soil in mapping are a few small areas of poorly drained soils that have a gray subsoil. Also included are a few small areas of moderately well drained soils that have a dark yellowish-brown, strong-brown, or yellowish-brown subsoil.

This soil is wet late in winter and early in spring. Seedbed preparation and planting are often delayed in spring.

If this soil is limed and fertilized and the surface water is removed, it is suited to several kinds of crops. It can be used for soybeans or some other crop every year. It is poorly suited to alfalfa and other deep-rooted crops. The response to lime and fertilizer is good. Capability unit IIIw-1; woodland group 3w8.

Bedford Series

The Bedford series consists of moderately well drained soils that have a fragipan. These soils are on broad, gently sloping uplands, mainly in the northern part of the county. The upper 2 or 3 feet of these soils formed in loess, and the part below the fragipan formed in old alluvium or in limestone residuum. Slopes range from 2 to 5 percent.

In a representative profile the surface layer is brown silt loam about 8 inches thick. The subsoil is about 52 inches thick. In sequence from the top, the upper 16 inches is brown, friable silt loam. The next 8 inches is a fragipan of mottled light-gray, strong-brown, yellowish-red, dark-brown, and light yellowish-brown silt loam that is firm and brittle. Below this is 4 inches of mottled yellowish-red, light-gray, and yellowish-brown silty clay loam over 10 inches of dark-red silty clay loam that has gray, light yellowish-brown, and strong-brown mottles. The lower 14 inches is dark-red clay that has gray, brownish-yellow, and yellowish-red mottles.

In unlimed areas these soils are strongly acid throughout. Permeability is moderate above the fragipan but is slow in the fragipan. These soils are slightly waterlogged above the fragipan at times during rainy periods.

Most areas of these soils are used for crops commonly grown in the county. Some areas are on the Fort Campbell Military Reservation.

Representative profile of Bedford silt loam, 2 to 5 percent slopes:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; abrupt, smooth boundary.

B1—8 to 15 inches, brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; common fine roots; few 1-inch root channels filled with very pale-brown silt; few, very fine, reddish-brown and black concretions; strongly acid; clear, smooth boundary.

B21t—15 to 24 inches, brown (7.5YR 4/4) silt loam; common, fine, faint, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; thin clay films on ped faces; few, fine, reddish-brown and black concretions; strongly acid; clear, smooth boundary.

Bx—24 to 32 inches, mottled light-gray (10YR 7/1), strong-brown (7.5YR 5/6), dark-brown (7.5YR 4/4), yellowish-red (5YR 4/6), and light yellowish-brown (10YR 6/4) silt loam; moderate, medium, angular blocky structure; firm; brittle; common, small block concretions; strongly acid; gradual, smooth boundary.

IIB22t—32 to 36 inches, mottled yellowish-red (5YR 4/6), light-gray (10YR 7/1), and yellowish-brown (10YR 5/6) silty clay loam; friable; weak, medium, subangular blocky structure; firm; slightly brittle; strongly acid; clear, smooth boundary.

IIB23t—36 to 46 inches, dark-red (2.5YR 3/6) silty clay loam; common, fine, prominent, gray (10YR 6/1), light yellowish-brown (10YR 6/4), and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; few, fine, black concretions; strongly acid; clear, smooth boundary.

IIB24t—46 to 60 inches, dark-red (2.5YR 3/6) clay; common, medium, gray (10YR 6/1), yellowish-red (5YR 4/6), and brownish-yellow (10YR 6/6) mottles; moderate, medium, subangular blocky structure; firm; few, fine, black concretions; strongly acid.

The mantle of loess is about 2 or 3 feet thick. Depth to the fragipan ranges from about 20 to 32 inches. The Ap

horizon ranges from 6 to 10 inches in thickness. It is slightly acid. The B21t horizon ranges from brown to strong brown and from silt loam to silty clay loam. The fragipan ranges from silt loam to silty clay loam. It ranges from about 6 to 18 inches in thickness. The IIB horizon ranges from dark red to yellowish red. The content of chert in the IIB horizon is as much as 30 percent, by volume.

Bedford silt loam, 2 to 5 percent slopes (BnB).—This soil is on broad uplands, mainly in the northern part of the county. Most areas range from 3 to 10 acres.

Included with this soil in mapping are a few small areas of soils that do not have a fragipan, small areas of severely eroded soils that have a strong-brown surface layer, and small areas of soils that have slopes of slightly more than 5 percent.

This soil is suited to most crops commonly grown in the county. It is well suited to small grain, soybeans, tall fescue, orchardgrass, and white clover, and it is moderately well suited to corn and tobacco. Alfalfa stands become thin after 2 to 3 years. The response to lime, fertilizer, and other management practices is good. Capability unit IIe-2; woodland group 3o7.

Bodine Series

The Bodine series consists of well-drained or excessively drained, steep, cherty soils (fig. 10). Most areas of these soils are adjacent to the Cumberland River flood plain south of Clarksville. The soils formed in residuum derived from cherty limestone. Slopes range from 15 to 45 percent.

In a representative profile the surface layer is yellowish-brown cherty silt loam about 11 inches thick, the uppermost 1 inch is stained darker by organic matter. The subsoil extends to a depth of 65 inches. The upper 14 inches is strong-brown, friable cherty silt loam. The lower 40 inches is light yellowish-brown, friable cherty silt loam.

These soils range from strongly acid to extremely acid. Permeability is moderately rapid, and available water capacity is low. Natural fertility is low.

All but about 1 percent of the areas of these soils are wooded. The 1 percent that has been cleared is idle and is reverting to woodland.

Representative profile of Bodine cherty silt loam, 15 to 45 percent slopes:

A1—0 to 1 inch, very dark grayish-brown (10YR 3, 2) cherty silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

A2—1 to 11 inches, yellowish-brown (10YR 5/4) cherty silt loam; weak, fine and medium, granular structure; very friable; many fine roots; very strongly acid; clear, smooth boundary.

B21t—11 to 19 inches, strong-brown (7.5YR 5/6) cherty silt loam; streaks of yellowish brown (10YR 5/6); weak, fine and medium, subangular blocky structure; friable; thin patchy clay films on some peds; few roots; very strongly acid; clear, smooth boundary.

B22t—19 to 25 inches, strong-brown (7.5YR 5/6) cherty silt loam; weak, fine and medium, subangular blocky structure; friable; thin patchy clay films on peds; 60 percent is chert fragments ½ inch to 4 inches in diameter; very strongly acid; clear, smooth boundary.

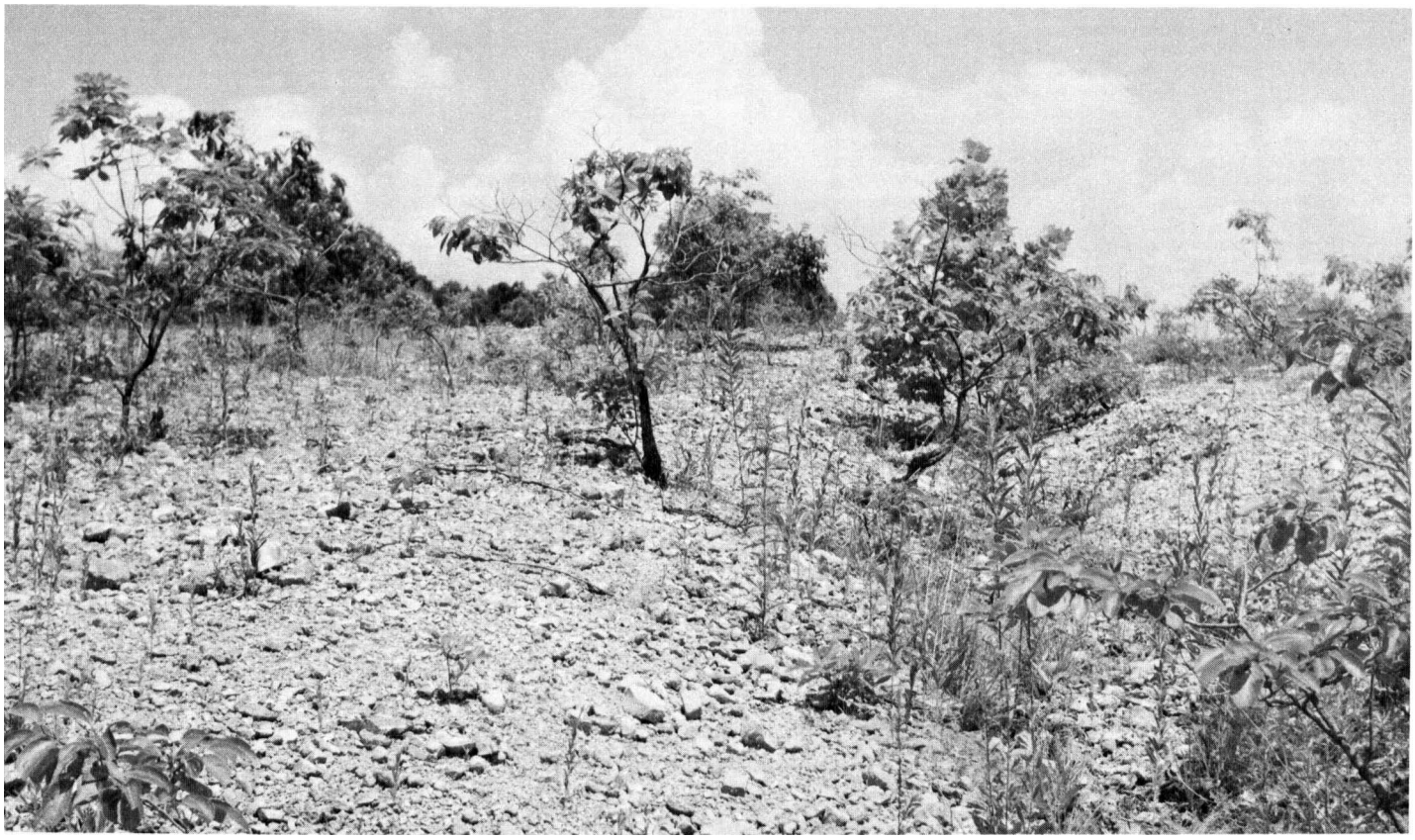

Figure 10.—**Typical surface of Bodine cherty silt loam.**

B23t—25 to 65 inches, light yellowish-brown (10YR 6/4) cherty silt loam; weak, medium, subangular blocky structure; friable; thin patchy clay films on peds and chert fragments; about 60 percent is chert fragments, some of which are 10 inches in diameter; dark concretionary stains on some chert fragments; very strongly acid.

The content of chert fragments ranges from about 20 to 50 percent in the surface layer and from 35 to 70 percent or more in the subsoil. Most chert fragments range from 1 inch to 4 inches in diameter, but a few are more than 12 inches in diameter. Some profiles have a plow layer that is brown or yellowish brown. The B horizon ranges from strong brown to yellowish brown and light yellowish brown. Depth to bedrock is generally 5 to 8 feet.

Bodine cherty silt loam, 15 to 45 percent slopes (BoF).—This soil is on hillsides. Most areas border the Cumberland River flood plain south of Clarksville. This soil formed in material weathered from cherty limestone.

Included with this soil in mapping are some areas of soils where cherty limestone bedrock is exposed, especially along the escarpment adjacent to the Cumberland River flood plain. Also included are areas of soils where depth to bedrock is less than 5 feet.

This soil is too cherty and too steep for tilled crops, but it is suited to trees. Only about 1 percent of the acreage has been cleared. Capability unit VIIs-1; woodland group 4f3.

Brandon Series

The Brandon series consists of gently sloping, sloping, and hilly, well-drained soils on ridgetops and side slopes. These soils are mainly west of the Cumberland River. They formed mainly in a mantle of loess that is underlain by a gravelly layer. Slopes range from 2 to 20 percent.

In a representative profile the surface layer is brown silt loam about 10 inches thick; the upper 2 inches is stained dark by organic matter. The subsoil extends to a depth of 70 inches or more. The upper 2 inches is dark-brown, friable silt loam. The next 16 inches is yellowish-red, friable silty clay loam. The next 14 inches is yellowish-red, firm, gravelly silty clay loam. The lower 28 inches is red, firm cherty clay.

In unlimed areas these soils are strongly acid or very strongly acid throughout. Permeability is moderate. Roots penetrate easily to the gravelly layer. Tilth is good. The available water capacity is medium.

Most areas of the gently sloping soils are cleared and are used for most crops commonly grown in the county. About 60 percent of the acreage of sloping and hilly soils has been cleared and is used mainly for tobacco, corn, hay, and pasture. About 40 percent of the acreage of hilly soils is wooded.

Representative profile of Brandon silt loam, 2 to 5 percent slopes:

A1—0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

A2—2 to 10 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1—10 to 12 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, granular and subangular blocky structure; friable; few fine roots; strongly acid; clear, smooth boundary.

B21t—12 to 28 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; friable; thin discontinuous clay films; very strongly acid; abrupt, smooth boundary.

IIB22t—28 to 42 inches, yellowish-red (5YR 4/6) gravelly silty clay loam; moderate, medium, subangular blocky structure; firm; 50 to 60 percent rounded and angular chert pebbles ¼ inch to 2 inches in diameter; very strongly acid; clear, smooth boundary.

IIIB23t—42 to 70 inches, red (2.5YR 4/6) cherty clay; strong, medium, angular blocky structure; firm; few spots of light-gray (10YR 6/1) and reddish-yellow (7.5YR 7/6) weathered chert fragments; continuous clay films; very strongly acid.

The mantle of loess ranges from 18 to 40 inches in thickness. The gravelly layer ranges from 5 to 18 inches in thickness. The content of coarse fragments in the gravelly layer ranges from 40 to 70 percent, by volume. The Ap horizon is yellowish-brown or reddish-brown silt loam or silty clay loam in severely eroded areas. The A2 horizon ranges from 4 to 10 inches in thickness. The B21t horizon is yellowish red, strong brown, dark brown, or, in a few places, yellowish brown. The IIB22t horizon is yellowish red or strong brown. The IIIB23t horizon is red, yellowish-red, or dark-red, firm or very firm cherty clay.

Brandon silt loam, 2 to 5 percent slopes (BrB).—This soil is on broad rounded hilltops on uplands. The profile of this soil is the one described as representative of the series.

Included with this soil in mapping are a few small areas of soils that have gravel scattered throughout the profile and a few areas of soils where slopes are more than 5 percent. Also included are a few areas of soils that have a fragipan at a depth of about 24 inches. A few areas of severely eroded soils that have a surface layer of silty clay loam are included.

This soil is easy to work. Available water capacity is medium. Only a few roots can penetrate into the gravelly layer, and the rooting zone is limited largely to the upper 28 inches.

This soil is suited to all the crops commonly grown in the county. The gentle slope is the main management concern. Capability unit IIe-1; woodland group 3o7.

Brandon silt loam, 5 to 12 percent slopes (BrC).—This soil is on narrow ridgetops on uplands, mainly west of the Cumberland River. It formed in a layer of loess 2 to 3 feet thick and in underlying gravelly and clayey material. Areas are mainly 5 to 20 acres. The surface layer is brown silt loam about 6 to 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish-red, friable silty clay loam in the upper part; strong-brown and yellowish-red, firm gravelly silty clay loam in the middle part; and red, firm or very firm cherty clay in the lower part.

Included with this soil in mapping are a few areas of soils that lack a gravelly layer and some areas in which gravel is scattered throughout the mantle of loess. Also included are a few areas of soils that have a fragipan and some areas of severely eroded soils where the mantle of loess is less than 15 inches thick over the gravelly layer.

This soil is easy to work. Available water capacity is medium. The root zone is moderately deep.

This soil is well suited to small grain. It is only moderately well suited to the other crops commonly grown in the county, because most plant growth occurs in summer, when moisture is limited. It is well suited to hay crops and pasture. Response to management is

fairly good. Providing adequate fertilization and controlling erosion are the main management concerns. Capability unit IIIe-1; woodland group 3o7.

Brandon silt loam, 10 to 20 percent slopes, eroded (BrD2).—This soil is on short hillsides on uplands. It formed in a layer of loess and in underlying gravelly and clayey material. Areas are 6 to 8 acres in size. The surface layer is brown silt loam about 4 to 7 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish-red, friable silty clay loam in the upper part; strong-brown and yellowish-red, firm gravelly silty clay loam in the middle part; and red or dark-red, firm cherty clay in the lower part.

Included with this soil in mapping are a few areas of severely eroded soils that have a surface layer of yellowish-brown silty clay loam or silt loam. Included also are a few areas of soils where slopes are slightly less than 10 percent and a few areas of soils that have chert or gravel scattered throughout the profile.

Available water capacity is medium. The root zone is moderately deep.

Because of steepness of slope and susceptibility to further erosion, this soil is better suited to permanent pasture or to hay than to cultivated crops. Cultivated crops are moderately well suited if grown in a long-term cropping system. Providing adequate fertilization and controlling erosion are the main management concerns. Capability unit IVe-1; woodland group 3o7.

Cannon Series

The Cannon series consists of deep, well-drained, nearly level, cherty soils along streams and small drainageways and in depressions on uplands. These soils formed in recent material washed from soils derived from cherty limestone and loess. Slopes are less than 2 percent.

In a representative profile the soil is dark-brown cherty silt loam that extends to a depth of 60 inches or more. Mottles in shades of brown and yellow occur at a depth below 33 inches.

These soils are medium acid to neutral in reaction throughout. The root zone is deep. Permeability is moderately rapid. Because of the chert fragments, available water capacity is medium. These soils are subject to occasional flooding.

Most areas of these soils are cleared and are used mainly for corn and pasture. A few irregularly shaped areas and areas of difficult access are wooded.

Representative profile of Cannon cherty silt loam:

Ap—0 to 10 inches, dark-brown (10YR 3/3) cherty silt loam; moderate, fine, granular structure; very friable; slightly acid; clear, smooth boundary.

A12—10 to 22 inches, dark-brown (10YR 3/3) cherty silt loam; moderate, fine, granular structure; friable; neutral; gradual, smooth boundary.

A13—22 to 33 inches, dark-brown (10YR 3/3) cherty silt loam; moderate, fine, granular and subangular blocky structure; friable; neutral; gradual, smooth boundary.

A14—33 to 42 inches, dark-brown (10YR 3/3) cherty silt loam; common, medium, distinct mottles of yellowish brown (10YR 5/4), reddish brown (5YR 4/4), and dark yellowish brown (10YR 4/4); weak, fine, granular and subangular blocky structure; friable; neutral; clear, smooth boundary.

B21—42 to 50 inches, dark-brown (7.5YR 4/4) cherty silt loam; common, medium mottles of pale brown (10YR 6/3) and yellowish brown (10YR 5/4); weak, fine and medium, granular and subangular blocky structure; friable; neutral; clear, smooth boundary.

B22—50 to 60 inches, dark-brown (10YR 3/3) cherty silt loam; weak, fine and medium, subangular blocky structure; very friable; neutral.

The sediment ranges from about 3 to 10 feet or more in thickness. Some stratification occurs in many profiles; stratification is more prominent and is at a shallower depth in areas along the smaller permanent streams and intermittent streams. The A horizon ranges from 24 to 45 inches in thickness. The content of coarse fragments in the A horizon ranges from about 15 to 30 percent, by volume. The B horizon is dark brown, brown, or very dark grayish brown. It commonly is cherty silt loam, but in a few places it is silt loam, fine sandy loam, loam, gravelly silt loam, or silty clay loam. The content of chert or gravel in the B horizon ranges from about 10 to 35 percent.

Cannon cherty silt loam (Ca).—This nearly level soil is on first bottoms and in depressions on uplands. Areas are irregular in shape and range from 2 to 10 acres. This soil has chert fragments scattered throughout.

Included with this soil in mapping are a few areas of soils that have a brown surface layer and a few areas that are less than 15 percent chert fragments, by volume.

The high content of chert makes this soil slightly droughty. Some areas are flooded once or twice each year, but the water recedes rapidly and flooding seldom lasts for more than a few hours. Flooding generally occurs late in winter or early in spring.

This soil is suited to pasture plants and to crops commonly grown in the county. Crops can be grown every year. In areas where flooding is a hazard, this soil is better suited to annual crops that are grown in summer than it is to such crops as small grain. The response to management is good. Capability unit IIs-1; woodland group 2o7.

Crider Series

The Crider series consists of deep, well-drained, gently sloping soils on uplands. These soils are in the north-central, central, and northeastern parts of the county. The upper 2 or 3 feet of these soils formed in loess, and the lower part, to a depth of 65 inches or more, formed in residuum or old alluvium. Slopes range from 2 to 8 percent.

In a representative profile the surface layer is dark-brown silt loam about 9 inches thick. The subsoil extends to a depth of 65 inches or more. It is brown, friable silt loam in the upper 11 inches; brown and reddish-brown, friable silty clay loam in the middle 17 inches; and dark-red, firm clay in the lower 28 inches.

In unlimed areas these soils are medium acid to strongly acid throughout. Permeability is moderate, and available water capacity is high. The root zone is deep.

Most areas of these soils are used for row crops. These soils are among the ones preferred for growing high-value cash crops such as tobacco, soybeans, and corn, because they are gently sloping and are suited to these crops. The response to management is very good.

Representative profile of Crider silt loam, 2 to 8 percent slopes:

Ap—0 to 9 inches, dark-brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable; many fine roots; medium acid; clear, smooth boundary.
B1—9 to 15 inches, brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; many fine roots; medium acid; gradual, smooth boundary.
B21t—15 to 20 inches, brown (7.5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; few thin clay films; strongly acid; gradual, smooth boundary.
B22t—20 to 28 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; common clay films; pale-brown silt coatings on some peds; few, small, black concretions; strongly acid; gradual, smooth boundary.
B23t—28 to 37 inches, reddish-brown (5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; common clay films; pale-brown silt coatings on some peds; few, small, black concretions; strongly acid; gradual, smooth boundary.
IIB24t—37 to 45 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm; common clay films; pale-brown silt loam coatings on some peds; few, small, black concretions; strongly acid; gradual, smooth boundary.
IIB25t—45 to 65 inches, dark-red (2.5YR 3/6) clay; few, medium, distinct, yellowish-red (5YR 4/6) and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; common clay films; few, small, black concretions; strongly acid.

The Ap horizon ranges from 6 to 12 inches in thickness. The B22t and B23t horizons are brown, reddish brown, or yellowish red. Depth to bedrock is more than 10 feet.

Crider silt loam, 2 to 8 percent slopes (CrB).—This soil is in broad areas on uplands in the north-central, central, and northeastern parts of the county.

Included with this soil in mapping are a few areas of soils that have slopes of less than 2 percent and a few areas that have slopes of more than 8 percent.

The root zone is deep. This soil is easy to work.

This soil is well suited to all crops commonly grown in the county, and it is used mostly for row crops. Because this soil is gently sloping and is suitable for a wide range of crops, it is among the soils preferred for growing high-value cash crops, such as tobacco, soybeans, and corn. Crops respond extremely well to management. Capability unit IIe-1; woodland group 2o7.

