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SOIL SURVEY

Franklin County Tennessee

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

How to use THE SOIL SURVEY REPORT

THIS SURVEY of Franklin County will help you plan the kind of farming that will protect your soils and provide good yields. It describes the soils, shows their location on a map, and tells what they will do under different kinds of management.

Find Your Farm on the Map

In using this survey, start with the soil map, which consists of the sheets bound in the back of this report. These sheets, if laid together, make a large photographic map of the county as it looks from an airplane. You can see woods, fields, roads, rivers, and many other landmarks on this map.

To find your farm on the large map, use the index to map sheets. This is a small map of the county on which numbered rectangles have been drawn to show the position of each sheet of the large map.

When you have found the map sheet for your farm, you will notice that boundaries of the soils have been outlined, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose you have found on your farm an area marked with the symbol Ca. You learn the name of the soil this symbol represents by looking at the map legend. The symbol Ca identifies Capshaw silt loam.

Learn About the Soils on Your Farm

Capshaw silt loam and all the other soils mapped are described in the section, Soil Types and Phases and Miscellaneous Land Types. Soil scientists described and mapped the soils. They walked over the fields and through the woodlands; dug holes and examined surface soils and subsoils; measured slopes with a hand level; noted differences in growth of crops, weeds, brush, or trees; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming.

After they mapped and studied the soils, the scientists judged what use and management each soil should have, and then they placed it in a management group. A management group is a group of similar soils that need and respond to about the same kind of management.

Capshaw silt loam is in management group 6. Turn to the section, Use and Management of Soils, and read what is said about soils of group 6. You will want to study the table, which tells you how much you can expect to harvest from Capshaw silt loam under two levels of management. In columns A are yields to be expected under ordinary management, and in columns B are yields to be expected under improved management.

Make a Farm Plan

For the soils on your farm, compare your yields and farm practices with those given in this report. Look at your fields for signs of runoff and erosion. Then decide whether or not you need to change your methods. The choice, of course, must be yours. This survey will aid you in planning new methods, but it is not a plan of management for your farm or any other farm in the county.

If you find that you need help in farm planning, consult the local representative of the Soil Conservation Service or the county agricultural agent. Members of your State experiment staff and others familiar with farming in your county will also be glad to help you.

Fieldwork for this survey was completed in 1949. Unless otherwise specifically indicated, all statements in the report refer to conditions in the county at that time.

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SOIL SURVEY OF FRANKLIN COUNTY, TENNESSEE

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UNITED STATES DEPARTMENT OF AGRICULTURE, IN COOPERATION WITH THE TENNESSEE AGRICULTURAL EXPERIMENT STATION AND THE TENNESSEE VALLEY AUTHORITY

General Nature of the Area

FRANKLIN COUNTY is mainly on the undulating Cumberland Plateau and the gently sloping Highland Rim. Forests cover about 55 percent of the county. The temperate and humid climate provides a long growing season and sufficient moisture to mature nearly all the common field crops. There is no distinct dry season, and crops such as fall-sown small grains and crimson clover seldom winterkill. The principal crops grown are corn, wheat, oats, rye, cotton, potatoes, crimson clover, lespedeza, and alfalfa. Livestock raising, dairying, tree nurseries, and the growing of fruits are enterprises of increasing importance. Most farms are small and produce crops and livestock for home use. About 58 percent of the county is suitable for crops.

Location and Extent

Franklin County is in the south-central part of Tennessee (fig. 1). Winchester, the county seat, is

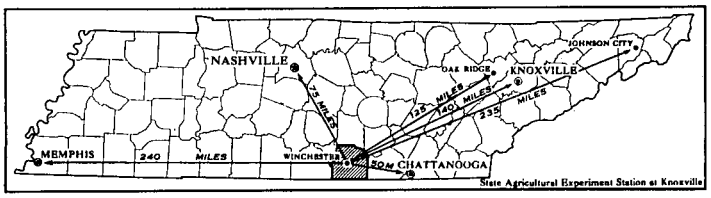

Figure 1.—Location of Franklin County in Tennessee.

approximately in the center of the county. The total area is 358,400 acres or 560 square miles.

Franklin County was created by an act of the Tennessee Legislature, December 3, 1807. At a later date, the counties of Moore, Coffee, Grundy, and Marion were established from land that was originally in Franklin County.[3]

The first settlements in what is now Franklin County were made on Rolling Fork near Cowan and on Beans Creek. Early pioneers came from North Carolina, Virginia, and Georgia and were mainly of Scotch-Irish, English, and German descent. Shortly after the Civil War a number of German-Swiss from northern States settled in the Belvidere community. Direct immigration from abroad added a limited number of people to the Belvidere community (*4*).[4] Itinerant frontiersmen were among the first to establish themselves in Franklin County. Other settlers received homestead warrants for service in the Revolutionary War. Land grants, usually for 200 acres, were given to some settlers by the State of Tennessee. Speculators obtained large land grants, but by 1812 most of these had been broken into small holdings and farms (*4*).

According to the 1950 census, the population of Franklin County was 25,431; that of Winchester, the county seat, was 3,974. The rural population is concentrated in the most productive parts of the Highland Rim and in the Central Basin. The Barrens and the Cumberland Plateau are sparsely populated.

Physiography, Relief, and Drainage

Franklin County covers parts of two broad physiographic divisions—the Cumberland Plateau section of the Appalachian Plateau Province, and the Highland Rim and Central Basin (also called Nashville Basin) sections of the Interior Low Plateau Province (*3*). The entire county is underlain by sedimentary rocks that range from the basal Pennsylvanian age to the Upper Ordovician (*5*). The rocks deviate but little from the horizontal.

The Cumberland Plateau and escarpments occupy about a third of the county. The plateau has an elevation of about 2,000 feet at Sewanee, near the eastern edge of the county, but declines somewhat toward the south. It is about 1,000 feet higher than the neighboring Highland Rim. At Lake View, near the southern edge of the county, the elevation is 1,830 feet.[5]

The Cumberland Plateau is a true peneplain with an undulating surface dissected by young valleys (*3*). Near Sewanee, the plateau is undulating to gently rolling except near the edges, where deep gorges cut into the face of the escarpment. In the southern part of the county, however, the plateau is much more highly dissected, and locally the difference in elevation may be as much as 800 feet within three-quarters of a mile. Sewanee conglomerate caps the Cumberland Plateau except where it has been removed by erosion from the projecting ridges. The formation consists of a soft, massive, cross-bedded sandstone that contains numerous quartz pebbles (*8*). Where this cap is removed,

[1] In charge for a part of the time that survey was in progress.

[2] Fieldwork for this survey was completed when Soil Survey was part of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

[3] *From:* A BRIEF HISTORY OF FRANKLIN COUNTY, TENNESSEE. Prepared by Thomas Foster Rhoton in partial fulfillment of the requirements for the degree of Master of Science, Department of Education, University of Tennessee. (Processed.)

[4] Italic numbers in parentheses refer to Literature Cited, page 84.

[5] Elevations from U. S. Geological Survey planimetric maps.

great sinks have formed in the underlying soluble limestone.

Drainage in the Cumberland Plateau section is mainly southward to the Tennessee River. On that part of the plateau bordering the Highland Rim, streams flow in deep V-shaped valleys down the steep escarpment onto the rim, and finally to the Elk River. Much of the drainage to the south ends in deep sinks. Some of the large streams flowing south into Alabama are: Crow Creek, Little Crow Creek, Turkey Creek, and Hurricane Creek. Crow Creek is the largest of these. A well-defined dendritic drainage pattern has developed in the Cumberland Plateau. On the broader remnants of the plateau there are slight depressions, sinks, and nearly level areas. Hartsells and Muskingum soils have developed on the better drained areas from materials weathered from the Sewanee conglomerate.

In many places the scarp drops 800 feet in half a mile; the upper part is almost vertical. The Warren Point sandstone member of the Gizzard formation is the basal formation of the Pennsylvanian series, and it forms the cliffs of the escarpment. Rocks of the Mississippian series extend up the escarpment almost to the top. These rocks are mostly limestone, parts of which contain much chert and small amounts of shale and sandstone. On the steep slopes, geologic erosion has been rapid and little soil has developed. Most of the area within the escarpment is rockland. Bangor limestone is exposed at the base of the escarpment.

Several of the large streams have cut ravines or deep valleys into the plateau. A few coves or large valley sinks, or series of sinks, are completely surrounded by higher land. These have subterranean drainage. Some of the coves, such as Sinking Cove and Lost Cove in the southeastern part of the State, are several miles long and 800 feet below the plateau. Their steep walls are generally limestone. The agricultural soils in the coves and valleys have developed from materials carried by water and moved by gravity from the limestone walls of the cove or from the sandstone cap on the plateau.

The Highland Rim and its escarpment occupy about two-thirds of the county. On the west near the Elk River, the Highland Rim is bounded by the escarpment that descends to the Central Basin, more than a hundred feet below. On the east, the rim is bounded by the escarpment ascending to the Cumberland Plateau, nearly 1,000 feet higher.

The Highland Rim section has an average elevation of about 970 feet above sea level. The elevation at Cowan near the eastern edge of the rim is 979 feet; at Decherd, 959 feet; and at the courthouse in Winchester, 965 feet. The elevation at Beans Creek in the southwestern part of the county is 875 feet; at Brick Church, about 1 mile northwest of Duncantown on the Barrens in the northern part, it is 1,034 feet.[6]

The Highland Rim, except near the Elk River, is gently rolling. The relief in localized spots is undulating to hilly. The northern part of the rim is called the Barrens. In this part of the county, drainage is not well developed. Stream dissection is slight except near the Elk River. This stream and its tributaries flow in rough gorges.