Cumberland Series

The Cumberland series consists of deep, well-drained, gently rolling to moderately steep soils on low hills. Some areas are deeply pitted by limestone sinks. These soils formed in old alluvium and in residuum of cherty limestone. Slopes range from 5 to 12 percent.

In a representative profile the surface layer is dark reddish-brown silty clay loam about 5 inches thick. The subsoil, which extends to a depth of 65 inches or more, is dark-red, firm clay.

In unlimed areas, these soils are medium acid to strongly acid. Permeability is moderate, and available water capacity is medium.

Most areas of these soils are used for pasture. The larger, less sloping areas are used for corn, small grain, and hay.

Representative profile of Cumberland silty clay loam, 5 to 12 percent slopes, eroded:

Ap—0 to 5 inches, dark reddish-brown (5YR 3/4) silty clay loam, and some dark-red (2.5YR 3/6) material from B21t horizon; weak, medium, granular and subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.
B21t—5 to 22 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm; many thin clay films; dark stains on some peds; common, small, hard, black concretions; strongly acid; gradual, smooth boundary.
B22t—22 to 50 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm; common clay films; few, small, hard, black concretions; strongly acid; gradual, smooth boundary.
B23t—50 to 65 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm; common clay films; common black stains on some peds; common, small, black concretions; few small chert fragments; strongly acid.

Depth to bedrock is 10 feet or more. Dark-colored concretions range from none to many in each horizon.

Cumberland silty clay loam, 5 to 12 percent slopes, eroded (CsC2).—This soil is on short hillsides. Many areas are on the rims of limestone sinks and depressions. This soil is mainly in the northern and eastern parts of the county. As a result of many years of cropping, much of the original silt loam surface layer and, in some places, the upper 10 inches of the subsoil have washed away.

Included with this soil in mapping are a few small areas of similar soils that are more than 15 percent chert fragments throughout. Also included are a few areas of uneroded soils where the original surface layer of dark reddish-brown silt loam remains.

This soil can be worked only in a narrow range of moisture content. It clods if worked when it is too wet or too dry. This soil is difficult to keep in good tilth.

This soil is only moderately well suited to row crops, because of steepness of slope, the moderately clayey plow layer, and medium available water capacity. This soil is moderately fine textured, is susceptible to further erosion, and has medium available water capacity; consequently, stands are difficult to establish and to maintain. If this soil is limed and fertilized, it is fairly well suited to grasses and legumes for hay and pasture and to some grain crops. Capability unit IVe-1; woodland group 4c3e.

Cumberland Series, Cherty Variant

The Cumberland series, cherty variant consists of deep, well-drained soils that have chert fragments throughout. These soils are on short hillsides and rims around limestone sinks. They formed in old alluvium and in residuum of cherty limestone. Slopes range from 10 to 25 percent.

In a representative profile the surface layer is dark reddish-brown cherty silty clay loam about 6 inches thick. The subsoil, which extends to a depth of 65 inches, is dark-red firm cherty clay.

In unlimed areas these soils are medium acid to strongly acid throughout. Permeability is moderate, and available water capacity is medium to low.

Most areas of these soils are used for pasture.

Representative profile of Cumberland soils, cherty variant, 10 to 25 percent slopes, eroded:

Ap—0 to 6 inches, dark reddish-brown (5YR 3/4) cherty silty clay loam and some dark-red (2.5YR 3/6) from B21t; weak, medium, granular and subangular blocky

structure; friable; many fine roots; strongly acid; about 20 percent, by volume, is chert fragments as much as 3 inches in diameter; clear; smooth boundary.

B21t—6 to 20 inches, dark-red (2.5YR 3/6) cherty clay; moderate, medium, subangular blocky structure; firm; many thin clay films; strongly acid; about 20 percent, by volume, is chert fragments as much as 3 inches in diameter; gradual, smooth boundary.

B22t—20 to 45 inches, dark-red (2.5YR 3/6) cherty clay; moderate, medium, subangular blocky structure; firm; common clay films; few, small, hard, black concretions; strongly acid; about 30 percent, by volume, is chert fragments as much as 3 inches in diameter; gradual, smooth boundary.

B23t—45 to 65 inches, dark-red (2.5YR 3/6) cherty clay; moderate, medium, subangular blocky structure; firm; common clay films; common black stains on some faces of peds; common, small, black concretions; strongly acid; about 25 percent, by volume, is chert fragments as much as 3 inches in diameter.

Depth to bedrock is 10 feet or more. The content of chert in each horizon ranges from 15 to 35 percent, by volume. The Ap horizon ranges from 4 to 6 inches in thickness.

Cumberland soils, cherty variant, 10 to 25 percent slopes, eroded (CuD2).—This soil is on short hillsides and around limestone sinks. It has a clayey subsoil. Much of the original surface layer has been removed by erosion.

Included with this soil in mapping are a few small areas of soils that are less than 15 percent chert fragments throughout, a few areas of soils in which nearly all of the original surface layer of silt loam remains, and a few small areas of soils that have a yellowish-red or red cherty clay subsoil. Also included are some areas of soils that have a few shallow gullies.

Available water capacity is medium to low. This soil is difficult to work and to keep in good tilth, because of steepness of slope, moderately fine texture, and a high content of chert fragments in the surface layer. It clods if worked when it is too wet or too dry.

Because of steepness of slope, susceptibility to further erosion, medium to low available water capacity, and a high content of chert fragments, this soil is poorly suited to row crops. If this soil is fertilized, limed, and otherwise well managed, it is moderately well suited to pasture, hay, and small grain. Response to management is fair. Capability unit VIe-1; woodland group 3o7.

Dickson Series

The Dickson series consists of moderately well drained soils that have a fragipan. These are gently sloping and sloping soils on broad uplands (fig. 11). They are scattered throughout the county, but they are mainly in the northwestern and east-central parts of the county. Slopes range from 1 to 8 percent.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The subsoil, to a depth of about 24 inches, is mainly yellowish-brown, friable silt loam. Between depths of 24 and 45 inches is a fragipan of yellowish-brown silt loam that is mottled in shades of gray and brown and is hard and brittle when dry. Below the fragipan, and extending to a depth of 60 inches or more, is mottled red, yellowish-red, pale-brown, and light brownish-gray, firm silty clay loam.

In unlimed areas these soils are strongly acid or very strongly acid throughout. Permeability is moderately slow, and available water capacity is medium.

Areas of these soils are used for all crops commonly grown in the county.

Figure 11.—Raising beef cattle on a Dickson silt loam.

Representative profile of Dickson silt loam, 1 to 4 percent slopes:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; many fine roots; medium acid; clear, smooth boundary.

B2—6 to 21 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; common fine roots; very strongly acid; clear, smooth boundary.

A'2—21 to 24 inches, pale-brown (10YR 6/3) silt loam; many, medium, yellowish-brown (10YR 5/6), light brownish-gray (10YR 6/2), and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

Bx—24 to 45 inches, yellowish-brown (10YR 5/6) silt loam; common, medium, distinct, light brownish-gray (10YR 6/2), strong-brown (7.5YR 5/6), light yellowish-brown (2.5Y 6/4), and gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm and brittle; few seams of gray (10YR 5/1) clay; thin patchy clay films; few reddish-brown concretions; very strongly acid; clear, smooth boundary.

IIB2t—45 to 60 inches, mottled red (2.5YR 4/6), yellowish-red (5YR 4/6), pale-brown (10YR 6/3), and light brownish-gray (10YR 6/2) silty clay loam; moderate, medium, angular and subangular blocky structure; firm; continuous clay films; very strongly acid.

The mantle of loess is about 2 to 3 feet thick. Depth to the fragipan commonly is about 24 inches but ranges from 18 to 36 inches. The Ap horizon ranges from 4 to 8 inches in thickness. It ranges from brown to dark grayish brown or dark yellowish brown. The Bx horizon ranges from yellowish brown to light olive brown and is silt loam or silty clay loam. The IIBt2 horizon is dominantly red, yellowish red, or strong brown and has grayish and brownish mottles. It ranges from silty clay loam to clay. The content of chert fragments in this horizon ranges from a few to about 30 percent, by volume.

Dickson silt loam, 1 to 4 percent slopes (DsB).—This soil is on uplands. Areas range from 5 to 150 acres. The profile of this soil is the one described as representative of the series.

Included with this soil in mapping are a few areas of soils that do not have a fragipan and a few small areas that have a gravelly fragipan about 5 to 18 inches thick. Also included are a few areas of soils that have a subsoil of light yellowish-brown silt loam and a few areas that have a subsoil that is strong brown in the upper part. A few areas of severely eroded soils that have a surface layer of yellowish-brown silt loam are included.

The upper 24 inches of this soil is easily penetrated by roots, water, and air. The fragipan restricts roots and slows the movement of water. Because drainage is moderately slow in the fragipan, the soil is waterlogged during rainy periods. This soil is slightly droughty in summer.

This soil is suited to most crops commonly grown in the county. It is moderately well suited to tobacco, soybeans, and corn. Alfalfa generally lasts only 2 or 3 years. Tobacco should be grown only where this soil is sloping enough for surface drainage. The response to management is good. Capability unit IIe-2; woodland group 3o7.

Dickson silt loam, 4 to 8 percent slopes (DsC).—This soil is on broad uplands. Areas range from 3 to 15 acres. The surface layer is brown silt loam about 4 to 7 inches thick. The subsoil, to a depth of about 22 inches, is yellowish-brown, friable silt loam. Between depths of 22 to 45 inches is a fragipan of yellowish-brown light silty clay loam that is mottled in shades of gray and is hard and brittle when dry. Below the fragipan, and extending to a depth of 60 inches or more, is strong-brown and yellowish-red silty clay loam or clay mottled in shades of gray and brown. This layer is cherty in many places.

Included with this soil in mapping are a few spots of severely eroded soils that have a surface layer of yellowish-brown silt loam and a few soils where depth to the fragipan is less than that in this soil. Also included are a few small areas of soils that have a gravelly fragipan about 6 to 15 inches thick and a few small areas that have a strong-brown subsoil.

Permeability is moderate above the fragipan, but the fragipan retards further penetration of water and roots. Available water capacity is medium.

This soil is suited to most crops commonly grown in the county, and it is well suited to small grain. It is moderately well suited to corn, tobacco, and other row crops because it is susceptible to erosion and is droughty in summer. Almost all hay and pasture plants, except alfalfa, grow well on this soil. Alfalfa generally grows well, but after about 2 years the stand becomes thin. Capability unit IIIe-2; woodland group 3o7.

Egam Series

The Egam series consists of deep, moderately well drained and well drained soils on flood plains of the Cumberland River and large tributary streams. These soils formed in sediment washed from soils derived from loess and limestone. Slope is less than 2 percent.

In a representative profile the surface layer is about 24 inches thick. It is very dark grayish-brown silt loam in the upper 10 inches and very dark grayish-brown silty clay loam in the lower 14 inches. The subsoil, which extends to a depth of 60 inches or more, is dark-brown, firm silty clay loam in the upper part and dark-brown, firm silty clay in the lower part.

These soils are medium acid to neutral. Available water capacity is high, runoff is slow, and permeability is moderately slow. A seasonal water table is within a depth of about 2 feet of the surface at times during wet seasons. These soils are occasionally flooded on the tributary stream bottoms but are only rarely flooded on the Cumberland River bottoms.

Almost all areas of these soils are cleared and are used mainly for row crops, but hay and pasture are also grown.

Representative profile of Egam silt loam:

Ap—0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine and medium, granular and subangular blocky structure; friable; many fine roots; medium acid; clear, smooth boundary.

A1—10 to 24 inches, very dark grayish-brown (10YR 3/2) silty clay loam; few, fine, distinct, dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; friable; common, fine roots in upper part; medium acid; clear, smooth boundary.

B21—24 to 32 inches, dark-brown (10YR 3/3) silty clay loam; moderate, medium, subangular and angular blocky structure; firm; few, fine, reddish-brown and black stains; medium acid; clear, smooth boundary.

B22—32 to 60 inches, dark-brown (10YR 4/3) silty clay; few, fine, distinct, dark-brown (7.5YR 4/4) mottles; strong, medium, angular blocky structure; firm; few, fine, black concretions; medium acid.

The A horizon ranges from very dark grayish brown to dark brown. The B horizon ranges from dark brown to very dark grayish brown, but in a few places it is brown. In many places it has grayish mottles.

Egam silt loam (Eg).—This nearly level soil is on bottom lands along the Cumberland River and its larger tributaries. It formed in alluvium washed mainly from loess and limestone.

Included with this soil in mapping are a few small areas of soils that are silt loam throughout and a few that have gray mottles at a depth of about 20 inches. Also included are a few areas of soils that have a yellowish-brown subsoil that has gray mottles.

This soil is fertile and productive. It has a narrow range of moisture content for suitable workability. It clods if it is worked when too wet or too dry.

This soil is well suited to row crops, hay, and pasture, and most of the acreage is used for these purposes. If this soil is well managed, it can be used intensively for crops. The hazard of flooding is a seasonal limitation in most places. Capability unit IIw-1; woodland group 2o7.

Forestdale Series

The Forestdale series consists of poorly drained, nearly level soils on low terraces of the Cumberland River. These soils are in the lowest position on the terraces.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The upper 7 inches of the subsoil is gray, firm silty clay loam mottled in shades of brown. Below this, and extending to a depth of 60 or more inches, the subsoil is gray, very firm and plastic clay mottled in shades of brown and red.

These soils are medium acid or strongly acid throughout. Permeability is very slow, and runoff is slow. Available water capacity is medium. The clayey subsoil restricts the movement of roots, water, and air. These soils have an excess of water in winter and early in spring, and some areas are ponded for short periods.

Most areas of these soil are cleared and are used mainly for soybeans and summer pasture. A few large areas are wooded.

Representative profile of Forestdale silt loam:

Ap—0 to 6 inches, dark grayish-brown (2.5Y 4/2) silt loam; common, medium mottles of brown (10YR 4/3) and gray (10YR 5/1); weak, fine, granular and subangular blocky structure; friable; many fine roots; many worm casts; medium acid; gradual, smooth boundary.

B21g—6 to 13 inches, gray (10YR 5/1) silty clay loam; common, fine, distinct mottles of strong brown (7.5YR 5/6) and brown (10YR 4/3); moderate, medium, subangular blocky structure; firm; few roots; common, black concretionary stains; medium acid; gradual, smooth boundary.

B22tg—13 to 26 inches, gray (10YR 5/1) clay; common, medium, prominent mottles of strong brown (7.5YR 5/6) and few, fine, prominent mottles of yellowish red (5YR 4/6); weak, medium, angular blocky structure; plastic; very firm; few roots; clay films on faces of peds; common, fine, reddish-brown concretions and a few pebbles; medium acid; gradual, smooth boundary.

B23tg—26 to 48 inches, gray (10YR 5/1) clay; common, medium, prominent mottles of strong brown (7.5YR 5/6) and yellowish-red (5YR 4/6); weak, medium and coarse, angular blocky structure; very firm; plastic; common, small, reddish-brown concretions; clay films on faces of peds; medium acid; gradual, smooth boundary.

B24tg—48 to 60 inches, gray (10YR 5/1) clay; common, medium, prominent mottles of strong brown (7.5YR 5/6) and yellowish red (5YR 4/6) and few, fine, faint mottles of yellowish brown; weak, coarse, angular blocky structure; very firm; plastic; clay films on faces of some peds; many, small, reddish-brown concretions; medium acid.

The Ap horizon ranges from 5 to 10 inches in thickness. It ranges from dark grayish brown to grayish brown and light brownish gray. The B horizon ranges from gray to dark gray and from clay to silty clay loam. The number of reddish-brown and black concretions increases with depth.

Forestdale silt loam (Fo).—This nearly level soil is on low terraces of the Cumberland River. Most areas range from 10 to 75 acres.

Included with this soil in mapping are a few small areas of soils that have a subsoil of light yellowish-brown silty clay loam.

This soil is suited to tall fescue, white clover, common lespedeza, soybeans, grain sorghum, and other crops that can be planted late. This soil is difficult to drain, because the subsoil is very slowly permeable. Capability unit IIIw-1; woodland group 1w6.

Guthrie Series

The Guthrie series consists of poorly drained soils that have a fragipan. These soils formed in silty material on upland flats and in level depressions. Slopes are less than 2 percent.

In a representative profile the surface layer is dark grayish-brown and light brownish-gray silt loam about 8 inches thick. The upper 15 inches of the subsoil is dominantly gray, friable silt loam. Between depths of 23 and 65 inches is a fragipan. It is gray, firm, brittle silt loam in the upper part. The lower part is dark-gray and gray, firm, brittle silty clay loam that is mottled in shades of brown, yellow, and gray.

In unlimed areas these soils are strongly acid or very strongly acid. The subsoil is poorly aerated and is slowly permeable. Runoff is very slow, and many areas are commonly ponded for short periods. During long, dry periods the soil is droughty and the subsoil becomes hard and dry.

Nearly all of the acreage of these soils is in woodland or pasture. A very small acreage is used for corn, soybeans, and other crops.

Representative profile of Guthrie silt loam:

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, faint and distinct mottles of gray (10YR 6/1) and strong brown (7.5YR 5/6); weak, fine, granular structure; very friable; many roots; strongly acid; abrupt, wavy boundary.

A2—3 to 8 inches, light brownish-gray (10YR 6/2) silt loam; common, medium, gray (10YR 5/1) and strong-brown (7.5YR 5/6) mottles; weak, medium, granular structure; friable; many roots; very strongly acid; clear, wavy boundary.

B1g—8 to 17 inches, gray (10YR 6/1) silt loam; common, medium, distinct, dark-brown (7.5YR 4/4), yellowish-brown (10YR 5/6), and gray (10YR 5/1) mottles; weak, medium and fine, subangular blocky structure; friable; common roots; very strongly acid; clear, smooth boundary.

B2g—17 to 23 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6), dark yellowish-brown (10YR 4/4), and gray (10YR 5/1) mottles; some platy structure in places parting to

moderate, medium, subangular blocky; friable; common roots; few fine pores; very strongly acid; clear, wavy boundary.

Bx1—23 to 27 inches, gray (10YR 5/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) and dark-brown (7.5YR 4/4) mottles; weak, medium, subangular blocky structure parting to massive; firm; brittle; few roots; many fine pores and vesicles; few, small, dark-brown and black concretions; very strongly acid; clear, irregular boundary.

Bx2—27 to 35 inches, dark-gray (10YR 4/1) and gray (10YR 5/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6), strong-brown (7.5YR 5/6), and gray (10YR 6/1) mottles; moderate, medium, angular and subangular blocky structure; firm; brittle; few small roots; few fine pores and vesicles; few, small, reddish-brown concretions; few thin clay films on some ped faces; very strongly acid; gradual, wavy boundary.

Bx3—35 to 41 inches, dark-gray (10YR 4/1) silty clay loam; few, medium, distinct, yellowish-brown (10YR 5/6) and reddish-brown (5YR 4/4) mottles; moderate, medium, angular and subangular blocky structure; firm; brittle; thin patchy clay films on ped faces; few vertical veins or streaks of gray silt loam and silty clay about one-fourth inch wide; few fine pores; few vesicles or voids; very strongly acid; clear, wavy boundary.

Bx4—41 to 65 inches, dark-gray (10YR 4/1) silty clay loam; common, medium, light-gray (10YR 7/1), white (2.5Y 8/0), olive-brown (2.5Y 4/4), and strong-brown (7.5YR 5/6) mottles; weak, coarse, subangular blocky structure; firm; brittle; common, thin, patchy clay films on ped faces; vertical veins of gray silt loam and silty clay about one-fourth inch wide; few, small, reddish-brown concretions; few chert fragments; very strongly acid.

Depth to the fragipan averages about 25 inches but ranges from about 18 to 30 inches. The fragipan ranges from 25 to 50 inches in thickness. The A1 horizon in wooded areas ranges from dark grayish brown to very dark gray and gray. In cultivated areas, the Ap horizon is grayish brown or dark grayish brown. The Bx horizon, or fragipan, is silt loam or silty clay loam. In most places it is chert free, but in some places it is as much as 6 to 8 percent chert fragments, by volume.

Guthrie silt loam (Gu).—This nearly level soil has a fragipan. It formed in loess on upland flats and in depressions where standing water drains slowly. It commonly is called "Crayfishy land." Areas range from 5 to 50 acres or more.

Included with this soil in mapping are a few small areas of somewhat poorly drained soils that have a yellowish subsoil. Also included are a few areas of soils on which more than 20 inches of recent overwash have accumulated.

Unless this soil is drained, it is poorly suited to many crops. It is suited to tall fescue, white clover, common lespedeza, and soybeans. Drainage outlets are not feasible in many areas. Where outlets are available, open ditches can be used to remove surface water. Capability unit IVw-1; woodland group 2w9.

Humphreys Series

The Humphreys series consists of deep, well-drained, cherty soils on low terraces and foot slopes on uplands. Slopes range from 3 to 10 percent.

In a representative profile the surface layer is dark-brown cherty silt loam about 9 inches thick. The subsoil, to a depth of 24 inches, is brown, friable cherty silt loam. Below this, to a depth of about 40 inches, it is reddish-brown, friable cherty silty clay loam. The underlying material, which extends to a depth of 60 or more inches, is yellowish-brown, friable cherty silt loam.

In unlimed areas these soils are strongly acid or very strongly acid. Permeability is moderately rapid. Available water capacity is medium. The root zone is deep and well aerated.

Almost all areas of these soils are cleared and are used for most crops commonly grown in the county. A few irregularly shaped areas are wooded.

Representative profile of Humphreys cherty silt loam, 3 to 10 percent slopes:

Ap—0 to 9 inches, dark-brown (10YR 3/3) cherty silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1—9 to 14 inches, brown (7.5YR 4/4) cherty silt loam; weak, fine, granular and subangular blocky structure; friable; common fine roots; strongly acid; clear, smooth boundary.

B21t—14 to 24 inches, brown (7.5YR 4/4) cherty silt loam; weak, fine, granular and subangular blocky structure; thin patchy clay films; friable; strongly acid; clear, smooth boundary.

B22t—24 to 40 inches, reddish-brown (5YR 4/4) cherty silty clay loam; weak, fine and medium, subangular blocky structure; friable; few thin clay films; strongly acid; clear, smooth boundary.

C—40 to 60 inches, yellowish-brown (10YR 5/6) cherty silt loam; about 40 percent, by volume, is chert fragments; massive; friable; strongly acid.

The content of chert ranges from 15 to 35 percent in the A and B horizons and from 15 to 50 percent, by volume, in the C horizon. The Ap horizon ranges from 5 to 10 inches in thickness. In severely eroded areas, this horizon ranges from very dark grayish brown to dark yellowish brown. It is cherty loam in some places. The B2 horizon ranges from brown and reddish brown to strong brown and, in a few places, to yellowish red.

Humphreys cherty silt loam, 3 to 10 percent slopes (HuB).—This soil is on low terraces along streams and on foot slopes on uplands. Areas are scattered throughout the county and range from 3 to 15 acres.