The St. Louis and Warsaw limestones underlie the surface on much of the Highland Rim. The St. Louis is a fine-grained to compact, generally thick-bedded gray limestone. Because of its solubility and long weathering, it is generally covered by a thick mantle of residual material. It weathers to cherty red clay on which productive soils have developed. The Warsaw formation is generally a grayish thick-bedded (in places cross-bedded) limestone very much resembling the St. Louis limestone. In this county the Warsaw formation is somewhat sandy and is about 100 feet thick. The St. Louis and Warsaw formations are both very soluble, and consequently both have well-developed underground drainage systems (*8*). Over most of the eastern and southwestern parts of the Highland Rim, the relatively chert-free Decatur and Dewey soils have developed from these limestones. Karst or sinkhole topography is much more common on these formations than on other formations of the Highland Rim.

Fort Payne chert, which outcrops along the Elk River, forms the escarpment of the Highland Rim and underlies much of the area known as the Barrens. This formation ranges from a siliceous limestone to a calcareous chert or cherty shale that weathers to a cherty soil. The scarp of the Highland Rim is about 150 feet high. Dissection is intense. Short narrow-crested ridges extend out from the Highland Rim, and short steep-walled V-shaped valleys are cut into it from the Central Basin below. The soils derived from the Fort Payne chert formation are the Bodine and Baxter. These soils, particularly the Bodine, are shallow, cherty, and generally unproductive.

A terrace deposit, usually sandy, covers a considerable part of the Highland Rim. Some parts of this deposit are associated with the present drainage system; others appear to have been laid down by a former drainage system and now occur as terrace remnants. A strip averaging about three-quarters of a mile wide occurs along the Elk River. The older terrace deposits are 80 to 100 feet above the river and above overflow. Holston, Waynesboro, and Nolichucky soils occur over most of these high terraces. The low terraces nearer the river are usually occupied by Sequatchie or Whitwell soils.

Back from the Elk River, and separated from it by residual soils throughout most of its course, is another large terrace deposit, predominantly of silt and clay. The main body of this terrace occurs within an area beginning at Winchester and fanning out northeastward and southeastward toward the base of the Cumberland Escarpment. Whether this terrace deposit was laid down by the Elk River at an earlier date or by some other drainage system from the Cumberland Plateau is uncertain. Obviously it was not deposited by the present drainage system. This main body covers roughly 62 square miles, and the soils are mainly of the Cumberland series.

Remnants of a loessal or loesslike silt mantle occur over much of the Highland Rim. The silt mantle ranges from a thin film to a layer about 20 to 30 inches thick. These loesslike remnants are extensive north of

[6] Elevations from U. S. Geological Survey topographic maps.

the Elk River and less extensive in an area south of the river in the western part of the county. Soils of the Mountview, Dickson, Lawrence, and Guthrie series were derived, at least in part, from this silt mantle.

Chattanooga shale, known locally as black slate, underlies the Fort Payne chert and forms the dividing line between the Highland Rim and the Central Basin. It is very thin and not an important soil-forming rock.

The Central Basin covers about 12 square miles in this county and has an elevation of about 800 feet. It occurs in a narrow strip along the Elk River and extends part way up its tributaries. At no place is it more than a mile wide. The local relief is greatly influenced by the remnants of the Highland Rim, which jut outward as ridges into the Basin. A well-defined dendritic drainage pattern has developed, stream dissection is well advanced, and drainage is good. The topography is rolling to steep in all parts. Rocks exposed in the Central Basin portion of the county are mainly argillaceous phosphatic limestone.

Climate

Franklin County is warm, temperate, and humid. It is located between two of the main storm paths that cross the eastern United States. Consequently, there are many comparatively gentle changes in the weather but few severe ones (*11*). The heavier storms are less intense than anywhere else in the same latitude in the eastern United States (*8*). Few are destructive. Hot summers and lack of a distinct dry season are characteristic of the county.

The difference between the average summer and winter temperatures is only about 35°F. (table 1). Summer weather is usually calm. Strong winds are uncommon except early in spring. Prolonged hot spells occur in July and August, but the temperature generally does not exceed 95° F. Winter weather is usually mild enough for outdoor work, although northerly winds are common. Winter temperatures change abruptly but fall below zero only about once a year. Some snow falls but it usually melts in a day or two. Crops are seldom winterkilled, except on poorly drained soils where severe erosion has exposed the heavier textured soils.

Temperature and precipitation data compiled from records of the United States Weather Bureau are given in table 1. The data from the Weather Bureau station

TABLE 1.—*Normal temperature and precipitation at two weather stations*

[TULLAHOMA, COFFEE COUNTY, TENN., ELEVATION, 1,072 FEET]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year	Wettest year	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	42.2	73	−5	5.45	3.52	7.28	1.9
January	41.1	74	−14	5.46	3.81	5.99	3.1
February	43.3	77	−22	5.56	1.34	5.10	2.5
Winter	42.2	77	−22	16.47	8.67	18.37	7.5
March	49.9	87	0	6.05	3.95	6.77	1.3
April	59.1	92	21	4.65	4.08	6.30	.1
May	66.6	95	29	4.03	1.35	9.03	0
Spring	58.5	95	0	14.73	9.38	22.10	1.4
June	74.8	100	40	3.96	2.72	4.46	0
July	77.5	105	41	4.88	6.56	7.60	0
August	76.4	103	47	3.80	3.71	5.24	0
Summer	76.2	105	40	12.64	12.99	17.30	0
September	71.8	105	27	2.99	.50	3.50	0
October	60.3	93	22	2.96	2.85	1.25	[3]
November	49.0	80	5	4.38	2.37	4.72	.5
Fall	60.4	105	5	10.33	5.72	9.47	.5
Year	59.3	105	−22	54.17	[4]36.76	[5]67.24	9.4

[SEWANEE, FRANKLIN COUNTY, TENN., ELEVATION, 1,910 FEET]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year	Wettest year	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	39.9	71	−6	5.33	4.32	3.03	1.7
January	38.9	70	−7	5.43	4.64	7.44	3.2
February	40.0	74	−11	5.27	1.24	5.86	2.4
Winter	39.6	74	−11	16.03	10.20	16.33	7.3
March	48.5	86	4	6.20	3.98	9.52	1.4
April	56.7	90	20	4.94	4.44	5.99	.3
May	65.4	90	30	4.40	.77	11.35	0
Spring	56.9	90	4	15.54	9.19	26.86	1.7
June	72.8	99	39	4.64	2.66	6.87	0
July	75.6	103	51	5.63	4.45	3.23	0
August	74.9	101	51	4.38	4.95	.93	0
Summer	74.4	103	39	14.65	12.06	11.03	0
September	70.3	101	34	3.15	.60	9.69	0
October	59.8	90	21	3.21	3.58	4.86	.1
November	48.0	78	.3	4.61	3.10	8.40	.5
Fall	59.4	101	3	10.97	7.28	22.95	.6
Year	57.6	103	−11	57.19	[6]38.73	[7]77.17	9.6

[1] Tullahoma: Average temperature based on a 67-year record, through 1955; highest and lowest temperatures on a 42-year record, through 1930. Sewanee: Average temperature based on a 49-year record, through 1942; highest and lowest temperatures on a 35-year record, through 1930.

[2] Tullahoma: Average precipitation based on a 68-year record, through 1955; wettest and driest years based on a 63-year record, in the period 1884-1955; snowfall based on a 39-year record, through 1930. Sewanee: Average precipitation based on a 62-year record, through 1955; wettest and driest years based on a 56-year record, in the period, 1860-1955; snowfall, based on a 33-year record through 1930.

[3] Trace. [4] In 1941. [5] In 1923. [6] In 1941. [7] In 1929.

at Tullahoma, Coffee County, (near the Franklin County line) is representative of the climate in most of Franklin County. The data from Sewanee is for that part of the county on the Cumberland Plateau.

According to the records of the weather station at Tullahoma, the average length of the growing season is 190 days. The average date of the last killing frost in spring is April 13. The average date of the first killing frost in fall is October 20. Frosts have occurred as early as September 27 and as late as May 10. The records of the station at Sewanee (on the Cumberland Plateau) show an average growing season of 200 days. The average date of the last killing frost in spring is April 12; that of the first in fall is October 29. The earliest frost recorded in fall was on October 1, and the latest in spring was May 10.

The growing season is long enough for the maturing of nearly all the common field crops. Late spring frosts occasionally damage fruit and early gardens. The grazing period is March 15 to December 1, but it is somewhat longer on soils that have good drainage.

The heaviest rains come in winter and spring; the driest season is fall. Winter rains are slow and drizzling and may be accompanied by sleet or snow. Spring and summer rains are usually torrential and cause much of the accelerated erosion on soils that are not protected by vegetation. Excessive rain in spring occasionally delays planting of crops. It may damage crops on poorly drained soils, creek bottoms, and places with restricted surface drainage.

Summer and fall droughts occasionally damage crops and pastures, particularly those on steep slopes and on soils of low moisture-holding capacity. Fall-planted crops are sometimes delayed by droughts. Rainfall throughout the growing season is usually sufficient for at least moderate yields of all crops except those on soils having excessive runoff.

Water Supply

Nearly all parts of the county have water supplies adequate for households and livestock. Exceptions are parts of the Cumberland Plateau and that part of the Highland Rim known as the Barrens. Flowing streams are uncommon in the Barrens. The water for households and livestock is obtained from wells and farm ponds. On the Cumberland Plateau, water for livestock comes from streams, springs, and a few wells. Many springs flow from the well-developed underground drainage systems of the St. Louis and Warsaw formation in deep valleys of the Cumberland Plateau (*8*). On the Highland Rim adequate supplies of water are available for household and livestock needs. The largest springs in the county are along the Highland Rim; many flow from the basal part of the Fort Payne chert that lies directly above the Chattanooga shale.

Irrigation appears feasible only along Elk River. Water can be pumped from the river to the bottom lands and terraces on the river flood plain. Most soils on the flood plains of the Elk River are coarse textured and have a low moisture-holding capacity. To date, no lands in Franklin County have been irrigated.