Included with this soil in mapping are a few small areas of soils that are similar to this soil, but they are less than 15 percent chert throughout. A few areas of severely eroded soils that have a dark yellowish-brown surface layer are included. Also included are a few small areas of soils that have a thick, yellowish-red cherty silty clay loam subsoil. A few areas of soils that have slopes of less than 3 percent are included.

The chert fragments in this soil limit the available water capacity. Tillage and stand establishment are slightly affected by the chert content of the surface layer. This soil is slightly droughty in summer.

This soil is well suited to small grain and most hay and pasture crops, but it is only moderately well suited to other crops. Row crops are the least suited, because they grow mostly in summer, when the moisture content is not optimum. Capability unit IIe-3; woodland group 2o7.

Lax Series

The Lax series consists of moderately well drained soils that have a fragipan. These gently sloping soils are on the broader ridgetops on highly dissected uplands, mainly west of the Cumberland River and south of U.S. Highway No. 79. These soils formed in a layer of loess 2 or 3 feet thick over a gravelly layer 6 to 24

inches thick. Below this gravelly layer is reddish cherty clay many feet thick (fig. 12). Slopes range from 1 to 8 percent.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The subsoil, to a depth of 24 inches, is friable silt loam that is strong brown in the upper part and yellowish brown in the lower part. Between depths of 24 and 39 inches is a fragipan. The upper 4 inches of the pan is yellowish-brown, firm and brittle silty clay loam that is mottled in shades of brown and gray, and the lower 11 inches is yellowish-brown, firm and brittle gravelly silty clay loam that is mottled in shades of gray and brown. Between depths of 39 and 52 inches is red, firm cherty silty clay mottled in pale brown and brownish yellow. Below this, and extending to a depth of 63 inches or more, is red, firm cherty silty clay loam.

In unlimed areas these soils are strongly acid or very strongly acid. Permeability is moderate above the fragipan and slow in the pan. The pan retards further penetration of water and roots. The available water capacity is medium.

Most areas of these soils are cleared and are used for most crops commonly grown in the county. Some areas are wooded. About 20 percent of the acreage is idle and is reverting to woodland.

Representative profile of Lax silt loam, 1 to 4 percent slopes:

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

B21t—6 to 12 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; few thin clay films on faces of peds; strongly acid; gradual, smooth boundary.

B22t—12 to 24 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; clay films on faces of peds; strongly acid; clear, smooth boundary.

Bx—24 to 28 inches, yellowish-brown (10YR 5/6) silty clay loam; many, medium, distinct, light brownish-gray (10YR 6/2), pale-brown (10YR 6/3), and strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm and brittle; few thin clay films on faces of some peds; few small pebbles; strongly acid; clear, smooth boundary.

Figure 12.—Road cut showing profile of a Lax silt loam.

IIBx—28 to 39 inches, yellowish-brown (10YR 5/6) gravelly silty clay loam; many, medium, distinct, light brownish-gray (10YR 6/2), gray (10YR 6/1), and strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; firm; compact and brittle; estimated 60 to 70 percent is pebbles; few, thin, patchy clay films on faces of peds; strongly acid; gradual, smooth boundary.

IIIB22t—39 to 52 inches, red (2.5YR 4/6) cherty silty clay; common, medium, prominent, pale-brown (10YR 6/3) and brownish-yellow (10YR 6/6) mottles; moderate, medium, angular and subangular blocky structure; firm; common thin clay films on faces of peds; strongly acid; gradual, smooth boundary.

IIIB23t—52 to 63 inches, red (2.5YR 4/6) cherty silty clay loam; strong, medium, angular and subangular blocky structure; firm; continuous clay films on faces of peds; strongly acid.

Depth to the fragipan ranges from about 18 to 35 inches. Depth to the gravelly layer ranges from about 20 to 36 inches. Gravel content in the gravelly fragipan ranges from about 40 to 70 percent, by volume. The Ap horizon is generally brown, but in severely eroded areas it is yellowish brown or strong brown. It ranges from 4 to 7 inches in thickness. In wooded areas the A1 horizon is dark grayish brown. Above the fragipan in the B horizon is yellowish-brown, strong-brown, or yellowish-red silt loam or silty clay loam. The IIIB22t horizon is red cherty clay or cherty silty clay.

Lax silt loam, 1 to 4 percent slopes (LaB).—This soil is on the broader ridgetops on highly dissected uplands. It is mainly west of the Cumberland River and south of U.S. Highway No. 79. Areas range from 3 to 100 acres. This soil has a fragipan at a depth of about 24 inches and a gravelly layer at a depth of about 28 inches. It has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of soils that do not have a gravelly layer in or below the fragipan and a few small areas that do not have a fragipan or a gravelly layer. Also included are a few areas of severely eroded soils that have a surface layer of yellowish-brown silty clay loam and a few areas that have slopes of slightly more than 4 percent.

Runoff is medium. This soil is easy to work. Drainage is slow through the fragipan, and the less sloping areas are waterlogged during rainy periods. This soil is slightly droughty in summer.

If this soil is well managed, it is moderately well suited to corn and to other crops commonly grown in the county. It is well suited to small grain. Alfalfa ordinarily lasts only 2 or 3 years. Response to fertilizer and lime is good. Capability unit IIe-2; woodland group 3o7.

Lax silt loam, 4 to 8 percent slopes (LaC).—This soil is on the sides of short hills on highly dissected uplands. It is mainly west of the Cumberland River and south of U.S. Highway No. 79. It has a fragipan. Areas range from 5 to 7 acres. The surface layer is mixed brown and strong-brown, friable silt loam about 4 to 7 inches thick. The subsoil, to a depth of 20 inches, is strong-brown and yellowish-brown, friable silt loam mottled in shades of brown in the lower few inches. Between depths of 20 and 40 inches in a fragipan that is yellowish-brown, firm and brittle gravelly silt loam and gravelly silty clay loam mottled in shades of gray and brown. Below this, and extending to a depth of 60 inches or more, is yellowish-red gravelly silty clay loam and red cherty clay mottled in shades of yellow, gray, and red.

Included with this soil in mapping are a few small areas of soils that do not have a fragipan or a gravelly layer and a few small areas that have a fragipan but do not have the gravelly layer. Also included are some areas of severely eroded soils that have a surface layer of yellowish-brown silty clay loam.

Available water capacity is medium. This soil is droughty in summer. The fragipan restricts the penetration of roots and the movement of air and water.

This soil is fairly well suited to almost all hay and pasture plants except alfalfa. It is moderately well suited to corn, tobacco, and similar crops. It is well suited to small grain. Erosion control is the main management concern. Response to management is good. Capability unit IIIe-2; woodland group 3o7.

Lindside Series

The Lindside series consists of moderately well drained soils on first bottoms and in depressions on uplands. Slopes are less than 2 percent.

In a representative profile the surface layer is brown silt loam about 7 inches thick. Below this, and extending to a depth of 48 inches or more, is brown, friable silt loam that is mottled at a depth below about 18 inches in shades of brown, gray, and red.

Reaction in these soils is medium acid to neutral throughout. Natural fertility is high. Available water capacity is high. The root zone is moderately deep and is favorable for root growth. Permeability is moderate, and runoff is slow. The gray colors at a depth below 18 inches indicate that these soils are waterlogged below that depth for part of the year. Most areas are occasionally flooded for very brief periods, mostly in winter and late in spring.

Most areas of these soils are used for row crops. A few irregularly shaped, isolated, and frequently flooded areas are wooded.

Representative profile of Lindside silt loam:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; clear, smooth boundary.

C1—7 to 18 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; common fine roots in upper part of horizon; few, pale-brown (10YR 6/3) silt coats in lower part; few, black and dark-brown concretions in lower part; medium acid; clear, smooth boundary.

C2—18 to 48 inches, brown (10YR 4/3) silt loam; common, medium, grayish-brown (10YR 5/2), light brownish-gray (10YR 6/2), yellowish-red (5YR 4/8), and pale-brown (10YR 6/3) mottles; weak, fine, granular structure; friable; stratification of some sandy material in the lower 7 inches; medium acid.

Depth to bedrock generally is 5 to 10 feet or more. Depth to grayish mottles averages about 18 inches but ranges from 15 to 22 inches. The Ap horizon ranges from brown to dark grayish brown and dark brown. In a few places the Ap horizon ranges from silt loam to silty clay loam. The C horizon ranges from brown to dark yellowish brown or yellowish brown. It ranges from silt loam to silty clay loam.

Lindside silt loam (Ld).—This nearly level soil is on first bottoms and in depressions on uplands. It is scattered throughout the county, mainly in areas that range from 3 to 20 acres.

Included with this soil in mapping are a few small areas of well-drained soils. Also included are a few small areas of soils that are about 10 to 20 percent, by volume, chert fragments throughout.

This soil is well suited to intensive farming. It is well suited to corn, soybeans, grain sorghum, lespedeza, tall fescue, and white clover. It is poorly suited to alfalfa and tobacco, because it is subject to flooding or ponding for short periods. Generally, flooding is in winter and late in spring and lasts for only a few hours. Response to management is very good. Capability unit IIw-1; woodland group 2w8.

Lobelville Series

The Lobelville series consists of moderately well drained, cherty soils on first bottoms and in small depressions on uplands. Slopes are less than 2 percent.

In a representative profile the surface layer is brown, friable cherty silt loam about 8 inches thick. The subsoil is also brown, friable cherty silt loam. It is mottled in shades of gray, brown, and yellow at a depth below about 16 inches. The number and size of mottles increase as depth increases, and grayish colors are dominant at a depth below about 35 inches. Fragments of chert as much as 2 inches in diameter are scattered on the surface and throughout the soil.

These soils are medium acid throughout. Runoff is slow, permeability is moderate, and available water capacity is medium. Most areas are occasionally flooded for very brief periods, generally in winter and late in spring.

Most areas of these soils are used for crops, but cultivation is difficult in some areas because of the chert fragments. A few narrow bands that are isolated in deep hollows and a few frequently flooded areas adjacent to streams are wooded.

Representative profile of Lobelville cherty silt loam:

Ap—0 to 8 inches, brown (10YR 4/3) cherty silt loam; weak, fine, granular structure; friable; many fine roots; about 15 to 20 percent, by volume, is chert fragments as much as 2 inches in diameter; medium acid; clear, smooth boundary.

B21—8 to 16 inches, brown (10YR 4/3) cherty silt loam; weak, medium, granular structure; friable; many roots; about 20 percent, by volume, is chert fragments as much as 2 inches in diameter; medium acid; clear, smooth boundary.

B22—16 to 25 inches, brown (10YR 4/3) cherty silt loam; common, medium, distinct mottles of light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4); moderate, medium, granular structure; friable; few fine roots; few, fine, black concretions; about 20 percent, by volume, is chert fragments as much as 2 inches in diameter; medium acid; clear, smooth boundary.

B23g—25 to 35 inches, yellowish-brown (10YR 5/4) cherty silt loam; many, medium, distinct mottles of light brownish gray (10YR 6/2) and gray (10YR 5/1); moderate, medium, granular structure; friable; common, fine, dark reddish-brown and few, fine, black concretions; about 25 to 30 percent, by volume, is chert fragments as much as 2 inches in diameter; medium acid; clear, smooth boundary.

B3g—35 to 50 inches, mottled light brownish-gray (10YR 6/2), gray (10YR 6/1), and yellowish-brown (10YR 5/6) cherty silt loam; moderate, medium, granular structure; friable; few, fine, black concretions; about 30 percent, by volume, is chert fragments as much as 2 inches in diameter; medium acid.

The Ap horizon ranges from brown to dark grayish brown in color and from 7 to 12 inches in thickness. Depth to grayish mottles averages about 18 inches but ranges from 15 to 24 inches. The content of chert fragments ranges from 15

to 30 percent in the upper 50 inches of the profile. The chert fragments are as much as 2 inches in diameter.

Lobelville cherty silt loam (Lo).—This nearly level soil is on first bottoms and in depressions on uplands. It is scattered throughout the county, mainly in areas that range from 3 to 20 acres.

Included with this soil in mapping are a few small areas of well-drained soils that do not have grayish mottles at a depth within 2 feet of the surface. Also included are a few small areas of soils that are less than 15 percent chert fragments throughout and a few areas of soils that have a dark-brown surface layer.

This soil is suited to most crops commonly grown in the county. Among the better suited crops are corn, tall fescue, white clover, and annual lespedeza. This soil is not well suited to tobacco or alfalfa, because it is occasionally flooded and is moderately well drained. Most flooding is in winter or early in spring and generally lasts for only a few hours. Response to fertilizer and to other management practices is good. This soil can be farmed intensively. Capability unit IIs-1; woodland group 2w8.

Melvin Series

The Melvin series consists of poorly drained soils on bottom lands, mainly along intermittent drainageways and in broad depressions on uplands. On bottom lands these soils are in long narrow bands, generally at the outer rim of flood plains. Slopes are less than 2 percent.

In a representative profile the surface layer is mottled, grayish-brown silt loam about 9 inches thick. Below this, and extending to a depth of 65 inches or more, is gray, friable silt loam that is mottled in shades of gray, brown, and red.

Reaction in these soils ranges from medium acid to neutral throughout. Permeability is moderate. Excess water slows the movement of air and the growth of roots of most crops. From winter to late in spring, the water table is at or near the surface. Ponding or flooding for a few hours to 1 or 2 days is common.

Much of the acreage of these soils is wooded. Some areas are used for soybeans and permanent pasture, and a few areas are used for corn. Poor drainage and susceptibility to occasional flooding are the main limitations to use.

Representative profile of Melvin silt loam:

Ap—0 to 9 inches, grayish-brown (10YR 5/2) silt loam; common, fine, faint, light brownish-gray (10YR 6/2) and prominent, yellowish-red (5YR 4/6) mottles; weak, fine, granular structure; friable; common fine roots; medium acid; clear, smooth boundary.

B21g—9 to 37 inches, gray (10YR 6/1) silt loam; common, medium, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) mottles and faint, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; common, dark reddish-brown and black concretions; medium acid; gradual, smooth boundary.

B22g—37 to 52 inches, gray (10YR 6/1) silt loam; many, medium, faint, light brownish-gray (10YR 6/2) mottles and prominent, strong-brown (7.5YR 5/6) and dark reddish-brown (2.5YR 3/4) mottles; weak, medium, subangular blocky structure; friable; common dark reddish-brown and black concretions; slightly acid; gradual, smooth boundary.

Cg—52 to 65 inches, gray (10YR 6/1) silt loam; many, medium, prominent, dark reddish-brown (2.5YR 3/4) mottles and distinct, yellowish-brown (10YR 5/6), and light yellowish-brown (10YR 6/4) mottles; massive; friable; many, small, dark reddish-brown and black concretions; slightly acid.

Depth to bedrock ranges from 6 to 10 feet or more. The A and B horizons are silty clay loam in a few places. The Ap horizon ranges from 5 to 10 inches in thickness.

Melvin silt loam (Me).—This soil is on first bottoms and in broad depressions on uplands. Areas range from about 3 to 20 acres.

Included with this soil in mapping are a few small areas of gray soils that have a fragipan at a depth of about 25 inches. Also included on the bottom lands of the Cumberland River are a few small areas of soils that have a gray silty clay subsoil.

Permeability is favorable for drainage. Because of the lack of suitable outlets, especially in depressions on uplands, this soil is difficult to drain in places.

This soil is suited to summer pasture plants such as tall fescue and white clover. It is also suited to soybeans and other crops that can be planted late. Drained areas are moderately well suited to corn. This soil is poorly suited to tobacco, small grain, and alfalfa because of wetness and susceptibility to flooding. Capability unit IVw-1; woodland group 2w9.

Mountview Series

The Mountview series consists of deep, well-drained soils, mainly on broadly rounded tops of low, rolling hills. These soils are mostly in the northwestern and southeastern parts of the county. They formed in a layer of loess 2 to 3 feet thick over old alluvium or cherty residuum weathered from limestone. Slopes range from 2 to 12 percent.

In a representative profile the surface layer is brown silt loam about 8 inches thick. The subsoil, to a depth of about 30 inches, is brown and strong-brown, friable silt loam and silty clay loam. At a depth of 30 inches, it is yellowish-red, firm cherty silty clay loam that grades, at a depth of about 64 inches, to red, very firm cherty clay that extends to a depth of many feet.

In unlimed areas these soils are strongly acid or very strongly acid throughout. Permeability is moderate. Roots penetrate easily, and the root zone is deep. Available water capacity is high.

Most areas of these soils are cleared and are used for crops commonly grown in the county. A large acreage is reverting to woodland.

Representative profile of Mountview silt loam, 2 to 5 percent slopes:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; strongly acid; clear, smooth boundary.

B1—8 to 12 inches, brown (7.5YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B21t—12 to 25 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; thin discontinuous clay films; very strongly acid; gradual, smooth boundary.

B22t—25 to 30 inches, strong-brown (7.5YR 5/6) silty clay loam; few, medium, pale-brown (10YR 6/3) and yellowish-red (5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; clay films on faces of peds; few, fine and medium, chert fragments; very strongly acid; gradual, smooth boundary.

IIB23t—30 to 44 inches, yellowish-red (5YR 4/6) cherty

silty clay loam; common, medium, dark-red (2.5YR 3/6), brownish-yellow (10YR 6/6), and pale-brown (10YR 6/3) mottles; moderate, fine and medium, subangular blocky structure; firm; common, fine and medium, chert fragments; common clay films; few, small, black concretions and stains; very strongly acid; gradual, smooth boundary.

IIB24t—44 to 64 inches, yellowish-red (5YR 4/6) cherty silty clay loam; many, medium, reddish-yellow (5YR 6/6), brownish-yellow (10YR 6/6), pale-brown (10YR 6/3), and gray (10YR 6/1) mottles; moderate, fine and medium, subangular and angular blocky structure; firm; common clay films; many medium and small chert fragments; very strongly acid; gradual, smooth boundary.

IIB25t—64 to 80 inches, red (2.5YR 4/6) cherty clay; common, medium, yellowish-red (5YR 5/6), strong-brown (7.5YR 5/6), brownish-yellow (10YR 6/6), and light-gray (10YR 7/1) mottles; strong, fine and medium, angular blocky structure; very firm; common clay films; many, medium and small, angular, chert fragments; very strongly acid.

Depth to bedrock is more than 10 feet. The loess capping ranges from 20 to 40 inches in thickness but averages about 30 inches. The Ap horizon ranges from 4 to 9 inches in thickness. In some places it is yellowish brown. The B21t horizon is silt loam in some places. The IIB horizon is as much as 35 percent chert fragments in some places. In places it is to dark-red clay.

Mountview silt loam, 2 to 5 percent slopes (MoB).—This soil is on uplands. It is mainly in the northwestern and southeastern parts of the county. Areas range from 3 to 10 acres. The profile of this soil is the one described as representative of the series.

Included with this soil in mapping are small areas of soils that have a few chert fragments throughout. Also included are small areas of soils that have a fragipan at a depth of about 24 inches.

This soil is easy to work. It is well suited to crops commonly grown in the county. It is well suited to high-value cash crops, such as tobacco, soybeans, corn, and truck crops. High-level management that includes adequate applications of lime and complete fertilizers is needed because this soil is low in natural fertility (fig. 13). Capability unit IIe-1; woodland group 3o7.

Mountview silt loam, 5 to 12 percent slopes (MoC).—This soil is on uplands. Areas range from 3 to 15 acres. The surface layer is brown, friable silt loam 4 to 7 inches thick. The subsoil is strong-brown, friable silty clay loam in the upper part, yellowish-red cherty silty clay loam in the middle part, and red firm cherty clay in the lower part.

Included with this soil in mapping are small areas of soils that have a few chert fragments throughout. Also included are a few areas of severely eroded soils that have a surface layer of yellowish-brown silt and small areas of soils that have a thin gravelly layer at a depth of 24 inches. A few small areas of soils that have slopes of more than 12 percent are included.

Available water capacity is high. This soil is easy to work and to keep in good tilth.

This soil is suited to all crops commonly grown in the county; however, crops should be grown in a long-term cropping system. Capability unit IIIe-1; woodland group 3o7.

Mountview silt loam, 5 to 12 percent slopes, eroded (MoC2).—This soil is on short hillsides. Most areas range from 3 to 20 acres. Much of the acreage is on the Fort Campbell Military Reservation, in the northwestern part of the county. The surface layer is yellowish-brown, friable silt loam about 4 to 6 inches thick. The subsoil, to a depth of about 24 inches, is strong-brown, friable silty clay loam. Below this is yellowish-red cherty silty clay loam underlain by red

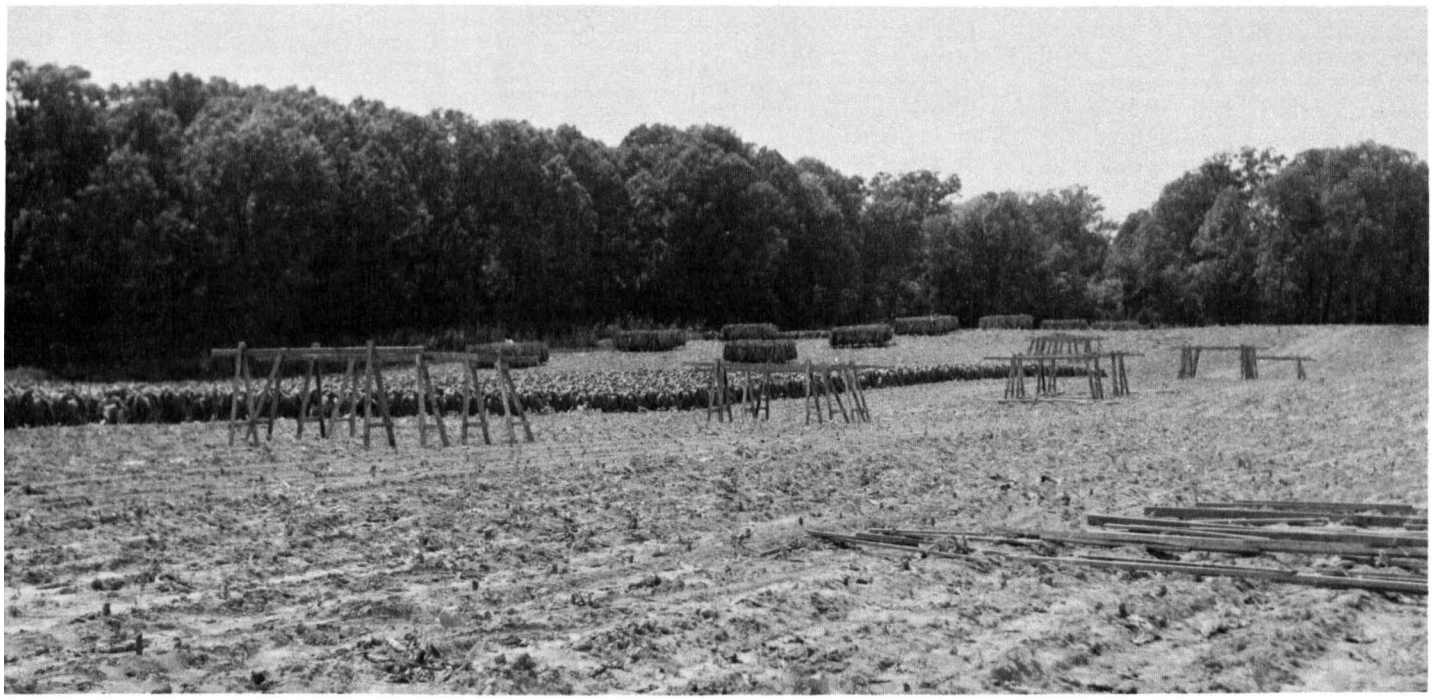

Figure 13.—**Burley tobacco on Mountview silt loam, 2 to 5 percent slopes.**

or dark-red, firm cherty clay or clay that is several feet thick.