Markets, Transportation, and Other Facilities

Winchester is the principal agriculture market and trading center. Decherd, on the main line of the Nashville, Chattanooga and St. Louis Railway, is the principal shipping point. Most farm products not used locally are shipped to Nashville and Chattanooga. Belvidere, Cowan, Estill Springs, and Huntland are other important trading centers and shipping points.

Farm-to-market transportation facilities are good in the Highland Rim and Central Basin sections of the county. Federal highways and State highways go through Winchester. All-weather State and county roads are well distributed over the Highland Rim and Central Basin, and practically all localities are accessible by automobile throughout the year. Many parts of the Cumberland Plateau are practically inaccessible to automobiles, because only a few graveled and secondary roads have been built.

Bus transportation to elementary schools and high schools is provided. The University of the South and two Episcopal preparatory schools, St. Andrews for boys and St. Marys for girls, are at Sewanee. The county has rural mail service to practically all populated parts. Nearly all communities have churches.

Agriculture

Franklin County is one of the most diversified farming areas in the State. It produces livestock and many kinds of crops. Dairying and the growing of fruit are becoming more important. Tree nurseries are a specialized business. Farms are small, and most of them produce crops and livestock primarily for home use.

The general fertility of the soil and the needs of the farmer usually determine the crop to be grown. Many farmers do not follow systematic rotations. A rotation commonly used is corn–crimson clover–corn–wheat (lespedeza); another common rotation is lespedeza-lespedeza–corn or cotton. The use of lime and fertilizer has been steadily increasing.

Land Use

According to the 1954 census, land in farms totaled 212,419 acres, or 59.3 percent of the county area. The rest was in urban and industrial areas, forests, and a military reservation. Forests, including farm woodlands, cover about 55 percent of the county and are discussed in the section, Forests.

Land in farms in 1954 was distributed as follows:

	Acres	*Percent*
All cropland	113,257	53.3
Harvested	74,263	35.0
Used only for pasture	31,545	14.8
Not harvested—not pastured	7,449	3.5
All woodland	68,653	32.3
Pastured	22,183	10.4
Not pastured	46,470	21.9
All other land pastured	22,694	10.7
All other land (house lots, roads, wasteland).	7,815	3.7

Type and Size of Farms

According to a sampling in the 1954 census, 2,246 farms in the county were classified by type as follows:

Type of farm:	Number
Miscellaneous and unclassified	867
General farms	431
Field crop	456
Livestock	271
Dairy	186
Poultry	35

The average size of farms in 1954 was 93.9 acres. Farms were distributed by size as follows:

Size range:	Number
Less than 10 acres	240
10 to 49 acres	710
50 to 99 acres	573
100 to 179 acres	475
180 to 259 acres	141
260 acres and over	123

Eleven farms in the county contained more than 1,000 acres.

Farm Tenure

According to the 1954 census, owners operated 1,761 farms, tenants 497, and managers 4. The usual landlord-tenant agreement is on a crop-share basis. Agreements vary, but for corn the landlord usually furnishes power and equipment and receives two-thirds of the crop. If fertilizer is used the landlord furnishes two-thirds of it. He normally furnishes two-thirds of the seed corn. If the tenant furnishes the power and equipment, in addition to his labor, he gets two-thirds of the corn crop.

Share-crop agreements for small grains, tobacco, crimson clover, and vetch are the same as for corn. For cotton, the landlord furnishes power and equipment and half the fertilizer and seed, and receives half the crop. If the tenant furnishes power, equipment, labor, and half the seed and fertilizer, he receives three-fourths of the crop. Agreements for potatoes are the same. For alfalfa, the landlord limes the soil, furnishes seed and half the fertilizer, and receives half the crop. For lespedeza, the landlord furnishes seed and half the fertilizer and receives one-third of the crop.

Crops

The main crops in Franklin County are corn, wheat, oats, rye, cotton, potatoes, crimson clover, lespedeza, and alfalfa (table 2).

Corn.—As shown in table 2, corn occupies a larger acreage than any other crop. It is grown on practically all farms and on nearly all soils that are commonly tilled. Its proportion to other crops varies in different parts of the county. In areas of strong relief, corn is grown mostly on bottom lands, colluvial lands, and ridgetops. On the Highland Rim, it is grown on practically all the soils. Corn is usually planted in April or May. Fertilizers are used by some farmers,

TABLE 2.—*Acreage of the principal crops and number* [1] *of bearing fruit trees and grapevines in stated years*

Crop	1929	1939	1949	1954
	Acres	*Acres*	*Acres*	*Acres*
Corn	38,091	33,504	29,901	25,567
For grain	36,694	32,964	29,279	24,855
For silage	350	241	175	343
Hogged, grazed, or cut for fodder.	1,047	299	447	369
Small grains threshed:				
Oats	606	1,475	2,320	6,884
Wheat	8,263	4,601	6,229	6,563
Barley	281	697	1,455	2,963
Rye	613	1,439	746	629
All hay	16,737	23,962	23,412	23,179
Alfalfa	1,093	3,200	7,348	4,798
Lespedeza	(2)	10,043	9,142	10,150
Clover and timothy, alone or mixed.	4,034	981	1,115	1,025
Other annual legumes cut for hay.	6,340	7,478	3,043	2,424
Small grains cut green	744	693	667	2,042
Other hay cut, including wild hay.	4,526	1,567	1,097	2,740
Potatoes	922	2,559	[3] 1,693	[4] 275
Sweetpotatoes	457	175	[3] 59	[4] 26
All other vegetables	250	339	89	114
Tobacco	218	149	212	221
Cotton	9,102	6,672	8,782	6,020
Sorghum cane (for sirup)	133	193	26	(2)
	Number	*Number*	*Number*	*Number*
Apple trees	17,086	15,532	10,469	2,471
Peach trees	20,327	19,549	7,392	2,257
Pear trees	2,134	1,807	1,210	482
Plum trees	2,144	2,272	508	112
Cherry trees	3,184	1,507	750	161
Grapevines	7,303	7,929	4,826	736

[1] Number of bearing trees and vines in 1930, 1940, 1950, and 1954.
[2] Not reported.
[3] Does not include acreage for less than 15 bushels harvested.
[4] Does not include acreage for less than 20 bushels harvested.

but the amount is generally small. Most corn is fed to livestock on the farm.

Small grains.—Wheat is the most important small grain. It is grown mainly on the Highland Rim on soils of uplands, terraces, colluvial lands, and bottom lands that are least subject to overflow. Wheat is planted in fall and harvested in June. Mixed fertilizer is used at the rate of about 200 pounds per acre to increase the yields of wheat.

Oats, rye, and barley are also grown, but the acreage is much less than that of wheat. They are planted in fall and harvested in June. The acreage in oats and barley has increased in the past few years as a consequence of their increased use for winter cover, pasture, and grain. Practically all of the small grains are used on the farms where grown. Oats furnish winter pasture and provide some protection against erosion. Rye is grown chiefly in the Central Basin and on the less productive soils surrounding it. It is used as winter pasture and for grain on soils of low fertility. Barley yields well on fertile soils and furnishes winter grazing for livestock and winter cover for the soil. Some buckwheat is grown, particularly on the heavier soils of the coves. It is planted during the latter part of July and August.

Cotton.—This is an important cash crop. It is grown mainly on the less productive and somewhat droughty Dickson and Holston soils. Cotton is usually planted the early part of May. Complete fertilizers are generally used. Most of the cotton is ginned locally.

Potatoes.—As a cash crop, potatoes are becoming less important. In 1949, farmers planted 1,693 acres of potatoes and produced 159,871 bushels. In 1954, farmers planted 275 acres and produced 46,596 bushels. Most potatoes are grown on Cumberland soils and on the coarse-textured soils such as those around Oak Grove. On the Highland Rim early potatoes are usually planted in March and on the Cumberland Plateau between April 15 and 20. The crop is harvested early in July. Potatoes get large quantities of complete fertilizers and manure. The potato land is sown to alfalfa following the harvest of potatoes. Most potatoes are of the Irish Cobbler variety, but the Katahdin and Sequoia varieties are also grown. Potatoes not used locally are shipped to points farther south.

Tobacco and other crops.—Burley tobacco is grown to a small extent as a cash crop.

Only 221 acres of tobacco were grown in 1954; 324,130 pounds were produced. Most of the crop is grown in the Central Basin. Naturally fertile soils, as the Emory, are best suited, and with heavy fertilization, tobacco yields are high.

Sweetpotatoes are a subsistence crop and practically all other vegetables are used locally. A small acreage of sorghum cane is made into sirup chiefly for home use. Apples, peaches, pears, plums, cherries, and grapes are the most common fruits, but some strawberries, blackberries, loganberries, and other small fruits are produced. Any surplus is sold locally. There are three large, and some smaller nurseries growing ornamental and fruit trees for sale.

Crimson clover.—This plant is grown principally for soil improvement. A considerable acreage is allowed to mature for seed. At one time this county supplied most of the crimson clover seed in the United States. The crop is generally planted in July or August and provides pasture from late October to May. If the crop is grown for seed, it is harvested late in May or early in June. Average yields are from 6 to 7½ bushels an acre. The crop is grown on many well-drained soils. For soil improvement, it is plowed under in spring. Generally it is followed by a corn crop.

According to census reports, Franklin County farmers produced 7,635 bushels of crimson clover seed from 3,176 acres in 1954.

Hay.—Alfalfa and lespedeza are the most extensively grown hay crops. The acreage of alfalfa has increased rapidly. Alfalfa is grown principally on the more fertile and better drained soils of the Highland Rim and the Central Basin. It is commonly established by planting it after potatoes that have been heavily fertilized. Practically none is grown on the Cumberland Plateau. Lespedeza is grown extensively because its soil and drainage requirements are not exacting. Most of the crop is used for pasture and soil improvement. Timothy and clover mixed was once an important hay crop, but the acreage is decreasing. A small acreage of cowpeas is grown for forage. Practically all hay is fed on the farm where grown.