Included with this soil in mapping are small areas of soils that have slopes of slightly less than 5 percent and small areas of soils that have slopes of slightly more than 12 percent. Also included are a few small areas of soils that have a thin gravelly layer at a depth of about 15 inches and some areas of uneroded soils that have a surface layer of brown silt loam about 8 to 10 inches thick.

This soil is well suited to small grain and to hay and pasture. Stands are sometimes hard to establish, but once established, plants grow well if adequate amounts of fertilizer and lime are added. This soil is moderately well suited to row crops if they are grown in a long-term cropping system. Capability unit IIIe-1; woodland group 3o7.

Newark Series

The Newark series consists of somewhat poorly drained soils on flood plains and in small depressions on uplands. Areas of these soils on flood plains are in long, narrow bands, generally at the outer rim of flood plains. Slopes are less than 2 percent.

In a representative profile the surface layer is brown silt loam about 9 inches thick. The subsoil is 24 inches thick. The upper 4 inches is brown, friable silt loam mottled in shades of gray and brown. The lower 20 inches is grayish-brown, friable silt loam and silty clay loam that is mottled in shades of gray, brown, and red. The underlying material is gray, friable silty clay loam mottled in shades of brown, yellow, and gray.

In unlimed areas these soils are slightly acid or medium acid throughout. Natural fertility is moderately high. Excess water slows the movement of air and the growth of roots of most crops. From winter to late in spring, the water table is near the surface. Ponding or flooding from a few hours to 1 or 2 days is common.

Most areas of these soils are on the Fort Campbell Military Reservation and are either wooded or idle. Many areas of these soils are too small or too irregularly shaped to be cleared and farmed. Some areas are in permanent pasture consisting of fescue and white clover. Corn is grown, but crop failures are common.

Representative profile of Newark silt loam:

Ap—0 to 9 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; common fine roots; few, small, reddish-brown concretions; slightly acid; clear, smooth boundary.

B21—9 to 13 inches, brown (10YR 4/3) silt loam; common, medium, faint, pale-brown (10YR 6/3), grayish-brown (10YR 5/2), and dark-brown (7.5YR 4/4) mottles; weak, fine, granular or subangular blocky structure; friable; few fine roots; few, small, reddish-brown concretions; slightly acid; gradual, smooth boundary.

B22g—13 to 20 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) and gray (10YR 5/1) mottles and common, medium, prominent, reddish-brown (5YR 4/4) mottles; weak, medium, subangular and weak, fine, granular structure; friable; few small concretions; medium acid; clear, smooth boundary.

B23g—20 to 33 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, faint, brown (10YR 4/3), light brownish-gray (10YR 6/2), and dark-gray (10YR 4/1) mottles; weak, medium, subangular blocky structure; friable; few, small, dark-brown concretions; medium acid; clear, smooth boundary.

Cg—33 to 50 inches, gray (10YR 5/1) silty clay loam; many, medium, faint, grayish-brown (10YR 5/2), dark-gray (10YR 4/1), and dark yellowish-brown (10YR 4/4) mottles; massive; friable; few, small, dark-brown concretions; medium acid.

The A horizon ranges from brown to dark grayish-brown and dark brown. It ranges from silt loam to loam or silty clay loam. The B and C horizons are silt loam or silty clay loam. Depth to bedrock is generally 6 to 10 or more feet.

Newark silt loam (Ne).—This soil is on first bottoms and in depressions on uplands. It is mostly in narrow bands on the outer rim of flood plains of larger streams and along the drainageways of intermittent streams. The areas in depressions are small and nearly circular. Most areas range from 3 to 25 acres. Slopes are 0 to 2 percent.

Included with this soil in mapping are small areas of poorly drained, grayish soils that have a surface layer of silt loam and small areas of moderately well drained, brown soils that have a surface layer of silt loam. Also included are a few areas of soils that have a surface layer of cherty silt loam.

This soil is well suited to summer pasture because adequate moisture is generally available. Tall fescue and white clover are well suited. This soil is also well suited to soybeans and to other crops that can be planted late. It is well suited or moderately well suited to several other crops if suitable outlets are available and the soil is drained. It is poorly suited to tobacco and alfalfa because of wetness and susceptibility to occasional flooding. Capability unit IIIw-1; woodland group 2w8.

Pembroke Series

The Pembroke series consists of deep, well-drained, gently rolling soils on broad uplands, mainly in the northern half of the county. These soils formed in loess that is about 2 feet thick and in the underlying old alluvium or residuum of limestone that is many feet thick. Slopes range from 2 to 12 percent.

In a representative profile the surface layer is dark-brown silt loam about 8 inches thick. The upper 20 inches of the subsoil is reddish-brown and dark reddish-brown, friable or firm silty clay loam. Below this, and extending to a depth of 65 inches or more, it is dark-red, firm clay.

Permeability is moderate. Available water capacity is high. In unlimed areas, these soils are strongly acid or very strongly acid throughout. The soils are easy to work and have a deep root zone.

Almost all of the acreage of these soils is used for all crops commonly grown in the county. Only a few areas are wooded.

Representative profile of Pembroke silt loam, 2 to 5 percent slopes:

Ap—0 to 8 inches, dark-brown (7.5YR 3/2) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1t—8 to 18 inches, reddish-brown (5YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; friable; common fine roots; few thin clay films; strongly acid; clear, smooth boundary.

B21t—18 to 28 inches, dark reddish-brown (5YR 3/4) silty clay loam; moderate, medium, subangular blocky struc-

ture; firm; common clay films; strongly acid; gradual, smooth boundary.

B22t—28 to 50 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm; light yellowish-brown (10YR 6/4) silt coatings on some of the larger peds; common thin clay films; few, fine, black concretions; strongly acid; gradual, smooth boundary.

B23t—50 to 65 inches, dark-red (10YR 3/6) clay; weak, medium, angular blocky structure; firm; common light yellowish-brown (10YR 6/4) silt coatings on some peds; few, fine, black concretions; few small chert fragments; strongly acid.

In some places the Ap horizon is dark reddish brown. The B1t horizon ranges from reddish brown to red. The B21t horizon ranges from dark reddish brown to yellowish red and reddish brown. The B22t and B23t horizons range from clay to silty clay loam and silty clay.

Pembroke silt loam, 2 to 5 percent slopes (PeB).—This soil is on uplands, mainly in the northern half of the county. Most areas range from 3 to 100 acres. The profile of this soil is the one described as representative of the series.

Included with this soil in mapping are a few small areas of soils that have a dark-brown silty clay loam or silt loam subsoil to a depth of about 28 inches. Also included are a few small areas of soils that have a surface layer of brown silt loam and a subsoil of yellowish-red silty clay loam. A few areas of severely eroded soils that have a surface layer of reddish-brown or dark reddish-brown silty clay loam and a few areas that have slopes of slightly less than 2 percent are included.

This soil is easy to work and to keep in good tilth. It is well suited to all crops commonly grown in the area. It is especially well suited to high-value cash crops, such as tobacco, soybeans, corn, and truck crops. It is also well suited to small grain, grasses, and legumes. Response to management is very good. Capability unit IIe-1; woodland group 2o7.

Pembroke silt loam, 5 to 12 percent slopes (PeC).—This soil is on short slopes on broad uplands. It is in the north-central and northeastern parts of the county. The surface layer is dark-brown silt loam about 5 to 8 inches thick. The subsoil, which extends to a depth of 60 inches or more, is yellowish-red or reddish-brown, friable silty clay loam in the upper part and dark-red, firm silty clay loam or clay in the lower part.

Included with this soil in mapping are a few small areas of soils that have a surface layer of brown silt loam. Also included are a few areas of eroded soils that have a surface layer of reddish-brown or dark reddish-brown silty clay loam.

The root zone is deep and well aerated. This soil is well suited to all crops commonly grown in the county. Slope is the main limitation to use. Response to management is good. Capability unit IIIe-1; woodland group 2o7.

Pickwick Series

The Pickwick series consists of deep, well-drained soils on old high terraces and on uplands. The upper 2 or 3 feet of these soils formed in loess, and the lower several feet formed in old alluvium or in limestone residuum. Slopes range from 2 to 20 percent.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of 65 inches or more. It is yellowish-red, friable silty clay loam in the upper 25 inches and red and dark-red, firm silty clay loam in the lower 34 inches.

In unlimed areas these soils are strongly acid or very strongly acid. The root zone is deep. Runoff is medium to rapid, permeability is moderate, and available water capacity is high.

Almost all areas of these soils are cleared and are used for a wide range of crops. Only a few irregularly shaped and hilly areas are idle or wooded.

Representative profile of Pickwick silt loam, 5 to 12 percent slopes:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; strongly acid; clear, smooth boundary.

B21t—6 to 19 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, fine and medium, subangular blocky structure; friable; few, thin, discontinuous clay films; strongly acid; clear, smooth boundary.

B22t—19 to 31 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; friable; thin discontinuous clay films; strongly acid; clear, smooth boundary.

B23t—31 to 38 inches, red (2.5YR 4/6) silty clay loam; few, fine, distinct, light yellowish-brown (10YR 6/4) mottles; moderate, medium, angular and subangular blocky structure; firm; thin continuous clay films; few, fine, black concretions and stains; strongly acid; gradual, smooth boundary.

B24t—38 to 65 inches, dark-red (2.5YR 3/6) silty clay loam; common, medium, distinct, light yellowish-brown (10YR 6/4) mottles; moderate, medium, angular and subangular blocky structure; firm; thick continuous clay films; few, fine, black concretions; strongly acid.

Depth to bedrock is more than 10 feet. The Ap horizon ranges from 4 to 9 inches in thickness. In eroded areas it ranges to yellowish-red and reddish-brown silty clay loam. The B21 horizon ranges from yellowish red to reddish brown and from silty clay loam to silt loam. In some places the B23t and B24t horizons have some pebbles about 1 inch in diameter. The B24t horizon is silty clay loam or clay.

Pickwick silt loam, 2 to 5 percent slopes (PkB).—This soil is on uplands and old terraces along the Cumberland River and its larger tributary streams. Areas are scattered throughout the county, and most range from 3 to 10 acres. The surface layer is brown silt loam about 5 to 9 inches thick. The subsoil is yellowish-red, friable silty clay loam to a depth of about 30 inches. Below that depth it is redder and is slightly more clayey.

Included with this soil in mapping are small areas of soils that have chert fragments throughout. Also included are small areas of soils that have a brown subsoil and small areas that have a dark-brown surface layer. Small spots of eroded soils are included in a few areas. These spots are more difficult to work and to keep in good tilth, and available water capacity is medium.

The root zone is deep. This soil has good tilth and is easy to work. Available water capacity is high.

This soil is well suited to all crops commonly grown in the county. Response to lime and fertilizer and other management practices is very good. This soil can be used in a short-term cropping system. Capability unit IIe-1; woodland group 3o7.

Pickwick silt loam, 5 to 12 percent slopes (PkC).—This soil is on uplands and old terraces along the Cumberland River and its larger tributary streams. Most areas range from 3 to 25 acres in size. The profile

of this soil is the one described as representative of the series.

Included with this soil in mapping are small areas of soils that have chert fragments throughout. Also included are small areas of soils that have a brown subsoil and small areas that have a dark-brown surface layer and a reddish-brown subsoil. A few small areas of severely eroded soils that have a surface layer of reddish-brown silty clay loam are included.

This soil is easy to work and to keep in good tilth. Available water capacity is high.

This soil is well suited to small grain, tobacco, soybeans, corn, alfalfa, pasture, and most other crops commonly grown in the county. Because of steepness of slope and susceptibility to erosion, this soil should be used in a long-term cropping system. Response to lime, fertilizer, and other management practices is very good. Capability unit IIIe-1; woodland group 3o7.

Pickwick silt loam, 5 to 12 percent slopes, eroded (PkC2).—This soil is on high terraces along the larger streams and on uplands. Some areas are around limestone sinks. Most areas range from 3 to 25 acres. The surface layer is brown silt loam 4 to 6 inches thick. The subsoil is yellowish-red, friable silty clay loam to a depth of about 30 inches. Below that depth, and extending to a depth of 65 inches or more, it is red or dark-red, firm silty clay loam or clay. In some places the lower part of the subsoil has some pebbles about 1 inch in diameter.

Included with this soil in mapping are small areas of soils that are cherty throughout and a few small areas that have a silt loam surface layer 8 to 10 inches thick. Also included in many places are small tracts of soils that are more eroded than this soil. These soils have a surface layer of reddish silty clay loam.

Available water capacity is high. Runoff is medium to rapid. This soil is somewhat difficult to work and to keep in good tilth, and establishment of stands is somewhat difficult in the more eroded spots.

This soil is suited to small grain, red clover, alfalfa, orchardgrass, and tall fescue. It is suited to cultivated crops if they are grown in a long-term cropping system. Response to lime, fertilizer, and other management practices is good. Capability unit IIIe-1; woodland group 3o7.

Pickwick silt loam, 12 to 20 percent slopes (PkD).—This soil is on short hillsides and around limestone sinks. Most areas range from 3 to 10 acres in size. The surface layer is brown silt loam about 4 to 6 inches thick. The subsoil extends to a depth of 65 inches or more. It is yellowish-red, friable silty clay loam in the upper part and red or dark-red, firm silty loam or clay in the lower part. In some places the lower part of the subsoil has some pebbles that are about 1 inch in diameter.

Included with this soil in mapping are small areas of severely eroded soils that have a surface layer of reddish-brown silty clay loam. Also included are a few small areas of soils that have chert fragments throughout.

Available water capacity is high. The root zone is deep.

This soil is suited to small grain, pasture grasses, and legumes such as tall fescue, white clover, and red clover. Because of steepness of slope and susceptibility to further erosion, it is suited to row crops grown in a long-term cropping system. Crops respond well to management. Capability unit IVe-1; woodland group 3o7.

Rock Outcrop

Rock outcrop consists of areas in which limestone bedrock is exposed. The bedrock is nearly level and is bedded. The outcrop ranges from 1 foot to several feet in diameter. The rocks extend to several feet above the surface.

Rock outcrop is mapped only with Baxter soils.

Staser Series

The Staser series consists of deep, well-drained soils on first bottoms and in depressions. Slopes are less than 2 percent.

In a representative profile the surface layer is dark-brown and very dark grayish-brown fine sandy loam, loam, and silt loam about 34 inches thick. Below this, and extending to a depth of 65 inches or more, is dark-brown, friable silt loam that has grayish-brown mottles.

These soils range from medium acid to neutral throughout. Permeability is moderate, and available water capacity is high. These soils are easy to work, and the root zone is deep. They are rarely flooded. Response to applications of fertilizer is good.

Areas of these soils are used mainly for corn, soybeans, small grain, grain sorghum, pasture, and hay.

Representative profile of Staser fine sandy loam:

Ap—0 to 12 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; very friable; many roots; few small rounded quartzite pebbles; few worm casts that are silt coated; slightly acid; abrupt, smooth boundary.

A12—12 to 22 inches, dark-brown (10YR 3/3) loam; weak, medium, granular structure; common roots; many fine pores; common worm casts, 2 to 5 millimeters in diameter, coated with fine sand; few, small, black concretions less than 2 millimeters in diameter; few rounded quartzite pebbles; slightly acid; clear, wavy boundary.

A13—22 to 34 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granuluar structure and weak, fine, subangular blocky structure; friable; few roots; common worm casts, 4 to 10 millimeters in diameter, coated with grayish-brown silt; few, small, black concretions; slightly acid; gradual, wavy boundary.

B21—34 to 50 inches, dark-brown (10YR 3/3) silt loam; discontinuous streaks of grayish-brown (10YR 5/2); weak, medium, granular and weak, fine, subangular blocky structure; friable; few roots; few worm casts and many fine pores coated with very fine sand and silt; slightly acid; diffuse, wavy boundary.

B22—50 to 65 inches, dark-brown (10YR 3/3) silt loam; patches of brown (10YR 4/3) and streaks of grayish brown (10YR 5/2); weak, medium, granular and weak, fine, subangular blocky structure; friable; few roots; common fine pores; few, small, black concretions; few brown and grayish-brown mottles below 60 inches, increasing in number and size with depth; slightly acid.

The B horizon is dark brown, brown, very dark grayish brown, or dark yellowish brown and is silt loam to fine sandy loam and loam.

Staser fine sandy loam (Ss).—This soil is in long narrow bands adjacent to the Cumberland River. Most areas range from about 5 to 25 acres. Slopes range from 0 to 2 percent.

Included with this soil in mapping are a few small areas of soils that are silt loam throughout. Also included are a few areas of soils that are fine sandy loam and loam throughout.

Available water capacity is high. This soil is rarely flooded.

This soil is well suited to all crops commonly grown in the county. It can be row cropped every year. Capability unit I-1; woodland group 2o7.

Statler Series

The Statler series consists of deep, well-drained soils on low terraces of creeks and rivers and on foot slopes on uplands. These soils are scattered throughout the county in areas 3 to 20 acres in size. Slopes range from 2 to 12 percent.

In a representative profile the surface layer is dark-brown silt loam about 8 inches thick. The subsoil is 42 inches thick. It is brown, friable silt loam in the upper 37 inches and is strong-brown, friable silty clay loam in the lower 5 inches. The underlying material, which extends to a depth of 65 inches, is strong-brown, friable cherty silt loam that is mottled in shades of brown and gray.

In unlimed areas these soils are strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is high. The root zone is deep.

Almost all areas of these soils are cleared and are used for all crops commonly grown in the county. A few, small, irregularly shaped tracts are wooded. In the Fort Campbell Military Reservation, several acres have been planted to walnut trees and many acres are idle.

Representative profile of Statler silt loam, 2 to 5 percent slopes:

Ap—0 to 8 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; many roots; medium acid; clear, smooth boundary.

B1—8 to 15 inches, brown (7.5YR 4/4) silt loam; weak, fine, subangular blocky structure and weak, fine, granular structure; friable; many roots; strongly acid; gradual, smooth boundary.

B2t—15 to 45 inches, brown (7.5YR 3/3) silt loam; weak, fine, subangular blocky structure; friable; common roots; thin clay films on peds; few, small, reddish-brown concretions in lower part; strongly acid; gradual, smooth boundary.

B3t—45 to 50 inches, strong-brown (7.5YR 5/6) silty clay loam; common, medium, brown (7.5YR 4/4, 10YR 5/3) and light brownish-gray (10YR 6/2) mottles; weak, fine and medium, subangular blocky structure; friable; few roots; few, small, black concretions and stains; strongly acid; gradual, smooth boundary.

C—50 to 65 inches, strong-brown (7.5YR 5/6) cherty silt loam; common, medium, brown (7.5YR 4/4), pale-brown (10YR 6/3), and light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure to massive; friable; few roots; strongly acid.

The Ap horizon ranges from dark brown to very dark grayish brown, and to dark yellowish brown in severely eroded spots. It ranges from 4 to 9 inches in thickness and from silt loam to loam in texture. The B horizon ranges from brown to reddish brown, strong brown, or, in a few places, to yellowish red. The B2t horizon ranges from silt loam to silty clay loam. The B3t horizon is silty clay loam or silt loam. The content of chert or gravel fragments in the C horizon ranges from a few percent to about 25 percent, by volume.

Statler silt loam, 2 to 5 percent slopes (StB).—This soil is on low terraces or second bottoms that are occasionally flooded. It is along the permanent streams in the county. It has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of soils that have slopes of less than 2 percent and a few areas that have a few pebbles or chert fragments scattered throughout. Also included are a few areas of eroded soils that have a dark yellowish-brown surface layer.

This soil is well suited to all crops commonly grown in the county. It is used mostly for row crops. Because this soil is gently sloping and well drained, it is among the soils preferred for growing high-value crops, such as corn, soybeans, tobacco, and truck crops. The response to management is very good. Capability unit IIe-1; woodland group 2o7.

Statler silt loam, 5 to 12 percent slopes (StC).—This soil is on low terraces along streams and on foot slopes on uplands. Areas range from 3 to 10 acres and are scattered throughout the county. The surface layer is dark-brown silt loam 4 to 9 inches thick. The subsoil, to a depth of about 40 inches, is dominantly brown, friable silty clay loam. At a depth below 40 inches, it is strong-brown silt loam or silty clay loam mottled in shades of brown and yellow.

Included with this soil in mapping are a few areas of soils that have slopes of slightly less than 5 percent and a few small areas that have slopes of slightly more than 12 percent. Also included are a few small areas of soils that have chert fragments throughout and a few areas of eroded soils that have a dark yellowish-brown surface layer.

The rooting zone is deep. Available water capacity is high, and permeability is moderate. In unlimed areas this soil is strongly acid or very strongly acid.

This soil is well suited to all crops commonly grown in the county. It is used for row crops, hay, and pasture. Controlling erosion is the main management concern, and response to management is very good. Capability unit IIIe-1; woodland group 2o7.

Taft Series

The Taft series consists of somewhat poorly drained soils on upland flats and in depressions. These soils have a fragipan at a depth of about 21 inches. They formed in a layer of loess about 2 to 5 feet thick. Slopes are less than 2 percent.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The next 15 inches is light yellowish-brown, friable silt loam that has mainly light brownish-gray, light-gray, olive-brown, and brown mottles. The middle 21 inches is a brittle fragipan of grayish, mottled silt loam. The lower 23 inches is grayish, mottled, firm silty clay loam.

In unlimed areas these soils are strongly acid or very strongly acid. Fertility is low. These soils are fairly well aerated in the upper 20 inches. Roots, water, and air easily penetrate to the fragipan, which is slowly permeable. Available water capacity is medium to low. These soils are wet in winter and in spring, and they are droughty in summer.

A large part of the acreage is in trees, mainly sweetgums and water oaks. Most cleared areas are used for pasture consisting of water-tolerant grasses and legumes.

Representative profile of Taft silt loam:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, faint, brown and light brownish-gray mottles; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1—6 to 11 inches, light yellowish-brown (2.5Y 6/4) silt loam; common, medium, faint, olive-brown (2.5YR 4/4), grayish-brown (10YR 5/2), and brown (10YR 5/3) mottles; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; gradual, smooth boundary.