Pasture

About a third of all land in farms, or 76,422 acres, was pastured in 1954. Nearly half of this acreage was land suitable for crops. Except in the Cumberland Plateau, most of the grazing is on rotation pastures. The most important pasture plants are orchardgrass, bluegrass, white, red, alsike, and Ladino clovers, and fescue. Permanent pastures are mainly on land that is too steep, stony, or shallow for cultivation. Poorly drained stream bottoms or those subject to overflow are also in pasture. Ordinarily permanent pastures are managed poorly, but a few farmers use lime and phosphate, control grazing, and eradicate weeds.

Livestock

Most well-established farms have some cattle, a few hogs, and a small flock of chickens. The number of livestock on farms in the county in stated census years is shown in table 3.

TABLE 3.—*Number of livestock and beehives on farms in stated years*

Livestock	1930	1940	1950	1954
	Number	*Number*	*Number*	*Number*
Horses	2,418	[1] 2,626	1,752	755
Mules	3,540	[1] 3,075	2,420	1,500
Cattle	12,836	[1] 14,295	20,287	29,394
Sheep	3,562	[2] 1,889	2,277	4,071
Goats	2,046	[3] 1,593	176	([5])
Swine	12,977	[3] 12,870	22,853	20,790
Chickens	[1] 91,186	[3] 91,379	[3] 103,389	[3] 139,034
Beehives	1,766	1,630	[4] 1,644	([5])

[1] Over 3 months old.
[2] Over 6 months old.
[3] Over 4 months old.
[4] In 1949.
[5] Not available.

More than two-thirds of the cattle are raised for beef; the rest are dairy cattle. Most dairy herds are small, produce mainly for home use, and are chiefly Jersey or Jersey grades. Dairying is becoming one of the major enterprises. Beef cattle are mainly of the Shorthorn and Hereford breeds.

Most farmers raise hogs for home use, but a few raise them for market. Hogs for market are produced on the better corn land on the Highland Rim, and in Sinking Cove near the Tennessee-Alabama State line. Duroc-Jersey, Poland China, Berkshire, and Hampshire are the most popular breeds.

Chickens and eggs sold locally are an important source of income for many farms. Many of the chickens and eggs are produced for home use. The most common breeds are White Leghorn, Plymouth Rock, and Rhode Island Red.

A few sheep are raised. Hampshire is the most common breed.

Farm Power and Equipment

Most of the farms in Franklin County still have horses and mules, but tractors are gradually replacing animals as a source of power except on rough terrain. In 1950, 35 percent of all farms reported tractors. In 1954, 45 percent of all farms reported tractors.

In 1954, 838 farms had motortrucks, 180 had pick-up hay balers, 140 had cornpickers, 319 had grain combines, and 111 had milking machines. Electricity was used on 2,140 farms, telephones on 1,056 farms, and automobiles on 1,181 farms.

On the Cumberland Plateau and rough parts of the Central Basin, draft animals are the main source of power, because the steep and irregular slopes prevent the use of modern farm machinery. On the better soils of the Highland Rim, much of the tillage and harvesting is done with modern machinery. Small grains are generally harvested with small combines, but corn is harvested by hand. Potatoes and cotton are hand picked because the acreage does not justify the use of expensive machinery.

The Soils of Franklin County

General Nature

The soils of Franklin County differ greatly in color, texture, consistence, reaction, fertility, relief, stoniness, depth to underlying material, permeability, and drainage. These characteristics affect productivity, workability, and conservability. They also determine the suitability of the soils for agriculture.

Colors range from nearly white through gray, yellow, and brown to red. Colors intermediate between brown and light gray predominate in the surface soils, and reds and yellows predominate in the subsoils. In texture and consistence, the soils vary from loose incoherent sand to plastic clay. The surface soils are mainly friable silt loam and loam. The subsoils are mainly silty clay loam, clay loam, or clay, and range in consistence from friable to very strongly plastic.

Relief ranges from nearly level to very steep. The degree of erosion varies greatly. Many soils are either uneroded or only slightly eroded, some are moderately eroded, and others are severely eroded. Loose fragments of chert, cobbles, gravel, or stones that interfere materially with cultivation are common in many soils. Numerous outcrops of bedrock also occur.

Many soils of uplands and terraces, particularly those of the Cumberland Plateau and Barrens, have been severely leached; consequently, they are acid, contain little organic matter, and are low in fertility. Even in the virgin state, they differ in fertility and content of organic matter. These natural differences have been intensified by cropping and erosion. Soils of the bottom lands and low terraces are high in natural fertility, moderately well supplied with bases, especially lime, and fairly well supplied with organic matter.

Differences in certain characteristics affect the use of soils. In suitability, most of the soils are between those that are well suited to agriculture and those that are poorly suited. About 58 percent of the county is suitable for crops, 10 percent for permanent pasture, and 32 percent for forest.

Soil Series and Their Relations

On the basis of differences in their characteristics, the soils have been classified into 45 series and 11 miscellaneous land types. There are 134 mapping units. To make full use of the soil survey, it is necessary to know each of the soil mapping units and understand how they are related. In order to make these relationships more easily understood, the soils are placed in groups according to their positions on the landscape, as follows: (1) Soils of the uplands, (2) soils of the terrace lands, (3) soils of the colluvial lands, and (4) soils of the bottom lands.

The topographic position, parent material, drainage, and color of the soil series are shown in table 4. Table 5 is included for readers who are interested in the higher categories of soil classification.

Soils of the uplands

The soils of the uplands are in the higher lands above the stream valleys. They have developed from materials that are residual from the weathering of the underlying limestone, sandstone, or silt.

Soils of the uplands are members of the Mountview, Dickson, Lawrence, Guthrie, Decatur, Dewey, Baxter, Bodine, Colbert, Talbott, Mimosa, Dellrose, Hartsells, and Muskingum series.

Mountview, Dickson, Lawrence, and Guthrie soils are underlain at a shallow depth by cherty limestone residuum. A thin mantle, probably of windblown silt, covered the smoother parts of the Highland Rim and greatly influenced the development of the relatively chert-free solum of these soils. The well-drained Mountview soils have grayish-brown to light yellowish-brown surface soils and strong-brown or yellowish-brown subsoils. The Dickson, Lawrence, and Guthrie soils have light-colored surface soils and a compact silty layer at a shallow depth. They occur on the smoother parts of the Barrens. Differences in these soils are closely related to differences in drainage.

Dickson soils are moderately well drained and have light brownish-gray to light yellowish-brown surface soils and yellowish-brown to brownish-yellow subsoils. Lawrence soils are imperfectly drained and have light-gray to gray surface soils and light yellowish-brown to pale-yellow (splotched with gray) subsoils. Guthrie soils are poorly drained and have light-gray to gray surface soils and light-gray subsoils mottled with yellow and yellowish red.

Decatur and Dewey soils were derived from high-grade limestone. They are closely associated on the Highland Rim and are moderately deep to deep. Decatur soils are relatively chert-free, but some of the Dewey soils are cherty. Decatur surface soils are brown or dark brown; the subsoils are dark-red silty

TABLE 4.—*Soil series and their topographic position, parent material, drainage, and color*

[Soil series are placed under headings that most nearly describe them; variations are explained in footnotes]

Parent material or parent rock	Excessively drained. Rapid to very rapid runoff; medium to very rapid internal drainage. Profiles indistinct because of rapid geologic erosion, and of variable color as determined by parent material.	Well drained. Soil brown or reddish brown to yellowish brown and free of mottlings to a depth of about 30 inches.	Moderately well drained. Soil yellowish-brown to brownish yellow; mottled below 18 to 24 inches.	Imperfectly drained. Soil pale-yellow (alluvial soils grayish-brown or yellowish-gray) and mottled below 12 to 18 inches.	Poorly drained. Soils brownish gray, mottled below 6 to 8 inches, and light gray.
SOILS OF THE UPLANDS					
Unconsolidated silt (loess):					
Relatively chert-free silt mantle over cherty limestone.		Mountview	Dickson	Lawrence	Guthrie.
Sedimentary rocks:					
High-grade limestone		Decatur, Dewey			
Cherty limestone	Bodine	Baxter			
Argillaceous limestone		Talbott	Colbert		
Phosphatic limestone		Mimosa			
Cherty limestone creep underlain by moderately phosphatic limestone.	Dellrose				
Acid sandstone	Muskingum	Hartsells			
SOILS OF THE TERRACE LANDS					
Old alluvium (stream terraces):					
Chiefly limestone		Cumberland, Etowah, Humphreys	Capshaw	Taft	Robertsville.
Chiefly sandstone, some limestone (high terraces).		Waynesboro, Nolichucky			
Chiefly sandstone		Holston			
Chiefly sandstone, some limestone (low terraces).		Sequatchie	Whitwell [1]	Tyler	Purdy.
SOILS OF THE COLLUVIAL LANDS					
Local wash and some colluvial materials:					
Chiefly high-grade limestone		Hermitage			
Argillaceous limestone			Swaim		
Chiefly limestone		Emory [2]		Ooltewah [2]	
Cherty limestone		Pace [3], Greendale [2, 3]			
Chiefly sandstone		Allen, Jefferson, Barbourville [2]		Cotaco [2, 4]	
SOILS OF THE BOTTOM LANDS					
Alluvium (stream bottoms):					
Chiefly limestone; some sandstone		Huntington	Egam [3]	Lindside [1], Dunning [5]	Melvin.
Cherty limestone		Ennis		Lobelville [1]	Melvin.
Mixed sandstone and limestone	Bruno [6]				

[1] Moderately well drained to imperfectly drained.

[2] These soils do not have distinct textural horizons chiefly because of the short time their parent materials have been in place.

[3] Moderately well drained to well drained.

[4] Moderately well drained to poorly drained.

[5] Imperfectly drained to poorly drained.

[6] Excessive drainage due to permeability rather than to slope.

TABLE 5.—*Soil series classified into higher categories and factors that have contributed to differences among the series* [1]

Great soil group and series [2]	Relief	Parent material	Time [3]
ZONAL SOILS			
Red-Yellow Podzolic Soils:			
Decatur	Undulating to rolling	Residuum from cherty limestone	Long.
Baxter	Undulating to steep	Residuum from cherty limestone	Long.
Talbott	Rolling	Residuum from argillaceous limestone	Long.
Dewey	Undulating to hilly	Residuum from high-grade limestone	Long.
Allen	Rolling to hilly	Old colluvium from acid sandstone; some limestone influence	Long.
Hermitage	Undulating to rolling	Old colluvium from high-grade limestone	Long.
Cumberland	Undulating to hilly	Old alluvium from limestone	Long.
Etowah	Undulating to rolling	Old alluvium from limestone	Long.
Waynesboro	Undulating to hilly	Old alluvium from sandstone and some limestone	Long.
Nolichucky	Undulating to rolling	Old alluvium from sandstone and some limestone	Long.
Hartsells	Undulating to rolling	Residuum from acid sandstone	Long.
Mimosa	Hilly to steep	Residuum from clayey phosphatic limestone	Long.
Mountview	Undulating to rolling	Residuum from thin loesslike silt over cherty limestone	Long.
Jefferson	Rolling to hilly	Old local alluvial-colluvial deposits from acid sandstone	Medium to long.
Pace	Undulating to hilly	Old local alluvial-colluvial deposits from cherty limestone	Long to very long.
Swaim	Undulating to rolling	Old colluvium from argillaceous limestone	Short to medium.
Capshaw	Undulating	Old alluvium from limestone	Long to very long.
Holston	Undulating to rolling	Old alluvium chiefly from sandstone and shale	Long to very long.
Sequatchie	Undulating to rolling	Old alluvium from sandstone and some limestone	Medium to long.
Whitwell [4]	Nearly level	Old alluvium from sandstone	Medium to long.
Humphreys	Nearly level	Old alluvium from cherty limestone	Medium.
INTRAZONAL SOILS			
Planosols:			
Dickson	Undulating to rolling	Residuum from thin silt over cherty limestone	Very long.
Lawrence	Nearly level	Residuum from thin silt over cherty limestone	Very long.
Guthrie	Nearly level	Residuum from thin silt over cherty limestone (local alluvium in places)	Very long.
Tyler	Nearly level	Old alluvium from sandstone	Very long.
Purdy	Nearly level	Old alluvium from sandstone and some limestone	Very long.
Taft	Nearly level	Old alluvium from limestone	Very long.
Robertsville	Nearly level	Old alluvium from limestone	Very long.
AZONAL SOILS			
Lithosols:			
Bodine	Steep	Residuum from cherty limestone or chert	Short to medium.
Colbert	Rolling	Residuum from argillaceous limestone	Short to medium.
Dellrose	Rolling to steep	Residuum from cherty limestone creep underlain by moderately phosphatic limestone.	Short to medium.
Muskingum	Rolling to steep	Residuum from acid sandstone	Short to medium.
Alluvial soils:			
Bruno	Nearly level	Alluvium or colluvium from mixed sandstone and limestone	Very short.
Barbourville	Undulating	Local alluvium or colluvium from acid sandstone; some limestone.	Short to medium.
Cotaco	Nearly level	Colluvium, mainly sandstone material	Short to medium.
Greendale	Undulating	Local alluvium or colluvium from cherty limestone	Short to medium.
Ennis	Nearly level	Alluvium or colluvium from cherty limestone	Very short.
Lobelville	Nearly level	Alluvium or colluvium from cherty limestone	Very short.
Emory	Nearly level to undulating	Local alluvium or colluvium from cherty limestone	Short to medium.
Ooltewah	Nearly level	Colluvium, chiefly limestone material	Short to medium.
Huntington	Nearly level	Alluvium, chiefly limestone material	Very short.
Lindside	Nearly level	Alluvium from limestone	Very short.
Melvin	Nearly level	Alluvium from limestone	Very short.
Egam	Nearly level	Alluvium from argillaceous limestone	Short.
Dunning	Nearly level	Alluvium from argillaceous limestone	Short.

[1] Since climate and vegetation are so nearly uniform in their effect on soil formation in the county, they do not account for the wide differences in the soils.

[2] A discussion of the natural classification and description of the higher series and categories is given in the Hamilton County, Tennessee soil survey report (*6*), the 1938 Yearbook of Agriculture (*10*), and the February 1949 issue of Soil Science (*9*).

[3] Refers to the length of time that the material has been in place as indicated by the degree of profile development.

[4] An intergrade to Low-Humic Gley (Gray Hydromorphic) soils.

clay. Dewey surface soils are grayish brown to brown; the subsoils are red to yellowish red. Decatur soils are darker, more plastic, and less cherty than the Dewey soils.

Baxter and Bodine soils were formed from cherty limestone and have a high content of chert on the surface and throughout the profile. They occur chiefly in the hilly and steep parts of the Highland Rim. Baxter surface soils are pale brown to brown, and Bodine surface soils are generally light grayish brown to yellowish brown. The soils differ chiefly in the color of the subsoils. Baxter subsoils are reddish yellow to red, whereas Bodine subsoils are brownish yellow to yellowish brown. In addition, Bodine surface soils generally are lighter colored and have a higher content of chert than Baxter soils.

Colbert and Talbott soils are shallow very plastic soils derived from the residuum of clayey limestone. The Colbert soils are shallower, more plastic, lighter colored, and have less distinct horizons than the Talbott soils. They have brownish-yellow or light yellowish-brown surface soils and yellow splotched with gray, reddish-brown, and light-yellow very plastic subsoils. The Talbott soils have grayish-brown to yellowish-brown surface soils and yellowish-red to reddish-yellow plastic subsoils. Bedrock outcrops are common on these soils but are generally more numerous on the Colbert soils. In this county, these soils are largely confined to the Highland Rim at the base of the Cumberland Escarpment.

Mimosa soils of the Central Basin resemble the Colbert and Talbott soils in depth, frequency of outcrops, and consistence. They differ chiefly in being derived from clayey phosphatic limestone residuum. They have brown or yellowish-brown surface soils and strong-brown very plastic silty clay subsoils with some yellow and gray splotches.

Dellrose soils, which are closely associated with Mimosa soils, have formed from cherty limestone creep underlain by phosphatic limestone. The parent materials drifted from Baxter and Bodine soils of the Highland Rim over the soils and rock of the Central Basin. The horizons are indistinct and the soils are friable throughout. The surface soils are brown and dark brown to yellowish brown and the subsoils yellowish brown to yellowish red.

Hartsells and Muskingum soils have formed from the residuum of acid sandstone and occur on the Cumberland Plateau. The Hartsells surface soils are grayish brown to yellowish brown, and the subsoils are brownish-yellow to yellowish-brown friable clay loam. Sandstone bedrock is generally at a depth of about 3 feet. Muskingum soils occupy the steeper slopes and are associated with the Hartsells soils. They are also much shallower than Hartsells soils. Areas of Muskingum soils are stony and have many sandstone outcrops. Muskingum surface soils are pale brown to yellowish brown, and the subsoils are light yellowish brown to yellowish brown.

Areas of land that have no true soil are mapped as miscellaneous land types. There are nine miscellaneous land types in the uplands. Some are characterized by extreme stoniness, others are man made. Their names indicate their character and main differences: (1) Rockland, sandstone, very steep; (2) Stony rolling land, Talbott and Colbert soil materials; (3) Stony hilly land, Talbott and Colbert soil materials; (4) Stony steep land, Talbott and Colbert soil materials; (5) Rockland, limestone, hilly and rolling; (6) Rockland, limestone, steep and very steep; (7) Stony hilly land, Mimosa soil material; (8) Gullied land, limestone material; and (9) Mines, pits, and dumps.

Soils of the terrace lands

In the geologic past, rivers and streams flowed at considerably higher levels and deposited gravel, sand, silt, and clay on their flood plains. Stream channels were cut deeper by flowing water, and new flood plains were formed at the lower levels. Remnants of the old flood plains are now above the overflow stage of present streams and are known as terraces, second bottoms, or benches. Geologically, they consist of old general stream alluvium.

Soils of the terrace lands are members of the Cumberland, Etowah, Humphreys, Capshaw, Taft, Robertsville, Waynesboro, Nolichucky, Holston, Tyler, Purdy, Sequatchie, and Whitwell series.

Cumberland, Etowah, Humphreys, Capshaw, Taft, and Robertsville soils are derived from old mixed alluvium that consists mainly of the weathered residuum from limestone. Differences in these soils are the result of differences in age and drainage. The well-drained Cumberland, Humphreys, and Etowah are identified mainly by their differences in color. The Cumberland soils have dark-brown or dark reddish-brown surface soils and dark-red or reddish-brown subsoils. Etowah soils have brown surface soils and reddish-brown or yellowish-red subsoils. The Humphreys soils have pale-brown to brown surface soils and brown to yellowish-brown subsoils. The moderately well-drained Capshaw soils have grayish-brown or yellowish-brown surface soils and yellowish-brown or brownish-yellow subsoils. The imperfectly drained Taft soils have gray to light-brown surface soils and brownish-yellow or pale-yellow (splotched with gray) subsoils. The poorly drained Robertsville soils are predominantly gray throughout.

Waynesboro, Nolichucky, Holston, Tyler, Purdy, Sequatchie, and Whitwell soils were derived from mixed alluvium that consisted mainly of sandstone and shale materials but that contained some limestone residuum. The most apparent differences between these soils and those of the previously discussed group of terrace soils are their coarser texture and the lighter colored surface layers of the better drained members. The Waynesboro surface soils are grayish brown to brown, and the subsoils, red or yellowish red. In addition to having coarser texture and lighter color, the Waynesboro soils differ from Etowah in having a thick transition layer between the surface soil and subsoil. The Nolichucky soils have much lighter colored surface soils and thicker transition layers between surface soil and subsoil than the Waynesboro. Nolichucky surface soils are light brownish gray, and the subsoils, yellowish red or reddish yellow.