B2—11 to 21 inches, light yellowish-brown (2.5Y 6/4) silt loam; common, medium, faint, light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), olive-brown (2.5Y 4/4), and light-gray (10YR 7/2) mottles; weak, medium, subangular blocky structure; friable; few fine roots; few fine pores; few, small, brown and black concretions; very strongly acid; clear, wavy boundary.

A'2x—21 to 25 inches, light-gray (10YR 7/2) silt loam; common, medium, distinct, light yellowish-brown (2.5Y 6/4), yellowish-brown (10YR 5/4), and brown (7.5YR 4/4) mottles; weak, medium, subangular blocky structure; friable; slightly brittle; few fine pores; common brown and black concretions; very strongly acid; irregular boundary.

Bx1—25 to 42 inches, gray (10YR 6/1) silt loam; common, medium, faint, very pale-brown (10YR 7/3) mottles and common, medium, distinct, light olive-brown (2.5Y 5/4), yellowish-brown (10YR 5/6), and dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; firm and brittle; clay films in pores and thin patchy clay films on some peds; few brown and black concretions; very strongly acid; gradual, wavy boundary.

B2t—42 to 65 inches, gray (10YR 5/1) silty clay loam; many, medium, faint, light-gray (10YR 7/1) mottles; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; and common, medium, prominent, yellowish-red (5YR 4/6) mottles; moderate, medium, subangular blocky structure; firm; common clay films on some peds; few brown and black concretions; very strongly acid.

The Ap horizon ranges from dark grayish brown to brown or grayish brown. The B2 horizon ranges from silt loam to silty clay loam. It ranges from light yellowish brown to light olive brown. Depth to the Bx horizon ranges from 20 to 30 inches. The Bx horizon ranges from 18 to 35 inches in thickness and from silt loam to silty clay loam in texture. It ranges from light gray to light yellowish brown and has many mottles in shades of gray and brown. The B2t horizon ranges from gray to yellowish brown and has many mottles in shades of red, brown, and gray.

Taft silt loam (Ta).—This nearly level soil is on upland flats and in depressions in areas that range from 3 to 50 acres. It has a compact fragipan at a depth of about 21 inches. The subsoil is saturated in winter and in spring, and some areas are ponded for short periods.

Included with this soil in mapping are small spots of soils that are poorly drained and have a gray subsoil. Also included are small areas of somewhat poorly drained soils that do not have a fragipan.

If this soil is limed and fertilized and surface water is removed, it is suited to several kinds of crops. It can be cultivated every year and used for row crops that can be planted late, such as soybeans and grain sorghum. This soil is suited to water-tolerant grasses and legumes. It is poorly suited to alfalfa and other deep-rooted crops. Capability unit IIIw-1; woodland group 3w8.

Urban Land

Urban land consists of areas that commonly are used as sites for schools, factories, roads, railroads, airports, and ammunition storage bunkers. The original soil material has been obscured to such an extent that its identification is no longer feasible. Soil material ranges from loam to clay. The areas are occupied by buildings and railroads or are covered by concrete or asphalt.

Urban land-Arents complex (Ua).—This complex is mainly in or near Clarksville and smaller towns. It is about 60 percent Urban land and about 40 percent Arents soils.

Urban land consists of land obscured by urban works and structures in the form of schools, factories, roads, railroads, airports, and ammunition storage bunkers. Arents soils have been altered by cutting and filling in connection with urban construction to the extent that identification is no longer feasible. The texture of the soil material ranges from loam to clay within very short distances. The material ranges from a few feet to many feet in thickness. Most areas are nearly level, but slopes range to 20 percent. Some areas, such as those used as ammunition storage bunkers on the Fort Campbell Military Reservation, have an uneven surface. Included in mapping are a few areas of unaltered soils that can be identified by onsite investigation.

Runoff from urban works and structures is almost 100 percent. Runoff from Arents soils depends on the slope and the kind of material. In some places the altered material is subject to erosion and is a source of sediment unless the areas are covered by grass, shrubs, or trees. Capability unit unassigned; woodland group unassigned.

Wolftever Series

The Wolftever series consists of moderately well drained, nearly level soils on low terraces of the Cumberland River. Slopes are less than 2 percent.

In a representative profile the surface layer is dark grayish-brown silt loam about 9 inches thick. The subsoil is yellowish-brown, firm silty clay loam that is mottled at a depth below about 24 inches in shades of brown, yellow, and gray.

In unlimed areas these soils are strongly acid or very strongly acid throughout. Runoff is slow, permeability is moderately slow, and available water capacity is high. These soils are subject to short periods of flooding in winter and in spring.

These soils are used mostly for corn, soybeans, pasture grasses and legumes, and annual lespedeza for hay. Susceptibility to occasional flooding is the main limitation to use.

Representative profile of Wolftever silt loam:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1t—9 to 12 inches, yellowish-brown (10YR 5/4) silty clay loam; weak, fine and medium, subangular blocky structure; friable; common fine roots; strongly acid; clear, smooth boundary.

B21t—12 to 24 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm; thin continuous clay films; few, small, dark-brown and black concretions; strongly acid; clear, smooth boundary.

B22t—24 to 38 inches, yellowish-brown (10YR 5/6) silty clay loam; few, medium, distinct, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; strong, medium, angular and subangular blocky structure; firm; common thin clay films; common, small, dark-brown and black concretions and black stains; strongly acid; clear, smooth boundary.

B23t—38 to 50 inches, yellowish-brown (10YR 5/6) silty clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles and faint, strong-brown (7.5 YR 5/6) and pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; firm; few, thin, discontinuous clay films; common, small, dark-brown and black concretions; common black stains; strongly acid; clear, smooth boundary.

B3t—50 to 62 inches, mottled dark yellowish-brown (10YR 4/4), light brownish-gray (10YR 6/2), and pale-brown (10YR 6/3) silty clay loam; weak, medium, angular and subangular blocky structure; firm; discontinuous clay films; few, fine, dark concretions; few, mostly chert pebbles, 5 to 10 millimeters in diameter; strongly acid.

The Ap horizon ranges from dark grayish brown to brown and dark yellowish brown. It is 6 to 10 inches thick and ranges from silt loam to silty clay loam. The Bt horizon ranges from yellowish brown to strong brown and dark yellowish brown. It ranges from silty clay loam to silty clay or clay in the lower part. Depth to grayish mottles ranges from 20 to 24 inches.

Wolftever silt loam (Wo).—This nearly level soil is on low terraces on the Cumberland River flood plain. It is mostly in long narrow bands that range from 10 to 25 acres.

Included with this soil in mapping are a few small areas of somewhat poorly drained soils that have a light yellowish-brown, friable silty clay loam subsoil that has grayish mottles at a depth within 10 inches of the surface. Also included are small areas of moderately well drained soils that have a brown, friable silt loam or silty clay loam subsoil.

This soil is suited to most crops commonly grown in the county. It is well suited to soybeans, small grain, grain sorghum, tall fescue, white clover, and annual lespedeza. It is moderately well suited to tobacco, and it is poorly suited to alfalfa because of susceptibility to occasional flooding and wetness in the lower part of the subsoil. Response to lime, fertilizer, and other management practices is good. Capability unit IIw-1; woodland group 3w8.

Use and Management of the Soils

The soils of Montgomery County are used extensively for cultivated crops and pasture. This section explains how the soils can be managed for these main purposes and as woodland, for wildlife, and in the building of highways, farm ponds, and other engineering structures. Also given are estimated yields of the principal crops under two levels of management.

Crops and Pasture

In this subsection the capability classification is explained and the management of soils by capability units is discussed. A table lists estimated yields of the soils under two levels of management.

Capability Groupings

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

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

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

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes. (None in Montgomery County.)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be

partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, but not in Montgomery County, shows that the chief limitation is climate that is too cold to too dry.

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

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

Management by capability units [3]

Suggestions for the use and management of the soils of Montgomery County, by capability unit, are given in the following pages. Specific statements are not made concerning the use of fertilizer, desirable varieties and mixtures of seeds, or favorable dates for planting. Up-to-date information is published from time to time by the Tennessee Agricultural Experiment Station and the Extension Service. Personnel of the local office of the Soil Conservation Service and the Extension Service can furnish information helpful in interpreting this information.

The capability unit designation for each soil in the county is given in the "Guide to Mapping Units" at the back of this survey.

[3] C. H. JENT, agronomist, Soil Conservation Service, helped to prepare this section.

CAPABILITY UNIT I-1

This unit consists of deep, nearly level, loamy soils on bottom lands or along drainageways. These soils are flooded in a few places or are subject to occasional flooding for very brief periods, mostly in winter and early in spring. Available water capacity is high. Roots penetrate to a depth of 4 feet or more. Fertility is moderate to high. The response to management is excellent.

These soils are well suited to crops and can be farmed intensively. They are easy to work. Practically all of the acreage of these soils is cultivated. Much of it is used for corn, tobacco, and hay, and all the common crops in the county can be grown. These soils are generally not used for pasture, but the high available water capacity makes them especially well suited to supplemental summer pasture. Alfalfa generally does not survive so long on these soils as on the reddish soils on uplands.

The soils in this unit can be row cropped every year because they are nearly level and are not subject to erosion. Incorporating large amounts of plant residue into the soils maintains their good physical condition.

Figure 14.—**Minimum tillage system where soybeans were planted in barley stubble.**

CAPABILITY UNIT IIe-1

This unit consists of deep or moderately deep, well-drained soils. The surface layer is silt loam. Permeability is moderate. The root zone is deep to moderately deep and is easily penetrated by air, roots, and water. Available water capacity is high to medium. Response to management is excellent.

These soils are among the most productive in the county. If adequately limed, fertilized, and otherwise well managed, they are suited to most crops commonly grown in the survey area. Corn, soybeans, tobacco, alfalfa, small grain, orchardgrass, tall fescue, red clover, and white clover are some of the suitable crops.

Simple conservation management such as contour cultivation, plant residue management, and minimum tillage are effective in controlling erosion (fig. 14). On long slopes, erosion can be reduced to a tolerable level by terracing, by stripcropping, or by using no-tillage measures. Diversions protect areas that receive excess runoff water from steep soils. Natural drainageways should be established in perennial sod.

CAPABILITY UNIT IIe-2

This unit consists of moderately well drained, gently sloping soils on uplands and low terraces. The surface layer is silt loam. These soils have a fragipan or a clayey subsoil in which permeability is moderately slow or slow. They are easy to work. Available water capacity is medium. The nearly impervious layer of these soils limits use. Above the fragipan or the clayey layer, the soils are easily penetrated by roots, air, and water; however, either of these layers restricts the movement of air and water, confining most plant root growth to about the upper 24 inches. During periods of heavy rain, a 4- to 10-inch layer immediately above the fragipan becomes waterlogged. During long dry periods, these soils dry out, and crops and pasture are damaged because of a lack of moisture.

Row crops can be grown as much as 50 percent of the time on soils in this capability unit. These soils are well suited to short-term cropping systems. Small grain, corn, tobacco, tall fescue, white clover, annual lespedeza, and sericea lespedeza are some suitable crops. Alfalfa generally lasts only 1 or 2 years.

Erosion is a hazard on some of the longer slopes. Contour cultivation and minimum tillage help to control erosion and are needed on many of the longer slopes. Management of crop residue helps to control erosion and to maintain tilth. Crops respond well to applications of fertilizer and lime. Fertilizer should be used in relatively small amounts, but it should be applied more frequently than on soils that do not have a fragipan. In places runoff from adjacent steep areas need to be diverted. Drainageways should be protected by establishing perennial vegetation in the channel. Suitable plants are those that can tolerate excess water during wet seasons and a scarcity of water during dry seasons.

CAPABILITY UNIT IIe-3

Humphreys cherty silt loam, 3 to 10 percent slopes, the only soil in this capability unit, is deep and well drained and is on low terraces and on foot slopes. It is loamy and has chert fragments on the surface and throughout the profile. Available water capacity is medium.

When adequately fertilized and otherwise well managed, this soil is well suited to many crops. Corn, soybeans, tobacco, lespedeza, white clover, and tall fescue are some of the crops that grow well.

Contour cultivation, crop residue management, and the use of no-tillage are practices that are effective in controlling erosion. In some areas, diversions are needed to intercept runoff from adjacent steep soils. Natural drainageways should be kept in perennial sod.

CAPABILITY UNIT IIw-1

In this unit are moderately well drained to well-drained, fertile soils on first bottoms and in depressions. The surface layer is silt loam. These soils are occasionally flooded for very brief periods, mostly in winter and early in spring, and planting is sometimes delayed because of excess moisture. Available water capacity is high. Response to management is good.

These soils are well suited to soybeans, grain sorghum, tall fescue, white clover, and lespedeza. They are well suited to supplemental summer pasture from plants such as pearl millets or sudan-sorghum hybrids. Corn grows well, but planting is delayed at times on the moderately well drained soils. Small grain and soybeans can be grown in areas where surface drainage is good and ponding or flooding is not severe.

These soils can be row cropped every year because they are level and are not subject to erosion. They can be cultivated in only a narrow range of moisture content because they either form clods or puddle if tilled when wet or they harden if tilled when dry. In many places a system of open drainage ditches and diversion ditches improves surface and internal drainage on the moderately well drained soils. Plowing under large amounts of residue replenishes the supply of organic matter and preserves tilth.

CAPABILITY UNIT IIs-1

This unit consists of nearly level soils on first bottoms, along small drainageways, and in depressions. The surface layer is cherty silt loam. The soils are well drained and moderately well drained and are sometimes flooded for very brief periods, mainly in winter and early in spring. Numerous chert fragments on the surface and throughout the soil interfere with tillage and reduce available water capacity.

If these soils are well fertilized and otherwise well managed, they are suited to many crops. Corn, soybeans, lespedeza, common and midland bermudagrass, white clover, and tall fescue are crops that grow well. Tobacco can be successfully grown in areas that are not susceptible to flooding.

These soils can be tilled in a wide range of moisture content without serious damage to their tilth. The good physical condition of these soils can be maintained by incorporating large amounts of plant residue into the soils. Maintaining a high level of fertility is necessary to insure an ample amount of plant residue. In many places damage from flooding and sedimentation can be reduced by straightening, cleaning, and snagging the stream channels. Diversions are needed in some areas to intercept runoff received from adjacent uplands.

CAPABILITY UNIT IIIe-1

This unit consists of deep to moderately deep, friable, well-drained, gently rolling soils on uplands. The surface layer is silt loam. The root zone is deep to moderately deep. Available water capacity is high to medium. The plow layer is easy to work. The upper part of these soils is easily penetrated by air, water, and plant roots. Reaction ranges from very strongly acid to medium acid.

If well fertilized and otherwise well managed, soils in this capability unit are suited to many crops. Suitable crops are corn, tobacco, soybeans, small grain, alfalfa, lespedeza, common or Midland bermudagrass, orchardgrass, tall fescue, and white and red clover.

Erosion control is the main management concern. Runoff and soil loss can be reduced by a suitable cropping system, adequate fertilizer, crop-residue management (including the use of residue as a surface mulch), and suitable water management. Suitable cropping systems consist of 1 year of row crops, followed by 2 years or more of grasses, legumes, or a mixture of both. These soils respond well to lime and to a complete fertilizer. Winter cover crops that help to control erosion are small grain, crimson clover, and hairy vetch. Corn stalks that are shredded and used as a surface mulch also adequately protect the soil in winter.

Diversions, stripcropping, terracing, and contour cultivation are practices that are effective in reducing soil loss (fig. 15). Crop production that includes a surface mulch of plant residue from a prior crop permits more intensive use of many of these soils for row crops. Natural drainageways need to be established in permanent grass sod for removal of runoff.

CAPABILITY UNIT IIIe-2

This unit consists of soils that have a surface layer of silt loam and a fragipan at a depth of about 24 inches. The fragipan restricts growth of roots and the movement of air and water. Excess water accumulates above the fragipan during wet periods, and the soils dry out rapidly. Available water capacity is medium.

The slowly permeable layer of these soils somewhat limits their use. Grain sorghum, tobacco, small grain, sericea lespedeza, and annual lespedeza are suitable crops. Small grain grows and matures during periods of ample rain. Alfalfa is poorly suited to these soils. Pasture and hay are fairly well suited if suitable forage plants are grown. Tall fescue, bermudagrass, sericea lespedeza, and annual lespedeza can be grown. These soils respond fairly well to lime and fertilizer. Small but frequent applications of fertilizer give the best response.

Because these soils have a compact subsoil and are sloping, they are difficult to manage and are subject to further erosion. If these soils are used for row crops, contour cultivation, stripcropping, terraces, or a combination of these practices are effective in retarding runoff and reducing soil loss. Crop-residue management, the use of residue as a surface mulch, and the use of no-tillage crops such as corn or grain sorghum reduce soil loss and runoff to a safe level. Diversions are sometimes needed to carry excess water to protected outlets. Natural drainageways should be established in perennial vegetation to remove runoff and to insure the minimum loss of soil material.

CAPABILITY UNIT IIIe-3

Baxter cherty silt loam, 5 to 12 percent slopes, is the only soil in this unit. This soil is deep and well drained and is on uplands. Chert fragments are scattered over the surface and throughout the profile. The chert reduces available water capacity. The root zone is deep. Response to management is favorable.

This soil is suited to all crops commonly grown in the county, but in many places plant growth is reduced by periods of drought during summer and fall. Tobacco,

Figure 15.—Stripcropping on soils of capability unit IIIe-1.

small grain, annual and perennial lespedeza, and pasture plants are some of the crops grown. Best results are obtained by growing a row crop every 3 or 4 years and growing hay or pasture the rest of the time. Under good management, this soil is suitable for cool-season pasture grasses and legumes. An annual application of a complete fertilizer and 2 to 3 tons of lime per acre every 5 to 6 years is needed for most crops and pasture mixtures to maintain good plant growth.

Growing a row crop every 3 or 4 years and using suitable management practices, such as diversions, contour cultivation, and stripcropping, help to control further erosion. The minimum tillage practice of no-tillage, using a surface mulch of crop residue, permits more intensive use of this soil for row crops without appreciable soil deterioration. Close-growing perennial vegetation established in natural drains provides safe removal of runoff water.

CAPABILITY UNIT IIIw-1

This unit consists of somewhat poorly drained and poorly drained soils on flood plains and in low areas on uplands. The surface layer is silt loam. Most areas on flood plains are subject to short periods of flooding, and those in low areas on uplands are likely to be ponded for short periods following periods of heavy rain. A water table is at a depth of 1 foot or 2 feet for several days during winter and spring.

These soils respond to applications of lime and fertilizer and to other management practices. Corn, grain sorghum, and soybeans are well suited to fairly well suited to these soils. Tall fescue, alsike clover, white clover, and annual lespedeza are suitable hay and pasture plants. Deep-rooted legumes such as sericea lespedeza are poorly suited. Except for infrequent crop damage from flooding and ponding, plant growth is fair to good on these soils. Supplemental drainage and land shaping eliminates ponding in many places.

Wetness is the main limitation to use of the soils. It often delays tillage in spring and harvest in fall. It can be overcome by selecting crops that can tolerate wetness and by using open ditches, where outlets are available, to remove surface water from pockets and low areas. Tile drainage generally is not effective, because of the slow movement of water in the soils or the absence of suitable outlets. Grazing is restricted during periods when these soils are wet, because the surface layer is soft, and puddling caused by livestock trampling is possible.

Row crops can be grown every year because these soils are nearly level and are not likely to erode. Applying ample amounts of fertilizer and plowing under plant residue help to replenish the supply of organic matter and to maintain the physical condition of these soils.

CAPABILITY UNIT IVe-1

This unit consists of deep to moderately deep, well-drained, sloping to moderately steep soils on uplands. The root zone is deep to moderately deep. Available water capacity is generally medium, but it ranges to low.

Most commonly grown crops and pasture plants are fairly well suited to these soils. In many places plant growth is reduced during periods of summer drought, especially on the cherty soils, and summer annual plants, such as annual lespedeza and sudan-sorghum hybrids, do not grow well. When well fertilized, limed, and otherwise well managed, these soils are suited to corn, small grain, tobacco, and hay. When these soils are used for row crops, a suitable cropping system is one that includes a cultivated crop 1 year out of 4 or 6 years and perennial pasture or hay crops the rest of the time. The use of no-tillage for corn and sorghum allows more intensive use of these soils if a good surface mulch of plant residue is provided.

Because of droughtiness, susceptibility to further erosion, and steepness of slope, these soils are better suited to pasture and hay than to row crops. All grasses and legumes commonly grown in the county are suitable. Tall fescue, orchardgrass, bermudagrass, white and red clover, alfalfa, and sericea lespedeza are some suitable plants.

Contouring, stripcropping, and using diversions are effective practices that help in retarding runoff and in controlling further erosion. Natural drainageways need to be established and maintained in perennial vegetation to remove runoff and to insure minimum loss of soil material. On the steeper soils, pasture and hay plants should be established or reestablished in alternate strips that have boundaries that approximate the contour of the land.

CAPABILITY UNIT IVw-1

This unit consists of poorly drained, nearly level soils on first bottoms and in low areas on uplands. The areas on flood plains are flooded for short periods in winter and in spring, and those on uplands collect runoff and are ponded for short periods. The surface layer is silt loam, and the subsoil ranges from silt loam to silty clay. In many places these soils are wet until late in spring, and planting is delayed.

Most areas of these soils are poorly suited to row crops. If adequately drained, these soils are suited to soybeans, grain sorghum, or other summer annuals that can be planted late in spring and harvested early in fall. In places, waterlogging delays or prevents harvesting and the use of heavy machinery. These soils are well suited to water-tolerant permanent pasture. Tall fescue, white clover, alsike clover, and annual lespedeza are suitable crops.

These soils are easy to work when they contain the proper amount of moisture. They are not subject to erosion. Where suitable outlets are available, excess surface water can be removed by open ditches. Where possible wooded areas should be left in trees.

CAPABILITY UNIT VIe-1

This unit consists of deep, well-drained soils that have either a cherty silt loam surface layer or a cherty silty clay loam surface layer. The subsoil is cherty clay. These are moderately steep to steep soils on hillsides and on short slopes surrounding limestone sinks. Available water capacity is medium to low.

These soils are not suited to crops. They are suited to pasture, and some of the less sloping soils are suited to hay. A tall fescue-white clover mixture can be maintained on these soils. Annual lespedeza should be intro-

TABLE 4.—*Estimated average acre yields of principal crops*

[Yields in columns A are obtained under common management; those in columns B are to be expected under

Soil
Arrington silt loam
Baxter cherty silt loam, 5 to 12 percent slopes
Baxter cherty silt loam, 12 to 20 percent slopes
Baxter cherty silt loam, 20 to 35 percent slopes
Baxter cherty silty clay loam, 5 to 12 percent slopes, eroded
Baxter cherty silty clay loam, 12 to 25 percent slopes, eroded
Baxter soils and Rock outcrop, 20 to 45 percent slopes
Beason silt loam
Bedford silt loam, 2 to 5 percent slopes
Bodine cherty silt loam, 15 to 45 percent slopes
Brandon silt loam, 2 to 5 percent slopes
Brandon silt loam, 5 to 12 percent slopes
Brandon silt loam, 10 to 20 percent slopes, eroded
Cannon cherty silt loam
Crider silt loam, 2 to 8 percent slopes
Cumberland silty clay loam, 5 to 12 percent slopes, eroded
Cumberland soils, cherty variant, 10 to 25 percent slopes, eroded
Dickson silt loam, 1 to 4 percent slopes
Dickson silt loam, 4 to 8 percent slopes
Egam silt loam
Forestdale silt loam
Guthrie silt loam
Humphreys cherty silt loam, 3 to 10 percent slopes
Lax silt loam, 1 to 4 percent slopes
Lax silt loam, 4 to 8 percent slopes
Lindside silt loam
Lobelville cherty silt loam
Melvin silt loam
Mountview silt loam, 2 to 5 percent slopes
Mountview silt loam, 5 to 12 percent slopes
Mountview silt loam, 5 to 12 percent slopes, eroded
Newark silt loam
Pembroke silt loam, 2 to 5 percent slopes
Pembroke silt loam, 5 to 12 percent slopes
Pickwick silt loam, 2 to 5 percent slopes
Pickwick silt loam, 5 to 12 percent slopes
Pickwick silt loam, 5 to 12 percent slopes, eroded
Pickwick silt loam, 12 to 20 percent slopes
Staser fine sandy loam
Statler silt loam, 2 to 5 percent slopes
Statler silt loam, 5 to 12 percent slopes
Taft silt loam
Wolftever silt loam

[1] Cow-acre-days is a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multiplied by the number of days the pasture is grazed during a single grazing season without injury to the sod. One acre of pasture that provides 30 days of grazing for two cows has a carrying capacity of 60 cow-acre-days. To determine the tonnage of air-dry forage per acre divide the cow-acre-days by 53.

duced if the clover fades out. Some other grasses and legumes that will grow on these soils are common bermudagrass, red clover, and sericea lespedeza; however, sericea lespedeza should not be grown on soils that are too steep to mow. To maintain a productive pasture, grazing must be controlled and cattle removed from pasture before overgrazing occurs. Weeds and bushes in pastures are best controlled by herbicides, especially on the steeper soils.

When establishing or renovating pasture stands, the long slopes in steep areas should be planted in alternate contour strips over a 2-year period. This practice helps to reduce erosion during the time when young pasture plants afford little erosion control. Critically eroded areas not needed or not suited to pasture should be planted to desirable tree species.

CAPABILITY UNIT VIIe-1

Baxter soils, 12 to 25 percent slopes, severely eroded, are the only soils in this unit. Areas of these soils are deeply cut by gullies. In most places the soil material is reddish and clayey and contains many chert fragments. In a few places there are outcrops of limestone rock.

This soil is suited to trees, and reforestation is the most economical method of reclamation. Expensive reclamation is needed before forage can be grown in the gullied areas. The cost of smoothing and establishing pasture generally cannot be justified.

CAPABILITY UNIT VIIs-1

This unit consists of steep to very steep, very rocky or cherty soils. Available water capacity is low.

on arable soils under two levels of management

highest feasible level of management. Absence of yield figure indicates crop is not commonly grown]

Corn		Dark fire-cured tobacco		Soybeans		Wheat		Lespedeza (seeded alone)		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B
Bu	*Bu*	*Lbs*	*Lbs*	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
80	110	2,000	2,250	30	40	35	42	1.7	2.3	170	220
50	65	1,600	1,800	20	23	27	32	1.1	1.4	120	155
40	60	1,400	1,600	18	20	25	30	1.0	1.3	120	145
										65	90
35	48	1,200	1,500	10	15	18	25	.6	.8	90	120
40	52	1,200	1,400					.5	.7	80	105
										30	45
40	60			28	35	24	28	1.2	1.7	140	180
55	75	1,700	1,900	26	33	32	38	1.2	1.6	145	180
										45	60
48	80	1,600	1,800	25	30	28	40	1.2	1.6	120	155
45	72	1,600	1,900	20	25	25	38	1.1	1.4	115	145
40	60	1,400	1,600	18	22	22	32	1.0	1.2	100	130
60	80	1,600	1,650	22	26	30	35	1.3	1.8	135	180
70	100	2,200	2,300	35	40	38	45	1.7	2.3	175	220
42	65	1,350	1,750	15	24	28	40	.9	1.2	140	180
35	52	1,200	1,500			20	28	.6	.8	75	115
50	75	1,700	1,900	22	28	30	38	1.1	1.6	125	175
45	68	1,600	1,900	19	26	28	36	1.0	1.4	110	165
65	80	1,800	1,900	30	35	33	38	1.8	2.2	140	195
40	55			25	35					140	190
	[2] 40			18	25			.8	1.1	100	145
50	68	1,750	1,900	20	25	28	38	1.2	1.6	125	180
50	70	1,650	1,900	20	28	30	38	1.1	1.5	120	170
45	62	1,450	1,800	18	24	28	36	1.0	1.3	105	160
65	95	1,500	1,700	32	40	27	32	1.4	2.0	155	210
52	70	1,350	1,600	24	28	26	30	1.2	1.7	130	175
	[2] 50				25			.9	1.2	130	170
55	85	1,900	2,200	27	35	35	42	1.2	1.6	130	190
50	75	1,700	2,000	25	30	32	40	1.0	1.4	120	170
35	54	1,300	1,600	18	24	25	35	.6	.9	85	145
35	[2] 60			20	30			.7	1.0	140	190
70	95	2,200	2,300	28	40	36	45	1.7	2.2	160	200
58	88	1,900	2,200	26	35	35	42	1.5	1.9	140	185
60	85	2,000	2,300	28	38	35	45	1.4	1.8	140	190
55	80	1,700	2,100	26	32	32	42	1.2	1.6	125	170
40	55	1,375	1,600	16	22	27	34	.8	1.1	90	145
45	65	1,400	1,700	18	22	30	35	1.2	1.5	120	165
65	90	1,700	2,000	28	35	34	40	1.4	1.8	150	190
65	95	1,900	2,300	32	40	38	45	1.5	2.0	145	210
55	85	1,800	2,100	25	32	34	42	1.3	1.7	130	185
35	50			19	28	20	25	.9	1.3	110	155
50	75	1,600	1,800	22	35	28	35	1.3	1.7	125	170

[2] Yields are for areas from which surface water has been removed by ditches or other drains.

Most areas of these soils are wooded. Cleared areas should be reforested. Multiple-use management is desirable.

Predicted yields

Table 4 lists predicted yields of the principal crops grown in the county. The predictions are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The predicted yields are average yields per acre on arable soils that can be expected by commercial farmers at the level of management that tends to produce the highest economic returns and yields obtained under common management practices.

Crops other than those shown in table 4 are grown in the county, but they are not considered in the table, because their acreage is small or reliable data on their yields are not available.

The predicted yields given under the highest level of management in table 4 can be expected if the following management practices are used.

1. Rainfall is effectively used and conserved.
2. Surface or subsurface drainage systems, or both, are installed.
3. Crop residue is managed to maintain soil tilth.
4. Minimum but timely tillage is used.
5. Measures to control insects, diseases, and weeds are consistently used.
6. Fertilizer is applied according to the needs

indicated by soil tests and according to the needs of the crops.

7. Adapted crop varieties are used at recommended seeding rates.

Woodland [4]

Originally, Montgomery County was mainly wooded, and there were dense canebrakes in the Cumberland River bottoms (*1*). Trees now cover about 41 percent of the county.

Good stands of commercial trees are produced in the woodlands of the County. Oak and hickory trees make up 82 percent of the woodland. Oak-gum-cypress and ash-elm-cottonwood trees are dominant on bottom lands along rivers and creeks and make up most of the rest of the woodlands. Only a small acreage of pine occurs on plantations on abandoned cropland (*6*).

Commercial value of the wood products is substantial, though it is below its potential. Woodland also has value as wildlife habitat and for recreation, natural beauty, and conservation of soil and water. This section has been provided to explain how soils affect tree growth and management in the county. In table 5 potential productivity and management concerns of the soils in Montgomery County are listed.

In the first column of table 5, the soils are listed by

[4] C. M. Henninger, woodland conservationist, Soil Conservation Service, assisted in writing this section.

TABLE 5.—*Potential productivity and factors in management of soils for woodland*

Soil series and map symbols	Woodland group	Potential productivity		Management hazards or limitations			Species suitable for plantings
		Species	Site index [1]	Erosion hazard	Equipment limitations	Seedling mortality	
Arents. Mapped only with Urban land. Productivity and limitations variable.							
Arrington: Ar	2o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	*100* *80* *80* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.
Baxter:							
BaC, BaD, BcC2	3o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine Eastern redcedar	90 70 67 73 51	Slight	Slight	Slight	Yellow-poplar, loblolly pine, shortleaf pine, black walnut.
BaE, BcD2	3r8	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine Eastern redcedar	90 70 67 73 51	Moderate	Moderate	Moderate	Yellow-poplar, loblolly pine, shortleaf pine.
BgE3	4c3e	Virginia pine Loblolly pine Eastern redcedar	*60* *70* *70*	Moderate to severe.	Moderate to severe.	Moderate to severe.	Loblolly pine, eastern redcedar.
BkF	4x3	Upland oaks Eastern redcedar Loblolly pine	*60* *40* *70*	Slight to moderate.	Severe	Severe	Loblolly pine, eastern redcedar.
Beason: Bm	3w8	Yellow-poplar Sweetgum Loblolly pine Upland oaks	*90* *80* *80* *70*	Slight	Moderate	Moderate	Loblolly pine, sweetgum.
Bedford: BnB	3o7	Yellow-poplar Upland oaks Loblolly pine Shortleaf pine	*90* *70* *80* *70*	Slight	Slight	Slight	Loblolly pine, shortleaf pine.
Bodine: BoF	4f3	Chestnut oak Scarlet oak Virginia pine Eastern redcedar	*55* *55* *50* *40*	Moderate	Severe	Severe	Virginia pine, eastern redcedar.
Brandon: BrB, BrC, BrD2	3o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	80 *65* 64 *75*	Slight	Slight	Slight	Loblolly pine, shortleaf pine.
Cannon: Ca	2o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	*100* *80* *80* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.

TABLE 5.—*Potential productivity and factors in management of soils for woodland*—Continued

Soil series and map symbols	Woodland group	Potential productivity		Management hazards or limitations			Species suitable for plantings
		Species	Site index [1]	Erosion hazard	Equipment limitations	Seedling mortality	
Crider: CrB	2o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	*95* *80* *80* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.
Cumberland: CsC2	4c3e	Virginia pine Loblolly pine Eastern redcedar	*60* *70* *40*	Slight	Moderate to severe.	Moderate to severe.	Loblolly pine, eastern redcedar.
Cumberland, cherty variant: CuD2	3o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine Eastern redcedar	90 *70* *70* *80* *50*	Slight	Slight	Slight	Yellow-poplar, black walnut, shortleaf pine, loblolly pine.
Dickson: DsB, DsC	3o7	Yellow-poplar Upland oaks Loblolly pine Shortleaf pine	92 73 *80* *70*	Slight	Slight	Slight	Loblolly pine, shortleaf pine.
Egam: Eg	2o7	Yellow-poplar Upland oaks Bottom-land oaks Loblolly pine	*100* *80* *90* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.
Forestdale: Fo	1w6	Cottonwood Sweetgum Green ash Cherrybark oak	*100* 100 78 94	Slight	Severe	Moderate	Cottonwood, sweetgum, cherrybark oak, sycamore.
Guthrie: Gu	2w9	Yellow-poplar Upland oaks Loblolly pine Bottom-land oaks Sweetgum	102 76 79 87	Slight	Severe	Severe	Loblolly pine, sweetgum.
Humphreys: HuB	2o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	101 *80* *80* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.
Lax: LaB, LaC	3o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	*90* *70* *70* *80*	Slight	Slight	Slight	Loblolly pine, shortleaf pine.
Lindside: Ld	2w8	Yellow-poplar Upland oaks Loblolly pine Sweetgum	*100* *80* *90* *90*	Slight	Moderate	Slight	Yellow-poplar, black walnut, loblolly pine.
Lobelville: Lo	2w8	Yellow-poplar Upland oaks Loblolly pine	94 76 *90*	Slight	Moderate	Slight	Yellow-poplar, black walnut, loblolly pine.
Melvin: Me	2w9	Yellow-poplar Bottom-land oaks Sweetgum Cottonwood Loblolly pine	*90* *90* *90* *100* *90*	Slight	Severe	Severe	Loblolly pine, sweetgum, cottonwood.
Mountview: MoB, MoC, MoC2	3o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	90 67 64 *80*	Slight	Slight	Slight	Shortleaf pine, loblolly pine.
Newark: Ne	2w8	Loblolly pine Bottom-land oaks Sweetgum Cottonwood	*90* *90* *90* *100*	Slight	Moderate	Slight	Loblolly pine, sweetgum, cottonwood.
Pembroke: PeB, PeC	2o7	Yellow-poplar Upland oaks Loblolly pine Shortleaf pine	*100* *80* *90* *80*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.

TABLE 5.—*Potential productivity and factors in management of soils for woodland*—Continued

Soil series and map symbols	Woodland group	Potential productivity		Management hazards or limitations			Species suitable for plantings
		Species	Site index [1]	Erosion hazard	Equipment limitations	Seedling mortality	
Pickwick: PkB, PkC, PkC2, PkD	3o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine Eastern redcedar	95 73 *70* *80* 55	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.
Rock outcrop: Mapped only with Baxter soils; see mapping unit BkF.							
Staser: Ss	2o7	Yellow-poplar Upland oaks Loblolly pine	*100* *80* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut loblolly pine.
Statler: StB, StC	2o7	Yellow-poplar Upland oaks Shortleaf pine Loblolly pine	*100* *80* *80* *90*	Slight	Slight	Slight	Yellow-poplar, black walnut, loblolly pine.
Taft: Ta	3w8	Yellow-poplar Upland oaks Loblolly pine Sweetgum	*90* 61 *85* *80*	Slight	Moderate	Moderate	Loblolly pine, sweetgum.
Urban land: Ua. No productivity or limitations given; both urban land and Arents part too variable to be rated.							
Wolftever: Wo	3w8	Yellow-poplar Upland oaks Bottom-land oaks Sweetgum Loblolly pine	*90* *70* *80* *80* *80*	Slight	Moderate	Moderate	Loblolly pine, yellow-poplar.

[1] Site indexes in italics are based on similar soils or comparative site indexes of other species.

their mapping unit symbols under the series to which they belong. If a mapping unit contains the name of two series, as in a complex, the component soils are listed and evaluated separately under their respective series.

The next column gives the woodland group. Each group is made up of soils that are suited to the same kinds of trees, that need about the same kind of management to produce these trees, and that have about the same potential productivity.

Each woodland group is identified by a three-part symbol. The first part of the symbol indicates the relative productivity of the soils: 1 is very high; 2 is high; 3 is moderately high; 4 is moderate; and 5 is low. The second part of the symbol, a letter, indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter *x* shows that the main limitation is stoniness or rockiness; *w* shows that excessive water in or on the soil is the chief limitation; *c* shows that clay in the upper part of the soil is a limitation; *f* shows that the soils have large amounts of coarse fragments; *r* shows the soils have steep slopes; and *o* shows the soils have no significant restrictions or limitations for woodland use or management. The third element in the symbol indicates the degree of management problems and the general suitability of the soils for certain kinds of trees.

In the third column is a list of some of the commercially important trees that are adapted to a specific soil. These trees are the ones that woodland managers will generally favor in intermediate or improvement cuttings. Also given is the potential productivity of the trees in terms of site index. The site index is the average height of dominant trees, in feet, at age 30 for cottonwood; at age 35 for sycamore; and at age 50 for all other species or types.

Erosion hazard measures the risk of soil losses in well-managed woodland. Erosion hazard is *slight* if expected soil loss is small, *moderate* if some measures to control erosion are needed in logging and construction, and *severe* if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Equipment limitation ratings reflect the soil conditions that restrict the use of equipment generally used in woodland management or harvesting. *Slight* ratings indicate equipment use is not limited in kind or time of year. A rating of *moderate* indicates a seasonal limitation or need for modification in methods or equipment. *Severe* ratings indicate the need for specialized equipment or operation.

Seedling mortality ratings indicate the degree of expected mortality of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed.

A *slight* rating indicates expected mortality is less than 25 percent; *moderate* indicates that expected mortality is 25 to 50 percent; and *severe* indicates that more than 50 percent of the seedlings will die.

In the last column is a list of trees suitable for planting for commercial wood production.

Wildlife [5]

Soils directly influence kinds and amounts of vegetation and amounts of water available, and in this way indirectly influence the kinds of wildlife that can live in an area. Soil properties that affect the growth of wildlife habitat are thickness of soil useful to crops, surface texture, available water capacity to a 40-inch depth, wetness, surface stoniness or rockiness, flood hazard, slope, and permeability of the soil to air and water.

In table 6 soils of Montgomery County are rated for producing seven elements of wildlife habitat and for three kinds of wildlife. The ratings indicate relative suitability for various elements.

A rating of *well suited* means the element of wildlife habitat and habitats generally are easily developed, improved, and maintained. Few or no limitations affect management in this category, and satisfactory results are expected when the soil is used for the prescribed purpose.

A rating of *suited* means habitats can be developed, improved, or maintained in most places. Moderate intensity of management and fairly frequent attention may be required for satisfactory results, however.

A rating of *poorly suited* means the limitations for the designated use are rather severe. Habitats can be developed, improved, or maintained in most places, but management is difficult and requires intensive effort.

A rating of *unsuited* means the limitations for the designated use are very severe and that unsatisfactory results are to be expected. It is either impossible or impractical to develop, improve, or maintain habitats on soils in this category.

Each soil is rated in table 6 according to its suitability for producing various kinds of plants and other elements that make up wildlife habitats. The ratings take into account mainly the characteristics of the soils and closely related natural factors of the environment. They do not take into account climate, present use of soils, or present distribution of wildlife and people. For this reason, selection of a site for development as a habitat for wildlife requires inspection at the site.

The elements of wildlife habitat rated in table 6 are briefly described in the following paragraphs.

Grain and seed crops are annual grain-producing plants, such as corn, sorghum, millet, and soybeans.

Grasses and legumes are domestic grasses and legumes that are established by planting. They provide food and cover for wildlife. Grasses include bahiagrass, ryegrass, lovegrass, and panicgrass; legumes include annual lespedeza, shrub lespedeza, and clovers.

Wild herbaceous upland plants are native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, and cheatgrass are typical examples.

Hardwood woody plants are nonconiferous trees, shrubs, and woody vines that produce wildlife food in the form of fruits, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Typical species in this category are oaks, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, and silverberry.

Coniferous woody plants are cone-bearing trees and shrubs that provide cover and frequently furnish food in the form of browse, seeds, or fruit-like cones. They commonly grow in their natural environment, but they may be planted and managed. Typical plants in this category are pines, cedars, junipers, and ornamental trees and shrubs.

Wetland food and cover plants are annual and perennial herbaceous plants that grow wild on moist and wet sites. They furnish food and cover mostly for wetland wildlife. Typical examples of plants are smartweed, wild millet, spikerush and other rushes, sedges, burreed, tearthumb, aneilema, and willow, water, and pin oaks. Submerged and floating aquatics are not included in this category.

Shallow water developments are impoundments or excavations for controlling water, generally not more than five feet deep, to create habitats that are suitable for waterfowl. Some are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submersed aquatics.

Table 6 also rates soils according to their suitability as habitat for the three kinds of wildlife in Montgomery County: open-land, woodland, and wetland wildlife. These ratings are related to ratings made for the elements of habitat. For example, soils rated unsuited for shallow water developments are rated unsuited for wetland wildlife. The ratings are described in the following paragraphs.

Open-land wildlife consists of birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlarks, field sparrows, cottontail rabbits, and foxes are typical examples of open-land wildlife.

Woodland wildlife consists of birds and mammals that normally live in areas of hardwood trees, coniferous trees, and shrubs. Woodcocks, thrushes, wild turkey, vireos, deer, squirrels, and raccoons are typical examples of woodland wildlife.

Wetland wildlife consists of birds and mammals that normally live in wet areas, marshes, and swamps. Ducks, geese, rails, shore birds, herons, mink, and muskrats are typical examples of wetland wildlife.

Engineering Uses of the Soils [6]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions,

[5] FLOYD R. FESSLER, biologist, Soil Conservation Service, helped to prepare this section.

[6] WILLIAM J. CARMACK, assistant State conservation engineer, Soil Conservation Service, helped to prepare this section.

TABLE 6.—*Suitability of the soils for elements*

Soil series and map symbols	Wildlife habitat elements			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants
Arents. Mapped only with Urban land.				
Arrington: Ar	Well suited	Well suited	Well suited	Well suited
Baxter:				
BaC	Suited	Well suited	Suited	Well suited
BaD	Poorly suited	Suited	Suited	Well suited
BaE	Unsuited	Poorly suited	Suited	Well suited
BcC2	Suited	Suited	Suited	Well suited
BcD2	Poorly suited	Suited	Suited	Well suited
BgE3	Unsuited	Suited	Suited	Suited
BkF	Unsuited	Unsuited	Well suited	Suited
Rock outcrop part not rated.				
Beason: Bm	Suited	Well suited	Well suited	Well suited
Bedford: BnB	Suited	Well suited	Well suited	Well suited
Bodine: BoF	Unsuited	Poorly suited	Suited	Suited
Brandon:				
BrB	Well suited	Well suited	Well suited	Well suited
BrC	Suited	Well suited	Well suited	Well suited
BrD2	Poorly suited	Suited	Well suited	Well suited
Cannon: Ca	Suited	Well suited	Well suited	Well suited
Crider: CrB	Well suited	Well suited	Well suited	Well suited
Cumberland:				
CsC2	Poorly suited	Suited	Suited	Well suited
Cumberland, silty variant				
CuD2	Suited	Suited	Suited	Well suited
Dickson:				
DsB	Suited	Well suited	Well suited	Well suited
DsC	Suited	Well suited	Well suited	Well suited
Egam: Eg	Suited	Well suited	Well suited	Well suited
Forestdale: Fo	Poorly suited	Suited	Suited	Suited
Guthrie: Gu	Poorly suited	Suited	Suited	Suited
Humphreys: HuB	Suited	Well suited	Well suited	Well suited
Lax:				
LaB	Suited	Well suited	Well suited	Well suited
LaC	Suited	Well suited	Well suited	Well suited
Lindside: Ld	Suited	Well suited	Well suited	Well suited
Lobelville: Lo	Suited	Well suited	Well suited	Well suited
Melvin: Me	Poorly suited	Suited	Suited	Suited
Mountview:				
MoB, MoC	Suited	Well suited	Well suited	Well suited
MoC2	Suited	Well suited	Well suited	Well suited
Newark: Ne	Suited	Suited	Suited	Well suited
Pembroke: PeB, PeC	Suited	Well suited	Well suited	Well suited
Pickwick:				
PkB, PkC	Suited	Well suited	Well suited	Well suited
PkC2	Poorly suited	Well suited	Well suited	Well suited
PkD	Poorly suited	Suited	Well suited	Well suited
Rock outcrop. Mapped only with Baxter soils; see map symbol BkF.				
Staser: Ss	Suited	Well suited	Well suited	Well suited
Statler:				
StB	Well suited	Well suited	Well suited	Well suited
StC	Suited	Well suited	Well suited	Well suited
Taft: Ta	Suited	Suited	Well suited	Well suited
Urban land: Ua. No ratings given; both Urban land and Arents parts too variable to be rated.				
Wolftever: Wo	Well suited	Well suited	Well suited	Well suited

town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils important in engineering are permeability, strength, compaction characteristics, drainage, shrink-swell potential, grain size, plasticity, and reaction. Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, foundations for small buildings, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational uses.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.

of wildlife habitat and kinds of wildlife

Wildlife habitat elements—Con.			Kinds of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Open-land	Woodland	Wetland
Poorly suited	Poorly suited	Suited	Well suited	Well suited	Poorly suited.
Poorly suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Poorly suited	Suited	Suited	Well suited	Suited	Suited.
Poorly suited	Poorly suited	Unsuited	Well suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Poorly suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Well suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Well suited	Well suited	Suited	Suited	Well suited.
Poorly suited	Well suited	Well suited	Suited	Suited	Well suited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Suited	Suited	Suited	Suited	Suited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Suited	Suited	Suited	Suited	Suited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Poorly suited	Unsuited	Poorly suited	Well suited	Well suited	Poorly suited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Poorly suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.