The Holston soils are well drained and have a pale-brown or light yellowish-brown surface soil and brownish-yellow or yellowish-brown subsoil. The imperfectly drained Tyler soil has a light brownish-gray to gray surface soil and a light yellowish-brown or pale-yellow (splotched with gray) subsoil. The poorly drained Purdy soil is predominantly gray throughout. The Sequatchie and Whitwell, in contrast to the above soils, occur on low stream terraces. The Sequatchie soils are well drained and have yellowish-brown to brownish-yellow subsoils free of mottling. The Whitwell soils are imperfectly to moderately well drained and have brownish-yellow to yellowish-brown subsoils mottled below about 18 inches.

Soils of the colluvial lands

These soils occur along small drainageways, at the base of upland slopes, and on small sloping alluvial-colluvial fans that were made when small streams deposited materials on the broad flood plains of larger streams. Their parent materials were derived from soil materials and rock fragments that washed and rolled from adjacent slopes.

This group consists of members of the Hermitage, Swaim, Emory, Ooltewah, Pace, Greendale, Allen, Jefferson, Barbourville, and Cotaco series.

Hermitage soils occur on old alluvial-colluvial deposits washed chiefly from relatively high-grade limestone. They have brown to reddish-brown surface soils and yellowish-red to reddish-brown moderately friable subsoils. Swaim soils occupy a similar position but are from more clayey limestone materials, have grayish-brown to light-brown surface soils, and yellowish-brown to brownish-yellow very firm subsoils. Emory soils are well drained and predominantly brown throughout. The parent materials of the Emory soils are similar to those of the Hermitage soils. These soils differ, however, in age and horizon development. Ooltewah soils differ from Emory soils chiefly in being imperfectly drained. Pace soils are derived from old alluvial-colluvial deposits, chiefly cherty limestone material. The surface soils are light yellowish brown or light brownish gray, and the subsoils are brownish yellow or yellowish brown. Greendale soils are from materials similar to those of Pace soils, but are much younger and have developed less distinct horizons. They have light grayish-brown to brown surface soils and yellowish-brown to light yellowish-brown subsoils.

Allen and Jefferson soils occupy old alluvial-colluvial deposits washed from uplands underlain by acid sandstone. These soils have grayish-brown surface soils. However, the Allen subsoils are red to yellowish red, whereas Jefferson subsoils are yellowish brown to brownish yellow. Barbourville and Cotaco soils consist of recent colluvium washed from acid sandstone. They differ from the Allen and Jefferson soils in not having distinct surface soil and subsoil layers. The Barbourville soils are brown and well drained; Cotaco soils are gray to yellowish brown and moderately well drained to poorly drained.

One miscellaneous land type—Bouldery colluvium, Jefferson soil material—is mapped in the colluvial lands.

Soils of the bottom lands

Bottom lands are those nearly level areas along streams that are subject to flooding. The material from which these soils were derived was deposited by streams. Its character depends mainly on its source and the rate at which the water was flowing when the material was deposited. Soils in the bottom lands are young, and their parent materials have not been in place long enough to have developed well-defined surface soil and subsoil layers such as those in profiles of the upland and terrace soils.

This group consists of soils of the Ennis, Lobelville, Huntington, Lindside, Melvin, Egam, Dunning, and Bruno series.

One miscellaneous land type—Riverwash—is mapped on the bottom lands.

Ennis and Lobelville soils were derived from alluvium that washed mainly from uplands underlain by cherty limestone but that included some silty loess material. The Ennis soils are well drained and predominantly brown in color. The Lobelville soils are moderately well drained to imperfectly drained, highly mottled, and are grayish brown below 10 to 18 inches. The associated Melvin soils are poorly drained and gray in color.

Practically all of the other bottom-land soils are from alluvium washed from uplands underlain by relatively noncherty limestone, but all are influenced in various degrees by material from sandstone. The Bruno soil, a grayish-brown to dark yellowish-brown loose loamy sand, is an exception and is predominantly from sandstone material. Differences between the Huntington, Lindside, and Melvin soils are related to differences in drainage. Huntington soils are brown and well drained. Lindside soils are moderately well drained to imperfectly drained, brown or grayish brown, and highly mottled below 10 to 18 inches. Melvin soils are poorly drained and predominantly gray throughout. Egam soils are dark grayish-brown (almost black), slightly compact, fine textured, droughty soils. Dunning soils are imperfectly or very poorly drained, predominantly dark grayish brown or dark gray throughout, and splotched with yellowish brown at a shallow depth.

Soil Types and Phases and Miscellaneous Land Types

In the following pages the soil types and phases, and miscellaneous land types are described in detail and their relationship to agriculture is given to the extent that present knowledge permits. The acreage and the proportionate extent of the soil mapping units are listed in table 6. The location and distribution of the soils are shown on the soil map accompanying the report.

TABLE 6.—*Acreage and proportionate extent of the soils mapped in Franklin County, Tenn.*

Soil	Area	Extent
	Acres	*Percent*
Allen fine sandy loam, eroded rolling phase	250	0.1
Allen stony fine sandy loam, hilly phase	89	(1)
Barbourville fine sandy loam	135	(1)
Baxter cherty silt loam:		
Hilly phase	1,648	.5
Eroded hilly phase	2,607	.7
Baxter cherty silty clay loam, severely eroded hilly phase	1,825	.5
Baxter cherty silt loam:		
Rolling phase	4,081	1.1
Eroded rolling phase	9,844	2.7
Baxter cherty silty clay loam, severely eroded rolling phase	2,554	.7
Baxter cherty silt loam:		
Undulating phase	626	.2
Eroded undulating phase	2,006	.6
Steep phase	1,690	.5
Eroded steep phase	2,076	.6
Baxter cherty silty clay loam, severely eroded steep phase	1,906	.5
Bodine cherty silt loam:		
Steep phase	3,402	1.0
Eroded steep phase	5,827	1.6
Severely eroded steep phase	1,023	.3
Bouldery colluvium, Jefferson soil material	10,778	3.0
Bruno loamy fine sand	1,370	.4
Capshaw silt loam	3,230	.9
Colbert-Talbott silty clay loams, eroded rolling phases	222	.1
Cotaco fine sandy loam	702	.2
Cumberland and Etowah silt loams, undulating phases	463	.1
Cumberland and Etowah silty clay loams, eroded undulating phases	16,785	4.7
Cumberland silt loam, rolling phase	140	(1)
Cumberland and Etowah silty clay loams, eroded rolling phases	4,140	1.2
Cumberland silty clay loam:		
Severely eroded rolling phase	2,150	.6
Eroded hilly phase	138	(1)
Severely eroded hilly phase	280	.1
Cumberland and Etowah loams:		
Undulating phases	317	.1
Eroded undulating phases	3,291	.9
Eroded rolling phases	1,834	.5
Cumberland clay loam, severely eroded rolling phase	397	.1
Decatur silt loam, undulating phase	81	(1)
Decatur silty clay loam:		
Eroded undulating phase	3,890	1.1
Eroded rolling phase	1,492	.4
Decatur silty clay, severely eroded rolling phase	734	.2
Dellrose cherty silt loam:		
Eroded hilly phase	837	.2
Steep phase	219	.1
Eroded steep phase	1,902	.5
Severely eroded steep phase	474	.1
Eroded rolling phase	178	.1
Dewey silt loam, undulating phase	208	.1
Dewey silty clay loam, eroded undulating phase	5,495	1.5
Dewey silt loam, rolling phase	160	(1)
Dewey silty clay loam, eroded rolling phase	2,666	.7
Dewey silty clay:		
Severely eroded rolling phase	1,474	.4
Severely eroded hilly phase	177	.1
Dewey cherty silt loam, rolling phase	193	.1
Dewey cherty silty clay loam, eroded rolling phase	2,466	.7
Dewey cherty silty clay, severely eroded rolling phase	1,189	.3
Dewey cherty silty clay loam, eroded hilly phase	514	0.1
Dewey cherty silty clay, severely eroded hilly phase	633	.2
Dickson silt loam:		
Undulating phase	12,016	3.3
Eroded undulating phase	13,102	3.6
Rolling phase	172	.1
Eroded rolling phase	1,596	.4
Dickson silty clay loam, severely eroded rolling phase	123	(1)
Dunning silty clay loam	486	.1
Dunning silty clay loam, better drained phase	1,335	.4
Egam silty clay loam	1,696	.5
Emory silt loam	10,185	2.8
Emory cherty silt loam	499	.1
Ennis cherty silt loam	1,605	.5
Greendale silt loam	2,284	.6
Greendale cherty silt loam	993	.3
Gullied land, limestone material	297	.1
Guthrie silt loam	3,451	1.0
Hartsells fine sandy loam:		
Rolling and undulating phases	23,049	6.4
Eroded rolling and undulating phases	3,053	.9
Hermitage silt loam:		
Eroded undulating phase	1,150	.3
Eroded rolling phase	316	.1
Holston loam:		
Undulating phase	560	.2
Eroded undulating phase	1,987	.5
Eroded rolling phase	445	.1
Holston clay loam, severely eroded rolling phase	92	(1)
Humphreys cherty silt loam	573	.2
Huntington silt loam	328	.1
Huntington fine sandy loam	2,686	.7
Jefferson fine sandy loam, eroded rolling phase	521	.2
Jefferson clay loam, severely eroded rolling phase	96	(1)
Jefferson stony fine sandy loam:		
Eroded rolling phase	354	.1
Hilly phase	488	.1
Eroded hilly phase	439	.1
Jefferson stony clay loam, severely eroded hilly phase	263	.1
Lawrence silt loam	4,866	1.4
Lindside silt loam	996	.3
Lindside silty clay loam	553	.2
Lindside fine sandy loam	3,208	.9
Lobelville cherty silt loam	1,790	.5
Melvin silt loam	548	.2
Melvin loam	568	.2
Mimosa silty clay:		
Severely eroded hilly phase	244	.1
Severely eroded steep phase	93	(1)
Mountview silt loam:		
Undulating phase	899	.3
Eroded undulating phase	4,134	1.2
Eroded rolling phase	886	.3
Mountview silty clay loam, severely eroded rolling phase	150	(1)
Muskingum stony fine sandy loam:		
Steep phase	1,289	.4
Hilly phase	10,890	3.0
Eroded hilly phase	278	.1
Rolling phase	1,932	.5
Eroded rolling phase	243	.1
Nolichucky loam:		
Eroded undulating phase	451	.1
Eroded rolling phase	147	(1)