4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 7 and 8 which show, respectively, several esti-

TABLE 7.—*Estimated soil properties*

[The symbol < means less than;

Soil series and map symbols	Depth to—		Depth from surface	Classification		
	Seasonal high water table	Bedrock		USDA texture	Unified	AASHO
	Feet	*Feet*	*Inches*			
Arents: Mapped only with Urban land; material too variable to be rated.						
Arrington: Ar	4–10	>8	0–52	Silt loam	ML or CL	A-4 or A-6
Baxter:						
BaC, BaD, BaE, BkF	>10	>10	0–6	Cherty silt loam	GM, ML, SM-SC, CL-ML, or SM	A-4
			6–12	Cherty silty clay loam	GM, CL, or SC	A-6
			12–65	Cherty clay	MH or CH	A-7
BcC2, BcD2, BgE3	>10	>10	0–7	Cherty silty clay loam	GM, CL, or SC	A-6
			7–65	Cherty clay	MH or CH	A-7
Beason: Bm	1–2	>10	0–10	Silt loam	ML	A-4
			10–65	Silty clay loam and silty clay.	CL	A-6
Bedford: BnB	2–3	>10	0–8	Silt loam	ML	A-4
			8–24	Silt loam	ML or CL	A-4 or A-6
			24–32	Silt loam	ML or CL	A-4 or A-6
			32–46	Silty clay loam	CL	A-6
			46–60	Clay	MH	A-7
Bodine: BoF	>10	5–8	0–11	Cherty silt loam	GM, ML, or SM	A-1 or A-4
			11–65	Cherty silt loam	GM, GP-GM, GM-GC, SM, GC, SC, SP-SM, or SM-SC	A-1 or A-4
Brandon: BrB, BrC, BrD2	>10	>10	0–10	Silt loam	ML	A-4
			10–28	Silty clay loam	CL-ML or CL	A-6 or A-7
			28–42	Gravelly silty clay loam	GM or GC	A-2
			42–70	Cherty clay	MH or CH	A-7
Cannon: Ca	4–10	>10	0–60	Cherty silt loam	ML, CL-ML, CL, GM, SM, GM-GC, SC, or SM-SC	A-4, A-6, or A-2
Crider: CrB	>10	>10	0–20	Silt loam	ML or CL-ML	A-4
			20–37	Silty clay loam	CL	A-6
			37–60	Clay	MH or CL	A-7
Cumberland:						
CsC2	>10	>10	0–5	Silty clay loam	CL	A-6 or A-7
			5–65	Clay	MH	A-7
Cumberland, silty variant						
CuD2	>10	>10	0–6	Cherty silty clay loam	CL	A-6
			6–65	Cherty clay	CH or MH	A-7

significant in engineering

the symbol > means more than]

Percentage passing sieve—				Permeability	Available water capacity	Reaction [1]	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	95–100	90–100	85–95	0.6–2.0	0.20–0.22	5.6–7.3	Low.
55–80	50–75	45–70	40–65	0.6–2.0	0.11–0.15	4.5–5.5	Low.
55–85	50–75	45–70	45–65	0.6–2.0	0.10–0.15	4.5–5.5	Low.
55–85	50–75	50–70	50–70	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
55–85	50–75	45–70	45–65	0.6–2.0	0.10–0.15	4.5–5.5	Low.
55–85	50–75	50–70	50–70	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
100	100	90–100	75–90	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	100	90–95	85–95	0.2–0.6	0.15–0.20	4.5–5.5	Low.
100	95–100	90–100	85–95	0.6–2.0	0.20–0.22	5.1–6.5	Low.
100	95–100	90–100	85–95	0.6–2.0	0.19–0.21	5.1–5.5	Low.
95–100	90–100	90–95	70–90	0.06–0.2	0.13–0.16	5.1–5.5	Low.
95–100	90–100	90–95	85–95	0.6–2.0	0.16–0.18	5.1–5.5	Low.
95–100	90–100	90–95	75–90	0.6–2.0	0.12–0.15	5.1–5.5	Moderate.
50–75	35–65	30–60	30–55	2.0–6.0	0.07–0.10	4.5–5.5	Low.
15–60	10–50	5–40	5–35	2.0–6.0	0.05–0.10	4.5–5.5	Low.
100	100	90–95	85–90	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	95–100	90–95	85–95	0.6–2.0	0.16–0.18	4.5–5.5	Low.
40–50	20–45	15–40	15–35	2.0–6.0	0.04–0.08	4.5–5.5	Low.
65–85	50–75	50–70	50–65	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
55–80	45–75	45–70	30–65	2.0–6.0	0.10–0.15	5.6–7.3	Low.
100	100	90–100	80–95	0.6–2.0	0.20–0.22	5.1–6.0	Low.
100	100	90–100	85–95	0.6–2.0	0.16–0.18	5.1–6.0	Low.
90–100	90–100	80–95	75–90	0.6–2.0	0.12–0.15	5.1–6.0	Moderate.
85–100	75–100	70–95	65–90	0.6–2.0	0.17–0.19	5.1–6.0	Low.
85–100	75–100	70–95	65–85	0.6–2.0	0.13–0.16	5.1–6.0	Moderate.
60–80	55–75	55–70	50–65	0.6–2.0	0.10–0.15	5.1–6.0	Low.
65–80	55–75	55–65	50–65	0.6–2.0	0.10–0.14	5.1–6.0	Moderate.

TABLE 7.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Classification		
	Seasonal high water table	Bedrock		USDA texture	Unified	AASHO
	Feet	*Feet*	*Inches*			
Dickson: DsB, DsC	[2]2–3	>10	0–6	Silt loam	ML	A-4
			6–24	Silt loam	ML or CL	A-4 or A-6
			24–45	Silt loam	ML or CL	A-6 or A-7
			45–60	Silty clay loam	CL, MH, GM, SC, GM-GC	A-7
Egam: Eg	2–5	>10	0–10	Silt loam	ML or CL	A-4
			10–32	Silty clay loam	MH or CL	A-6 or A-7
			32–60	Silty clay	MH	A-7
Forestdale: Fo	0–2	>10	0–6	Silt loam	ML or CL	A-4 or A-6
			6–60	Clay	MH or CH	A-7
Guthrie: Gu	0–2	>10	0–8	Silt loam	ML	A-4
			8–27	Silt loam	CL or ML	A-4
			27–65	Silty clay loam	CL or ML	A-6
Humphreys: HuB	6–10	>10	0–9	Cherty silt loam	ML, SM, GM-GC, GM, ML-CL, SM-SC	A-4 or A-6
			9–24	Cherty silt loam	ML, CL-ML, CL, SM-SC, GM-GC, SM, GM, or SC	A-4 or A-6
			24–40	Cherty silty clay loam	CL, CL-ML, ML, SM-SC, GM-GC, GM, SM, or SC	A-4 or A-6
			40–60	Cherty silt loam	GM, GM-GC, or SM	A-4 or A-2
Lax: LaB, LaC	2–3	>10	0–6	Silt loam	ML or CL	A-4
			6–24	Silty clay loam	ML or CL	A-6 or A-7
			24–39	Gravelly silty clay loam	GM	A-2
			39–63	Cherty silty clay and cherty silty clay loam.	MH or CH	A-7
Lindside: Ld	1–3	5–10	0–48	Silt loam	ML or CL	A-4
Lobelville: Lo	1–3	4–10	0–50	Cherty silt loam	ML, SM, CL, SC, GM, or GC	A-4
Melvin: Me	0–2	6–10	0–65	Silt loam	ML	A-4
Mountview: MoB, MoC, MoC2	>10	>10	0–12	Silt loam	ML	A-4
			12–30	Silty clay loam	CL or ML	A-6
			30–64	Cherty silty clay loam	GM, GC, CL, SC, ML, or SM	A-6
			64–80	Cherty clay	MH or CH	A-7
Newark: Ne	1–2	6–10	0–20	Silt loam	ML or CL	A-4 or A-6
			20–50	Silty clay loam	ML or CL	A-6
Pembroke: PeB, PeC	10	7–10	0–8	Silt loam	ML or CL	A-4
			8–28	Silty clay loam	CL	A-6
			28–65	Clay	MH or CH	A-7

significant in engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction [1]	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
95–100	90–100	80–95	75–90	0.6–2.0	0.20–0.22	4.5–5.5	Low.
95–100	90–100	85–100	85–90	0.6–2.0	0.18–0.20	4.5–5.5	Low.
95–100	90–100	85–100	80–90	0.2–0.6	0.12–0.16	4.5–5.5	Low.
60–95	55–95	50–90	45–85	0.2–0.6	0.10–0.15	4.5–5.5	Moderate.
100	95–100	90–100	85–95	0.6–2.0	0.20–0.22	5.6–7.3	Low.
100	95–100	90–100	80–95	0.6–2.0	0.16–0.18	5.6–7.3	Moderate.
100	100	95–100	80–95	0.2–0.6	0.15–0.17	5.6–7.3	Moderate.
100	100	95–100	85–95	0.6–2.0	0.17–0.20	5.1–6.0	Low.
100	100	90–100	85–95	<0.06	0.15–0.17	5.1–6.0	Moderate to high.
100	100	95–100	90–100	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	100	95–100	90–100	0.6–2.0	0.18–0.20	4.5–5.5	Low.
95–100	95–100	90–100	85–95	0.06–0.2	0.14–0.16	4.5–5.5	Low.
55–80	50–75	45–70	40–60	2.0–6.0	0.10–0.15	4.5–5.5	Low.
55–85	50–75	45–70	40–60	2.0–6.0	0.10–0.15	4.5–5.5	Low.
55–85	50–75	50–70	45–65	2.0–6.0	0.10–0.15	4.5–5.5	Low.
40–65	35–60	30–55	25–50	6.0–20.0	0.10	4.5–5.5	Low.
100	100	90–95	85–95	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	95–100	90–95	85–95	0.6–2.0	0.17–0.19	4.5–5.5	Low.
40–50	20–40	15–40	15–35	0.06–0.2	0.07–0.11	4.5–5.5	Low.
60–85	50–75	50–75	50–0	0.6–2.0	0.10–0.15	4.5–5.5	Low.
95–100	90–100	85–95	75–95	0.6–2.0	0.20–0.22	5.6–7.3	Low.
60–85	50–75	45–70	30–65	0.6–2.0	0.10–0.15	5.6–6.0	Low.
100	90–100	85–95	80–95	0.6–2.0	0.18–0.22	5.6–7.3	Low.
100	95–100	90–95	85–95	0.6–2.0	0.19–0.21	4.5–5.5	Low.
95–100	95–100	90–95	85–95	0.6–2.0	0.17–0.19	4.5–5.5	Low.
55–85	50–75	45–70	40–65	0.6–2.0	0.15–0.17	4.5–5.5	Low.
55–85	50–75	50–70	50–70	0.6–2.0	0.15–0.17	4.5–5.5	Moderate.
95–100	95–100	90–95	85–95	0.6–2.0	0.18–0.20	5.6–6.5	Low.
95–100	95–100	90–95	85–95	0.6–2.0	0.16–0.18	5.6–6.5	Low.
100	95–100	90–100	85–95	0.6–2.0	0.20–0.22	4.5–5.5	Low.
95–100	90–100	90–95	80–95	0.6–2.0	0.16–0.19	4.5–5.5	Low.
95–100	90–100	90–95	75–90	0.6–2.0	0.13–0.16	4.5–5.5	Moderate.

TABLE 7.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Classification		
	Seasonal high water table	Bedrock		USDA texture	Unified	AASHO
	Feet	*Feet*	*Inches*			
Pickwick: PkB, PkC, PkC2, PkD	>10	10	0–6	Silt loam	ML	A-4
			6–38	Silty clay loam	CL or ML	A-6
			38–65	Silty clay loam	CL, MH, or CH	A-7 or A-6
Rock outcrop: Mapped only with Baxter soils; see mapping unit BkF.						
Staser: Ss	5–10	>10	0–12	Fine sandy loam	ML or CL	A-4
			12–22	Loam	ML or CL	A-4 or A-6
			22–65	Silt loam	CL	A-4 or A-6
Statler: StB, StC	6–10	>10	0–45	Silt loam	ML	A-4
			45–50	Silty clay loam	CL	A-6
			50–65	Cherty silt loam	GM, GC, SM, SC, ML, or CL	A-4
Taft: Ta	1–3	5–10	0–6	Silt loam	ML	A-4
Urban land: Ua. Both Urban land and Arents parts too variable to rate.			6–21	Silt loam	ML or CL	A-4
			21–42	Silt loam	ML or CL	A-4
			42–65	Silty clay loam	CL	A-6 or A-7
Wolftever: Wo	2–3	>10	0–9	Silt loam	ML or CL-ML	A-4
			9–62	Silty clay loam	CL or MH	A-6 or A-7

[1] Without additions of lime.

mated soil properties significant to engineering and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in table 8 and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists that is not known to all engineers. The Glossary defines many of these terms commonly used in soil science.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*11*), used by SCS engineers, the Department of Defense, and others; and the AASHO system, adopted by the American Association of State Highway Officials (*2*).

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML-CL.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. The estimated classification is given in table 7 for all soils mapped in the survey area.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 7. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observation made in the

significant in engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction [1]	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	95–100	90–95	80–95	0.6–2.0	0.20–0.22	4.5–5.5	Low.
95–100	90–100	85–95	80–95	0.6–2.0	0.16–0.19	4.5–5.5	Low.
90–100	90–100	85–95	75–90	0.6–2.0	0.13–0.16	4.5–5.5	Moderate.
95–100	95–100	75–95	55–75	2.0–6.0	0.13–0.15	5.6–7.3	Low.
95–100	95–100	80–95	70–85	0.6–2.0	0.14–0.16	5.6–7.3	Low.
95–100	95–100	85–95	75–85	0.6–2.0	0.20–0.22	5.6–7.3	Low.
95–100	95–100	85–95	75–90	0.6–2.0	0.20–0.22	4.5–5.5	Low.
95–100	90–100	85–95	75–90	0.6–2.0	0.18–0.20	4.5–5.5	Low.
60–85	55–75	50–70	40–65	2.0–6.0	0.11–0.15	4.5–5.5	Low.
100	95–100	90–100	85–95	0.6–2.0	0.15–0.20	4.5–5.5	Low.
100	95–100	90–100	85–95	0.6–2.0	0.15–0.20	4.5–5.5	Low.
95–100	85–100	80–100	80–95	0.06–0.2	0.10–0.15	4.5–5.5	Low.
85–100	80–100	75–95	75–90	0.2–0.6	0.10–0.15	4.5–5.5	Low.
100	95–100	95–100	90–95	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	95–100	85–95	80–95	0.2–0.6	0.15–0.17	4.5–5.5	Moderate.

[2] Perched water above the fragipan.

course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 7.

Depth to seasonal high water table is the distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Depth to bedrock is the distance from the surface of the soil to the upper surface of the rock layer.

Soil texture is described in table 7 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added; for example, "gravelly loamy sand." "Sand," "silt," "clay," are some of the other terms used in USDA textural classifications that are defined in the Glossary of this soil survey.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 7 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundation, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering interpretations

The estimated interpretations in table 8 are based on the engineering properties of soils shown in table 7 and on the experience of engineers and soil scientists with the soils of Montgomery County. In table 8, ratings are used to summarize the limitation or suitability of the soils for all listed purposes other than for drainage of cropland and pasture, ponds and reservoirs, embankments, and terraces and diversions. For these particular uses, table 8 lists those soil features not to be

TABLE 8.—*Interpretations of*

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
Arents: Mapped only with Urban land; material too variable to be rated.						
Arrington: Ar	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.
Baxter:						
BaC, BcC2	Slight	Severe: slopes	Moderate: slopes; coarse fragments.	Slight	Moderate: too clayey.	Moderate: low strength.
BaD, BcD2	Severe: slopes	Severe: slopes	Moderate: slopes; coarse fragments.	Severe: slopes	Moderate: slopes; too clayey.	Moderate: slopes; low strength.
BaE	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes
BgE3	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes	Severe: slopes.	Severe: slopes; low strength.
BkF	Severe: rock outcrop; slopes.	Severe: slopes	Severe: slopes; rockiness.	Severe: slopes; rockiness.	Severe: slopes; rockiness.	Severe: slopes; rockiness.
Rock outcrop part not rated.						
Beason: Bm	Severe: restricted permeability; subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; wetness.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.
Bedford: BnB	Severe: restricted permeability.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength.
Bodine: BoF	Severe: slopes	Severe: slopes; excessive permeability.	Severe: slopes	Severe: slopes	Severe: excessive permeability.	Severe: slopes
Brandon:						
BrB	Slight	Severe: excessive permeability.	Slight	Slight	Moderate: excessive permeability.	Moderate: low strength.
BrC	Slight	Severe: slopes; excessive permeability.	Moderate: slopes.	Slight	Moderate: excessive permeability.	Moderate: low strength; slopes.
BrD2	Moderate: slopes.	Severe: slopes; excessive permeability.	Severe: slopes	Moderate: slopes.	Moderate: excessive permeability.	Moderate: slopes; low strength.
Cannon: Ca	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to frequent flooding.	Severe: subject to flooding.

engineering properties of the soils

Suitability as source of—		Soil features affecting—			
Road fill	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage for crops and pasture	Terraces and diversions
Fair: low strength.	Good	Excessive permeability; subject to flooding.	Medium stability; high to low piping hazard.	Subject to flooding	(2)
Fair: low strength.	Poor: coarse fragments.	Excessive permeability.	Medium to low stability and piping hazard.	(2)	Slopes; coarse fragments.
Fair: low strength.	Poor: coarse fragments.	Excessive permeability.	Medium to low stability and piping hazard.	(2)	Slopes; coarse fragments.
Poor: slopes	Poor: slopes; coarse fragments.	Excessive permeability.	Medium to low stability and piping hazard.	(2)	Slopes.
Poor: low strength.	Poor: slopes; coarse fragments.	Excessive permeability.	Medium to low stability and piping hazard.	(2)	Slopes; erodibility.
Fair: rockiness; low strength.	Poor: slopes; rockiness.	Excessive permeability.	Medium to low stability and piping hazard.	(2)	Rockiness; slopes.
Fair: wetness; low strength.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	Medium stability; high to low piping hazard.	Restricted permeability; subject to flooding.	(2)
Fair: low strength.	Good	Moderate permeability below fragipan.	Medium to low stability; low to high piping hazard.	Restricted permeability; wetness.	Restricted permeability.
Poor: slopes	Poor: coarse fragments.	Excessive permeability.	Medium to low compaction characteristics; medium to low piping hazard.	(2)	Slopes; coarse fragments.
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; fair to good compaction characteristics.	(2)	(3)
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; fair to good compaction characteristics.	(2)	Slopes; erodibility.
Fair: low strength.	Poor: slopes	Excessive permeability.	High to low piping hazard; fair to good compaction characteristics.	(2)	Slopes; erodibility.
Fair: low strength.	Poor: coarse fragments.	Excessive permeability.	Low to medium piping hazard; good to fair compaction characteristics.	Subject to flooding	(2)

TABLE 8.—*Interpretations of*

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
Crider: CrB	Slight	Moderate: excessive permeability.	Slight	Slight	Moderate: too clayey.	Moderate: low strength.
Cumberland: CsC2	Slight	Severe: slopes.	Moderate: slopes.	Moderate: volume change.	Severe: too clayey.	Moderate: volume change.
Cumberland, cherty variant: CuD2	Moderate: slopes.	Severe: slopes.	Severe: slopes.	Severe: slopes.	Severe: too clayey.	Severe: slopes.
Dickson: DsB, DsC	Severe: restricted permeability.	Moderate: slopes.	Moderate: wetness.	Moderate: wetness; low strength.	Severe: wetness.	Moderate: low strength.
Egam: Eg	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.
Forestdale: Fo	Severe: restricted permeability.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness; volume change.
Guthrie: Gu	Severe: restricted permeability; subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.
Humphreys: HuB	Slight	Severe: excessive permeability.	Moderate: coarse fragments.	Slight	Severe: excessive permeability.	Moderate: low strength.
Lax: LaB	Severe: restricted permeability.	Severe: wetness	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: low strength.
LaC	Severe: restricted permeability.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: low strength.
Lindside: Ld	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject flooding.
Lobelville: Lo	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject flooding.
Melvin: Me	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.
Mountview: MoB	Slight	Moderate: excessive permeability; slopes.	Slight	Slight	Moderate: too clayey.	Moderate: low strength.
MoC, MoC2	Slight	Severe: slopes.	Moderate: slopes.	Slight	Moderate: too clayey.	Moderate: low strength.

engineering properties of the soils—Continued

Suitability as source of—		Soil features affecting—			
Road fill	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage for crops and pasture	Terraces and diversions
Fair: low strength.	Good	Excessive permeability.	Medium to low stability; low to medium piping hazard.	(2)	(3)
Fair: volume change.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	Medium to low compressibility; low to medium stability.	(2)	Slopes; erodibility.
Fair: volume change.	Poor: coarse fragments.	Excessive permeability.	Medium to low compressibility; low to medium stability.	(2)	Slopes; erodibility.
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	(3)	Medium to low stability; high to low piping hazard.	Restricted permeability; wetness.	Erodibility; rooting depth.
Poor: low strength.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	Medium to low compressibility; high to medium stability.	Subject to flooding	(2)
Poor: wetness; volume change.	Poor: thin surface layer; too clayey in subsoil; wetness.	(3)	High compressibility; low to medium stability.	Subject to flooding; restricted permeability.	(2)
Poor: wetness	Poor: wetness	(3)	High to low piping hazard; medium to low stability.	Restricted permeability; subject to flooding.	(2)
Fair: low strength.	Poor: coarse fragments	Excessive permeability.	High to low piping hazard; medium to low stability.	Excessive permeability; coarse fragments.	Coarse fragments; slopes.
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	(3)	High to low piping hazard; low to medium stability.	Restricted permeability; wetness.	(3)
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	(3)	High to low piping hazard; low to medium stability.	Restricted permeability; wetness.	(3)
Fair: low strength.	Good	Excessive permeability.	High to low piping hazard; medium to low stability.	Subject to flooding; wetness.	(2)
Fair: low strength.	Poor: coarse fragments.	Excessive permeability.	High to low piping hazard; high to low stability.	Subject to flooding; wetness.	(2)
Poor: wetness	Poor: wetness	Excessive permeability.	High piping hazard; medium to low stability.	Subject to flooding; wetness.	(2)
Fair: low strength.	Fair: thin surface layer.	Excessive permeability.	Low to high piping hazard; medium to low stability.	(2)	(3)
Fair: low strength.	Fair: thin surface layer.	Excessive permeability.	Low to high piping hazard; medium to low stability.	(2)	(3)

TABLE 8.—*Interpretations of*

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
Newark: Ne	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding.
Pembroke:						
PeB	Slight	Moderate: excessive permeability; slopes.	Slight	Moderate: low strength; volume change.	Moderate: low strength; volume change.	Moderate: low strength; volume change.
PeC	Slight	Severe: slopes	Moderate: slopes.	Moderate: low strength; volume change.	Moderate: too clayey.	Moderate: low strength; volume change.
Pickwick:						
PkB	Slight	Moderate: slopes.	Slight	Moderate: low strength.	Moderate: too clayey.	Moderate: low strength.
PkC, PkC2	Slight	Severe: slopes	Moderate: slopes.	Moderate: low strength.	Moderate: too clayey.	Moderate: low strength.
PkD	Moderate: slopes.	Severe: slopes	Severe: slopes	Moderate: low strength; slopes.	Moderate: too clayey; slopes.	Severe: slopes
Rock outcrop. Mapped only with Baxter soils. No interpretations given; material too variable.						
Staser: Ss	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding; low strength.
Statler:						
StB	Slight	Moderate: excessive permeability; slopes.	Slight	Slight	Slight	Moderate: low strength.
StC	Slight	Severe: slopes	Slight	Slight	Slight	Moderate: low strength.
Taft: Ta	Severe: restricted permeability; subject to flooding; wetness.	Severe: subject to ponding; wetness.	Severe: subject to ponding; wetness.	Severe: subject to ponding; wetness.	Severe: subject to ponding; wetness.	Severe: subject to ponding; wetness.
Urban land: Ua. No interpretations given; both Urban and Arents too variable.						
Wolftever: Wo	Severe: restricted permeability; subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; low strength.