TABLE 6.—*Acreage and proportionate extent of the soils mapped in Franklin County, Tenn.—Continued*

Soil	Area	Extent
	Acres	*Percent*
Nolichucky clay loam, severely eroded rolling phase	89	(1)
Ooltewah silt loam	4,519	1.2
Pace cherty silt loam:		
Eroded undulating phase	237	.1
Eroded rolling phase	1,365	.4
Eroded hilly phase	883	.3
Purdy silt loam	776	.2
Riverwash	1,234	.3
Robertsville silt loam	1,293	.4
Rockland, limestone:		
Hilly and rolling	16,089	4.5
Steep and very steep	66,710	18.6
Rockland, sandstone, very steep	5,022	1.4
Sequatchie fine sandy loam:		
Undulating phase	2,960	.8
Severely eroded rolling phase	117	(1)
Stony hilly land, Mimosa soil material	135	(1)
Stony rolling land, Talbott and Colbert soil materials	2,197	.6
Stony hilly land, Talbott and Colbert soil materials	2,753	.8
Stony steep land, Talbott and Colbert soil materials	436	0.1
Swaim silty clay loam:		
Eroded rolling phase	1,676	.5
Eroded undulating phase	514	.1
Taft silt loam	2,038	.6
Tyler silt loam	3,060	.9
Waynesboro loam:		
Undulating phase	105	(1)
Eroded undulating phase	2,169	.6
Rolling phase	108	(1)
Eroded rolling phase	564	.2
Waynesboro clay loam:		
Severely eroded rolling phase	1,036	.3
Severely eroded hilly phase	107	(1)
Whitwell loam	5,016	1.4
Mines, pits, dumps	532	.2
Water	1,447	.4
Total	358,400	100.0

[1] Less than 0.1 percent.

Allen fine sandy loam, eroded rolling phase (5 to 12 percent slopes) (Ao).—This well-drained soil is at the base of steep or very steep mountain slopes. It occupies small fan-shaped areas widely distributed along the Cumberland Escarpment and in mountain coves. The soil has formed from materials that have rolled or were washed chiefly from the Muskingum and associated upland soils. The deposits are underlain by limestone and contain a slight amount of limestone material. The soil is mainly associated with the Jefferson soils, on similar topographic positions, and with other Allen soils.

Profile description:

0 to 6 inches, grayish-brown to brownish-yellow friable fine sandy loam; in wooded areas surface 2 inches stained dark with organic matter.
6 to 24 inches, yellowish-red to red friable sandy clay loam; weak fine blocky structure.
24 to 36 inches, red friable fine sandy clay; single-grained or weak fine granular structure; sandstone boulders and sandy clay occur at depths ranging from 3 to 9 feet.

The surface layer in some places is 10 inches thick. Most cultivated areas are moderately eroded, and many are severely eroded. As a result, the present surface layer is highly variable in thickness, color, and texture. Where remnants of the original surface soil are mixed with the subsoil in the plow layer, the texture is usually a fine sandy clay loam. In some places the heavier textured red subsoil is at the surface. A few stones occur in all areas, but semiangular sandstone fragments on and in the soil are numerous enough in a few places to interfere with tillage.

The soil is medium to strongly acid and contains a moderate amount of organic matter and plant nutrients. It is porous and friable and allows easy penetration of plant roots and the free movement of air and moisture. The sandy surface soil absorbs rainfall easily, and the soil retains moisture well.

Use suitability (5)[7].—Nearly all this soil has been cleared and cultivated. An estimated 20 to 30 percent is now idle, and some areas have reverted to forest. A variety of crops are grown but not in a systematic rotation.

This soil is well suited to crops and pasture, but its productivity has been lowered by erosion. It is deficient in lime, nitrogen, phosphorus, and probably potassium for high yields of most crops. The soil is poorly suited to intensive use for row crops, because it is somewhat difficult to conserve. Rotations of moderate length that include legumes and other close-growing crops are suitable.

Allen stony fine sandy loam, hilly phase (12 to 25 percent slopes) (Ab).—This well-drained stony soil is at the base of steep mountain slopes. It occurs in mountain coves or in small, widely scattered areas along the base of the Cumberland Plateau and is closely associated with the Jefferson and other Allen soils. The parent materials are partly colluvial and partly alluvial. This soil differs from Allen fine sandy loam, eroded rolling phase, chiefly in having stronger slopes and enough stones in nearly all areas to interfere with tillage. In addition, the colluvial material of this soil varies more in depth and is underlain nearly everywhere by limestone.

This soil varies greatly in the depth to underlying material. It is generally darker and heavier where shallow over limestone. The shallow areas vary in depth from 18 to 42 inches, but along sharp breaks, limestone soil material may be exposed. About half this soil is uneroded and has a thin dark surface layer high in organic matter. Some areas are moderately

[7] Numbers in parentheses refer to the management group in which this soil has been placed. Use and management of this and other soils in the same group are discussed under the heading, Use and Management of Soils.

eroded and have lost 25 to 75 percent of the original surface soil. Included also are severely eroded areas that have lost practically all the original surface layer. Gullies have formed in these areas.

Use suitability (13).—Most of Allen stony fine sandy loam, hilly phase, is in forest but a part has been cleared and cultivated. Systematic crop rotations are not followed. The land may be cultivated for 3 or 4 years and then allowed to remain idle or in pasture.

This soil is poorly suited to crops that require tillage but is fairly well suited to permanent pasture. Permanent pastures produce good forage if lime and phosphorus are applied. Pastures are difficult to clip for weed control because of surface stones. Under good management, the less sloping areas of this soil may be feasibly used for small grains and hay. Intertilled crops can be successfully grown if long rotations are used and the management is good.

Barbourville fine sandy loam (2 to 7 percent slopes) (Ba).—This well-drained soil is on gently sloping, fanlike areas at the base of slopes, or in narrow bands along intermittent drainageways. It occurs in small areas widely scattered over the Cumberland Plateau and in a few areas at the base of the plateau escarpment. It consists of recent colluvial or local alluvial materials that washed or rolled from the residual soils, such as Hartsells or Muskingum, or from the old colluvial soils, such as the Jefferson and Allen.

Although not extensive, this soil is important agriculturally because it is more productive and more intensively used than the soils with which it is associated. It is closely associated with the Hartsells, Muskingum, Jefferson, Allen, and Cotaco soils.

Profile description:

0 to 10 inches, brown, light-brown, or yellowish-brown very friable or loose fine sandy loam.
10 to 30 inches, brown, brownish-yellow, or yellowish-brown friable fine sandy loam to light sandy clay loam; underlain by sandstone rocks or sandy clay residual material.

The soil depth over sandstone bedrock ranges from 2 to 8 feet; thickness of the soil layers also varies. The soil is relatively stone free but may contain some small fragments of sandstone.

This soil is strongly acid, apparently high in organic matter, and moderately well supplied with plant nutrients. The permeable subsoil allows easy penetration of plant roots and normal circulation of air and moisture. Water is readily absorbed and fairly well retained.

Use suitability (3).—About half the soil is wooded; the rest is in crops or pasture. Individual areas are small, and many are isolated by large areas of noncropland. This soil is suitable for corn, small grains, and many hay crops. It is particularly well suited to intertilled crops and can be used intensively for them. Crop yields are fair without fertilization but can be improved if the soil is moderately to heavily fertilized. Many areas are too shallow for alfalfa.

Baxter cherty silt loam, hilly phase (12 to 25 percent slopes) (Bf).—This well-drained soil occurs mainly in a belt surrounding the Central Basin. It occupies the escarpment and the steeper slopes along drainageways in the Highland Rim. It has formed under a deciduous forest cover and is underlain by cherty limestone. Most of this soil is in the Pace-Baxter-Greendale, the Mountview-Baxter, the Dickson-Baxter-Greendale, and the Bodine-Baxter-Ennis soil association areas.

Profile description:

0 to 2 inches, pale-brown to brown cherty silt loam stained dark with organic matter; chert is angular and porous and about ½ to 2 inches in diameter.
2 to 12 inches, yellowish-brown to light grayish-brown friable cherty silt loam.
12 to 24 inches, reddish-yellow to red friable cherty silty clay loam.
24 to 36 inches, red or yellowish-red firm very cherty silty clay loam or very cherty silty clay; weak medium blocky structure.
36 to 50 inches +, red friable very cherty silty clay loam streaked with yellow, gray, and brown; moderate fine blocky structure; bedrock at depths of 8 feet or more.

Chert fragments on the surface and in the plow layer interfere with tillage. The soil is strongly acid and moderately well supplied with plant nutrients. Except in the thin surface layer, the content of organic matter appears to be moderately low. Runoff is rapid, but internal drainage is medium. The soil is permeable to plant roots, air, and moisture. The moisture-supplying capacity is fair.

Included with this mapping unit are areas on steeper slopes along drainageways that are associated with the Dickson soils. They differ from this soil mainly in having a yellowish-brown subsoil that is compact in the lower part.