[1] Onsite studies of the underlying strata, water table, and hazard of aquifer pollution and drainage into ground water should be made for landfill deeper than 5 or 6 feet.

engineering properties of the soils—Continued

Suitability as source of—		Soil features affecting—			
Road fill	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage for crops and pasture	Terraces and diversions
Fair: low strength; wetness.	Good	Excessive permeability.	High to low piping hazard; medium to low stability.	Subject to flooding; wetness.	(2)
Fair: low strength; volume change.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; low to medium stability.	(2)	(3)
Fair: low strength; volume change.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; low to medium stability.	(2)	Slopes.
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; low to medium stability.	(2)	(3)
Fair: low strength.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; low to medium stability.	(2)	(3)
Fair: low strength; slopes.	Fair: thin surface layer; too clayey in subsoil.	Excessive permeability.	High to low piping hazard; low to medium stability.	(2)	Slopes; erodibility.
Fair: low strength; slopes.	Good	Excessive permeability.	High to low piping hazard; medium to low stability.	(2)	(2)
Fair: low strength; slopes.	Good	Excessive permeability.	Low to medium compressibility; low to high piping hazard.	(2)	(2)
Fair: low strength; slopes.	Good	Excessive permeability.	Low to medium compressibility; low to high piping hazard.	(2)	Slopes.
Fair: low strength; wetness.	Fair: wetness	(3)	High to low piping hazard; medium to low stability.	Restricted permeability; subject to ponding; wetness.	(2)
Poor: low strength.	Fair: thin surface layer; too clayey in subsoil.	(3)	High to low piping hazard; medium to low stability.	Restricted permeability; subject to flooding.	(2)

[2] Practice not applicable or not needed on this soil.
[3] All features favorable.

overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* means that soil properties generally are favorable for the rated use or, in other words, that limitations are minor and easily overcome or modified by special planning and design. *Moderate* means limitations can normally be overcome by good planning, careful design, and good management. *Severe* means soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe.

Following are explanations of some of the columns in table 8.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material between depths of 18 inches and 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slope; and, if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material, as interpreted from the Unified soil classification system, and the amount of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, as for example, excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 8, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 8 apply only to a depth of about 6 feet, and therefore limitation ratings of slight or moderate may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 to 15 feet, but every site should be investigated before it is selected.

Local roads and streets, as rated in table 8, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load supporting capacity and stability of the subgrade, and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material, and also the shrink-swell potential, indicate load supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Drainage for crops and pasture is affected by such

soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

None of the soils in Montgomery County are considered to be a source of sand. However, sand is dredged from the Cumberland River, which crosses the county.

Formation and Classification of Soils

This section describes the major factors of soil formation, tells how these factors have affected the soils of Montogmery County, and explains some of the principal processes in horizon development. It also defines the system for classifying soils and shows the classification of the soils by higher categories of the system.

Factors of Soil Formation

Soil forms through the interaction of the five major soil forming factors: parent material, climate, living organisms, topography, and time. Each of these factors affects the formation of every soil, but the relative importance of each factor differs from place to place.

Climate and vegetation are the active factors that change parent material gradually into soil. Topography, or relief, modifies the effects of climate and vegetation, mainly by its effect on runoff and temperature. The parent material also affects the kind of soil that is formed. Time is needed for the parent material to change into soil.

Parent material

Parent material is the unconsolidated mass from which a soil forms. It determines the limits of the chemical and mineralogical composition of the soil. Many soils in Montgomery County formed in material derived from limestone. Other soils formed in loess or a combination of loess, limestone, and Coastal Plain gravel. Still others formed in limestone material derived from soils that formed in loess or limestone, or both, and transported by water, wind, or gravity.

The county is underlain by limestone of Mississippian age. Most of the northern part is underlain by nearly chert-free, relatively soluble limestone, and the rest (Warsaw Limestone and St. Louis Limestone Formations) is underlain by cherty limestone that weathers slowly. Most of the sloping or rolling soils are covered by a mantle of loess about 1 foot to 3 feet thick.

In the Pembroke, Crider, and Bedford soils in the northern part of the county, the upper 2 feet formed in a loess and limestone mixture. The lower part formed in a reddish, clayey, nearly chert-free limestone material.

Brandon and Lax soils are mainly in the southwestern part of the county. The upper 2 feet of these soils formed in loess underlain by a Coastal Plain gravel layer about 5 to 18 inches thick. This layer is underlain by reddish cherty and clayey limestone material several feet thick.

Dickson, Mountview, and Pickwick soils are the main sloping or rolling soils in the county. The upper 2 feet of these soils formed in loess. The lower part formed in material weathered from cherty limestone. The limestone is reddish and clayey and extends to limestone bedrock.

Most of the hilly and steep soils are in the Baxter series. These soils have had most of the loess removed by geological erosion. They formed mainly in reddish, clayey material weathered from cherty limestone. This material is several feet thick.

The gray, wet Guthrie soils formed mainly in depressions or basins where the loess deposits are 4 to 6 feet thick. Dickson, Lax, and Bedford soils have a fragipan at a depth of about 24 inches. The upper 2 feet of these soils formed in loess. The lower part formed in material derived from cherty limestone or Coastal Plain gravel and limestone. In most of these soils, where slope is less than 5 percent, a fragipan is commonly at the contact of these contrasting materials. The boundary between the loess and the underlying material is not abrupt, and considerable mixing of the two materials has taken place.

Transported materials are general alluvium and local alluvium, either of which can be young or old. Young alluvium that has been deposited recently consists of fresh material slightly altered by the soil-forming processes. Old alluvium is material that has been deposited long enough for horizon formation.

Most deposits of old and young general alluvium are on the floors and some of the lower side slopes of stream valleys. Examples of terrace soils that formed in old alluvium and colluvium are Beason, Forestdale, Humphreys, Pickwick, Statler,and Wolftever soils. The Arrington, Egam, Lindside, Lobelville, and Staser soils formed in young alluvium.

Climate

The climate in Montgomery County is characterized by mild winters, warm summers, and abundant rainfall. Presumably, it is similar to the climate under which the soils formed. A more nearly complete discussion of the climate is given in the section "General Nature of the County."

The warm, moist climate promotes rapid soil formation. The warm temperatures permit rapid chemical reaction. A large amount of water moves through the soil and removes dissolved or suspended materials. Plant remains decompose rapidly, and the organic acids hasten the development of clay minerals and the removal of carbonates. Leaching and soil development continue almost the year round because the soil is frozen for only short periods, and then to a depth of no more than 4 to 5 inches.

The climate is fairly uniform throughout the county. However, some local differences are caused by differences in microrelief, slope, aspect, and drainage.

On the steep south-facing and west-facing slopes, annual and daily temperatures are higher, organic matter decays faster, and freezing and thawing are more frequent than on the north-facing and east-facing slopes. Because freezing and thawing is more frequent, more creep and soil erosion occur on the south-facing and west-facing slopes. Consequently, the soils are shallower, have more rock outcrop, and are less fertile than the soils on the north-facing and east-facing slopes.

Living organisms

Plants, animals, insects, bacteria, and fungi are important in the formation of soils. They cause gains in content of organic matter and nitrogen, gains or losses in content of plant nutrients, and changes in structure and porosity.

Plants generally have a greater effect on soil formation than other living organisms. The native vegetation in this county was mostly hardwoods. The dominant trees on the well-drained soils were oak, hickory, beech, and yellow-poplar. Sycamore, maple, gum, and water-tolerant oaks grew in the wet places. Eastern redcedar and hickory were dominant in some areas that have many outcroppings of limestone. Because of the climate and the rapid decomposition of organic material, the content of organic matter in all the soils generally is low.

Topography

Topography, or relief, influences soil formation through its effect on drainage, erosion, plant cover, and soil temperature. Most of the slopes in Montgomery County range from 0 to 40 percent, but in some parts, especially bluffs along the streams, the slopes are as much as 90 percent. Much of the southern part of the county is deep hollows, steep hillsides, and fairly narrow winding ridgetops. The rest of the county is mostly gently rolling and hilly. In a few other places the surface is rough and is broken by many sinkholes and depressions. It contains a few fairly large basins.

The gently rolling and nearly level soils on uplands are covered by 1 to 3 feet of loess. Fragipans are common in these areas, partly because water drains off slowly. Examples of soils that contain a fragipan are Dickson, Lax, and Bedford soils.

Guthrie soils and other poorly drained soils formed in nearly level and depressional areas. Water stands or drains slowly from these areas, and the soils are poorly aerated and are saturated for long periods.

The well-drained, rolling soils generally are well aerated and are red, yellow, or brown. On most of the hilly and steep soils, geologic and accelerated erosion have removed most of the loess. Baxter soils formed in these areas. They are reddish, are well drained, and contain a large amount of clay and chert. Relief dominates soil formation in areas of steep soils.

Time

Generally a long time is required to form distinct horizons in a soil. Differences in the length of time that parent material has been in place are commonly reflected in the degree of horizon formation in the soil profile.

Most soils in the county are very old. They have well-defined horizons and a strongly formed profile. A few are young, and the horizons in their profile either have not formed or are only faint. Arrington and Statler soils, for example, differ mainly because of differences in time. Arrington soils are young alluvial soils that lack strongly formed horizons because the material has been in place only a relatively short time. Statler soils, which are intermediate in age, have been in place long enough for horizons to form. Their B horizon is redder and slightly more clayey than the A horizon. The carbonates have leached out, and these soils are now strongly acid in contrast to the slightly leached Arrington soils, which are neutral or slightly acid in reaction.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics, assemble knowledge about them, see their relationship to one another and to the whole environment, and understand their behavior and their response to management. First through classification and then through use of soil maps, we can apply our knowledge of soils to specific tracts of land.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*3*) and revised later (*5*). The system currently used was adopted by the National Cooperative Soil Survey in 1965. This system is under continual study. Readers interested in the development of the system should refer to the latest literature available (*4, 8*).

The current system of classification defines classes in terms of observable or measurable properties of soils. It has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The placement of some soil series in the current system, particularly in families, may change as more precise information becomes available. In table 9 the soils of Montgomery County are classified according to family, subgroup, and order of the current system. Following are brief descriptions of the categories in the current system.

ORDER: Ten soil orders are recognized in the current system: Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The orders are primarily broad climatic groupings. Two exceptions are the Entisols and Histosols, which include soils of many different climates. Five of the orders are represented in this county—Entisols, Inceptisols, Mollisols, Alfisols, and Ultisols.

Entisols are recent mineral soils that do not have genetic horizons or that have ony the beginning of such horizons. Inceptisols occur most commonly on young but not recent land surfaces. Mollisols have a dark-colored, thick surface layer and high base saturation. Alfisols contain accumulated aluminum and iron, have argillic or natric horizons, and have a base saturation

TABLE 9.—*Classification of soil series* [1]

Series	Family	Subgroup	Order
Arrington	Fine-silty, mixed, thermic	Cumulic Hapludolls	Mollisols.
Baxter	Clayey, mixed, mesic	Typic Paleudults	Ultisols.
Beason	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Bedford	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols.
Bodine	Loamy-skeletal, siliceous, thermic	Typic Paleudults	Ultisols.
Brandon [2]	Fine-silty, mixed, thermic	Typic Hapludults	Ultisols.
Cannon	Fine-loamy, mixed, thermic	Cumulic Hapludolls	Mollisols.
Crider	Fine-silty, mixed, mesic	Typic Paleudalfs	Alfisols.
Cumberland [3]	Fine, mixed, thermic	Rhodic Paleudalfs	Alfisols.
Dickson	Fine-silty, siliceous, thermic	Glossic Fragiudults	Ultisols.
Egam	Fine, mixed, thermic	Cumulic Hapludolls	Mollisols.
Forestdale	Fine, montmorillonitic, thermic	Typic Ochraqualfs	Alfisols.
Guthrie	Fine-silty, siliceous, thermic	Typic Fragiaquults	Ultisols.
Humphreys	Fine-loamy, siliceous, thermic	Humic Hapludults	Ultisols.
Lax	Fine-silty, siliceous, thermic	Typic Fragiudults	Ultisols.
Lindside	Fine-silty, mixed, mesic	Fluvaquentic Eutrochrepts	Inceptisols.
Lobelville	Fine-loamy, siliceous, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Melvin	Fine-silty, mixed, nonacid, mesic	Typic Fluvaquents	Entisols.
Mountview	Fine-silty, siliceous, thermic	Typic Paleudults	Ultisols.
Newark	Fine-silty, mixed, nonacid, mesic	Aeric Fluvaquents	Entisols.
Pembroke	Fine-silty, mixed, mesic	Mollic Paleudalfs	Alfisols.
Pickwick	Fine-silty, mixed, thermic	Typic Hapludults	Ultisols.
Staser	Fine-loamy, mixed, thermic	Cumulic Hapludolls	Mollisols.
Statler	Fine-loamy, mixed, thermic	Humic Hapludults	Ultisols.
Taft	Fine-silty, siliceous, thermic	Glossaquic Fragiudults	Ultisols.
Wolftever	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.

[1] The survey area lies in a transitional zone between areas having mesic and thermic soil temperatures. Differences in soil temperature within the survey area are small and are relatively unimportant to soil use and behavior. For these reasons, series in mesic families, as well as series in thermic families, are used in the names of mapping units.

[2] The Brandon soils in this county are taxadjuncts to the series because the interstices of the gravelly layer are filled with clayey material instead of loamy material. This difference does not alter their usefulness and behavior.

[3] Some of the Cumberland soils in this county are outside the range of this series because they contain too many fragments of chert. Inasmuch as the acreage is relatively small, these cherty soils are correlated as Cumberland series, cherty variant.

of more than 35 percent. Ultisols have a clay-enriched B horizon in which base saturation is less than 35 percent. The base saturation decreases with increasing depth.

SUBORDER: Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders have a narrower climatic range than the orders. The soil properties used to define suborders reflect mainly either the presence or absence of waterlogging or differences resulting from the climate or vegetation.

GREAT GROUP: Each suborder is divided into great groups, which are based on uniformity in kind and sequence of the major soil horizons and features. The horizons considered in making these separations are those in which clay, iron, or humus has accumulated and those that have a pan that interferes with the growth of roots or the movement of water. The features considered are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly in calcium, magnesium, sodium, and potassium), and the like.

SUBGROUP: Each great group is divided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be recognized in those instances where soil properties intergrade outside the range of any established great group, suborder, or order.

FAMILY: Families are established within a subgroup primarily on the basis of properties important to the growth of plants or the behavior of soils when they are used for engineering. Among the properties considered are texture, mineral composition, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES: The series has the narrowest range of characteristics of the categories in the classification system. It is described fully in the section "How This Survey Was Made." The profiles described under the mapping units in the section "Descriptions of the Soils" are considered representative of the soil series recognized in this survey.

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Glossary

Acidity. See Reaction, soil.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

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

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

Bedrock. The more or less solid rock in place either on or beneath the surface of the earth. It may be soft or hard and have a smooth or an irregular surface.

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.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

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

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

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Creep, soil. Slow mass movement of soil and soil material down relatively steep slopes, primarily under the influence of gravity, but facilitated by saturation with water and by alternate freezing and thawing.

Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it 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; they generally occur below the B horizon, 15 to 40 inches below the surface.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Microclimate. The climatic nature of the air space that extends from the surface to a height where the effects of the immediate character of the underlying surface no longer can be distinguished from the general local climate.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material in which a soil has formed.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral compo-

sition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Second bottom. The first terrace above the normal flood plain of a stream.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "course," "fine," or "very fine."

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs. In referring to a capability unit or woodland group, read the introduction to the section it is in for general information about its management. Other information is given in tables as follows:

Acreage and extent, table 3, page 11.
Estimated yields, table 4, page 38.
Management of soils for woodland, table 5, page 40.
Engineering uses of the soils, tables 7 and 8, pages 46 through 57.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group
			Symbol	Page	Number
Ar	Arrington silt loam	12	I-1	34	2o7
BaC	Baxter cherty silt loam, 5 to 12 percent slopes	13	IIIe-3	36	3o7
BaD	Baxter cherty silt loam, 12 to 20 percent slopes	13	IVe-1	37	3o7
BaE	Baxter cherty silt loam, 20 to 35 percent slopes	13	VIe-1	37	3r8
BcC2	Baxter cherty silty clay loam, 5 to 12 percent slopes, eroded	14	IVe-1	37	3o7
BcD2	Baxter cherty silty clay loam, 12 to 25 percent slopes, eroded	14	VIe-1	37	3r8
BgE3	Baxter soils, 12 to 25 percent slopes, severely eroded	14	VIIe-1	38	4c3e
BkF	Baxter soils and Rock outcrop, 20 to 45 percent slopes	14	VIIs-1	38	4x3
Bm	Beason silt loam	15	IIIw-1	37	3w8
BnB	Bedford silt loam, 2 to 5 percent slopes	16	IIe-2	35	3o7
BoF	Bodine cherty silt loam, 15 to 45 percent slopes	17	VIIs-1	38	4f3
BrB	Brandon silt loam, 2 to 5 percent slopes	17	IIe-1	35	3o7
BrC	Brandon silt loam, 5 to 12 percent slopes	17	IIIe-1	36	3o7
BrD2	Brandon silt loam, 10 to 20 percent slopes, eroded	18	IVe-1	37	3o7
Ca	Cannon cherty silt loam	18	IIs-1	35	2o7
CrB	Crider silt loam, 2 to 8 percent slopes	19	IIe-1	35	2o7
CsC2	Cumberland silty clay loam, 5 to 12 percent slopes, eroded	19	IVe-1	37	4c3e
CuD2	Cumberland soils, cherty variant, 10 to 25 percent slopes, eroded	20	VIe-1	37	3o7
DsB	Dickson silt loam, 1 to 4 percent slopes	21	IIe-2	35	3o7
DsC	Dickson silt loam, 4 to 8 percent slopes	21	IIIe-2	36	3o7
Eg	Egam silt loam	22	IIw-1	35	2o7
Fo	Forestdale silt loam	22	IIIw-1	37	1w6
Gu	Guthrie silt loam	23	IVw-1	37	2w9
HuB	Humphreys cherty silt loam, 3 to 10 percent slopes	23	IIe-3	35	2o7
LaB	Lax silt loam, 1 to 4 percent slopes	24	IIe-2	35	3o7
LaC	Lax silt loam, 4 to 8 percent slopes	24	IIIe-2	36	3o7
Ld	Lindside silt loam	25	IIw-1	35	2w8
Lo	Lobelville cherty silt loam	26	IIs-1	35	2w8
Me	Melvin silt loam	26	IVw-1	37	2w9
MoB	Mountview silt loam, 2 to 5 percent slopes	27	IIe-1	35	3o7
MoC	Mountview silt loam, 5 to 12 percent slopes	27	IIIe-1	36	3o7
MoC2	Mountview silt loam, 5 to 12 percent slopes, eroded	27	IIIe-1	36	3o7
Ne	Newark silt loam	28	IIIw-1	37	2w8
PeB	Pembroke silt loam, 2 to 5 percent slopes	29	IIe-1	35	2o7
PeC	Pembroke silt loam, 5 to 12 percent slopes	29	IIIe-1	36	2o7
PkB	Pickwick silt loam, 2 to 5 percent slopes	29	IIe-1	35	3o7
PkC	Pickwick silt loam, 5 to 12 percent slopes	29	IIIe-1	36	3o7
PkC2	Pickwick silt loam, 5 to 12 percent slopes, eroded	30	IIIe-1	36	3o7
PkD	Pickwick silt loam, 12 to 20 percent slopes	30	IVe-1	37	3o7
Ss	Staser fine sandy loam	30	I-1	34	2o7
StB	Statler silt loam, 2 to 5 percent slopes	31	IIe-1	35	2o7
StC	Statler silt loam, 5 to 12 percent slopes	31	IIIe-1	36	2o7
Ta	Taft silt loam	32	IIIw-1	37	3w8
Ua	Urban land-Arents complex	32	------	--	---
Wo	Wolftever silt loam	33	IIw-1	35	3w8

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