Use suitability (13).—All of Baxter cherty silt loam, hilly phase, is covered with trees left from an incomplete timber harvest. This soil is moderately well suited to crops if it is properly managed. However, the steeper areas are probably best suited to pastures. On many farms the soil is not used for crops or pasture because of its inaccessible location. Permanent pastures give only fair yields unless they are fertilized. Additions of lime and phosphorus greatly increase pasture yields. The soil is susceptible to erosion when cultivated and requires conservation practices.

Baxter cherty silt loam, eroded hilly phase (12 to 25 percent slopes) (Bg).—This soil is similar to the hilly phase of Baxter cherty silt loam in distribution, in soils with which it is associated, and in variability. It differs from the hilly phase chiefly in erosion. It has lost 50 to 75 percent of the original surface soil, including the thin surface layer high in organic matter. A few shallow gullies occur. In many places the plow layer consists of surface soil mixed with subsoil.

The surface layer of this soil ranges from yellowish brown to brown or yellowish red. It is somewhat heavier and less friable where erosion has been most severe. Small severely eroded spots are common and are conspicuous because the subsoil is exposed. The subsoil, like that of Baxter cherty silt loam, hilly phase, is a reddish-yellow to red firm cherty silty clay loam or silty clay.

Use suitability (13).—All of this soil has been cleared and is used for crops or pasture. An estimated 50 percent of the acreage is now in crops, 30 percent is in pasture, and the rest is idle.

This soil has lost organic matter and plant nutrients and has become more susceptible to erosion because of

loss of surface soil. It is therefore less well suited to crops than the hilly phase of Baxter cherty silt loam. It is moderately deficient in lime, nitrogen, phosphorus, and potassium for most crops. However, it responds well to good management that includes proper fertilization. Erosion control is also needed.

Baxter cherty silty clay loam, severely eroded hilly phase (12 to 25 percent slopes) (Bn).—This is not an extensive soil but is widely distributed in areas where soils have developed from cherty limestone residuum. It differs from the hilly phase of Baxter cherty silt loam chiefly in erosion. It is generally unevenly eroded. In many areas, all the original surface soil and even the upper part of the subsoil have been lost, and tillage is now done in the subsoil. Gullies 1 to 2 feet deep are common, but areas between gullies may have several inches of original surface soil.

The surface layer of this soil ranges in color from yellowish brown to yellowish red and in texture from cherty silt loam to cherty silty clay loam. The subsoil is reddish-yellow to red firm cherty silty clay or cherty silty clay loam.

As mapped, this soil has the same inclusions as the other Baxter soils.

Use suitability (14).—Most of the soil is idle or abandoned and sparsely covered by weeds or brush. Part of the acreage is in pasture, and some of it is still used for crops. Yields are very low.

The soil is very poorly suited to crops or pasture. It is better suited to pasture than to crops, but establishing pastures is difficult. Good management is needed to maintain profitable pastures because of the loss of plant nutrients and the increased surface runoff. Forestry is the best use for this soil.

Baxter cherty silt loam, rolling phase (5 to 12 percent slopes) (Bd).—Most of this soil is in the same general area as Baxter cherty silt loam, hilly phase. However, much of it occurs on the tops of ridges that extend into the Central Basin from the Highland Rim. Milder slopes, slightly thicker soil layers, and a somewhat deeper profile differentiate this soil from the hilly phase. The soil is closely associated with the Bodine, Dellrose, and Dickson soils. A small acreage is associated with the Cumberland, Decatur, and Dewey soils along the drainageways and on the more rolling landscapes.

A variation associated with the Dickson soils occurs north of the Elk River. It has a yellowish-brown subsoil that is slightly compact in the lower part.

Use suitability (10).—Baxter cherty silt loam, rolling phase, is nearly all in cutover forest. It is well suited to crops commonly grown in the area. It is moderately productive, not too difficult to work, and fairly easy to conserve. Chert, however, interferes with cultivation, but it also retards runoff and reduces the hazard of erosion. The soil can be maintained by using moderate to long rotations that include legumes and grasses. It does not have enough lime, phosphorus, nitrogen, and possibly potassium for continuous high yields of most crops and pasture. The soil could be used more intensively for crops if terracing, contour tillage, and stripcropping were practiced.

Baxter cherty silt loam, eroded rolling phase (5 to 12 percent slopes) (Be).—Milder slopes, somewhat thicker soil layers, and loss of a large part of the surface layer are the chief differences between this soil and Baxter cherty silt loam, hilly phase. In some areas the upper part of the subsoil has been mixed with the remaining original surface soil by tillage. The subsoil material incorporated has not been enough to change the texture and consistence of the surface layer, but it has given that layer a reddish color in places.

The surface layer of this eroded rolling phase is yellowish-brown to brown friable cherty silt loam. The subsoil is reddish-yellow to red firm cherty silty clay loam or silty clay. A few gullies have formed, mostly in idle fields.

This soil includes some areas in which the subsoil is yellowish brown and the lower part of the profile is slightly compact.

Use suitability (10).—Most of this soil is used for crops, but some is idle and some is used for pasture.

The soil is suited to the crops commonly grown in the county. Management, with a few exceptions, is similar to that of Baxter cherty silt loam, rolling phase. This soil needs more fertilizers, lime, and organic matter because it has been cultivated for a long time and damaged by erosion. If the soil cannot be adequately fertilized, crops such as lespedeza should be planted in preference to alfalfa and red clover. Deep-rooted legumes can be grown successfully, however, if proper amounts of fertilizer are applied.

Baxter cherty silty clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Bm).—This soil differs from Baxter cherty silt loam, hilly phase, in having milder slope and severe erosion. In most areas nearly all the original surface soil has been lost. In some places the upper part of the subsoil has also been lost. Tillage is now in the subsoil. Much of the original surface layer, however, remains on the intergully areas.

The surface layer of this severely eroded rolling phase is yellowish-brown to yellowish-red cherty silt loam to cherty silty clay loam. The subsoil is reddish-yellow to red firm cherty silty clay or cherty silty clay loam.

Use suitability (11).—Some of this soil is used for crops and pasture, but most of it is idle or abandoned and sparsely covered by weeds and brush.

Productivity of the soil is poor because of its low fertility, poor tilth, and unfavorable moisture relations. In addition, conserving and working the soil are difficult. The soil is fairly well suited to small grains, hay, and pasture under management that includes fertilization, liming, and addition of organic matter.

Baxter cherty silt loam, undulating phase (2 to 5 percent slopes) (Bb).—This soil is on smooth ridge crests in the highly dissected part of the Highland Rim area and is closely associated with the Mountview, Bodine, and other Baxter soils. Milder slopes, thicker layers, more yellowish color, and less chert differentiate this soil from the hilly and rolling phases of Baxter cherty silt loam.

The surface layer is pale-brown to brown cherty silt loam. The subsoil is reddish-yellow to red firm cherty silty clay loam or cherty silty clay. Where windblown

silt is in the surface layer, the soil is lighter in color and texture.

Use suitability (10).—All of this soil is in a cutover forest that consists chiefly of red, white, post, and blackjack oaks, hickories and other trees.

This soil is suited to general farm crops, but yields are moderately low under ordinary management. Corn, wheat, oats, barley, lespedeza, red clover, orchardgrass, fescue, alfalfa, and tobacco can be successfully grown if proper amendments are applied. The soil is easy to work and conserve. It can be used more intensively for row crops with less supporting erosion control practices than the rolling phase of Baxter cherty silt loam. The response to improved management is moderately good, but it is limited to some extent by droughtiness of the soil. Many small areas of this soil cannot be efficiently cropped because they are isolated by large areas of poor-quality soils. Such areas probably should be left in forest.

Baxter cherty silt loam, eroded undulating phase (2 to 5 percent slopes) (Bc).—This soil occupies gentle slopes and ridge crests and is associated with Bodine and Mountview soils and with other Baxter soils. It differs from the undulating phase of Baxter cherty silt loam in having lost material through erosion. In addition, organic matter and plant nutrients are less in this soil and some chert has accumulated on the surface.

The surface layer is pale-brown to yellowish-brown cherty silt loam that is very low in organic matter. The subsoil consists of reddish-yellow to red firm cherty silty clay loam or cherty silty clay.

Use suitability (10).—All of this soil has been cleared and used for corn, cotton, lespedeza and pasture. A small acreage is now idle or is wasteland. Although the soil is suited to many field crops, amendments are needed to obtain satisfactory yields and are essential for alfalfa and red clover. The soil is moderately easy to conserve and, if properly fertilized, can be maintained by the use of moderately short rotations. The response to improved management is moderately good but is limited to some extent by droughtiness.

Baxter cherty silt loam, steep phase (25 to 60 percent slopes) (Bh).—This soil occurs mainly in the Dickinson-Baxter-Greendale and Bodine-Baxter-Ennis soil association areas. Steeper slopes and somewhat thinner, more variable soil layers differentiate it from the hilly phase of Baxter cherty silt loam.

This steep phase has a surface soil of brown or pale-brown friable cherty silt loam. The subsoil is a reddish-yellow to red firm cherty silty clay or cherty silty clay loam.

Use suitability (17).—Nearly all of this soil is still in forest that consists mainly of oaks. This soil is too steep for continuous production of field crops. Chertiness, high susceptibility to erosion, and rather easily depleted fertility also make it unsuitable for cropping. The soil is only moderately well suited to pasture, but reasonably good pastures can be established and maintained if proper amounts of lime and phosphorus are used. However, unless additional pasture is urgently needed, the shift in use from forest to pasture is not encouraged.

Baxter cherty silt loam, eroded steep phase (25 to 60 percent slopes) (Bk).—The soil is widely distributed throughout the Bodine-Baxter-Ennis and the Dickson-Baxter-Greendale soil association areas. Stronger slopes and erosion differentiate it from the hilly phase of Baxter cherty silt loam. Most of this soil has lost from 50 to 75 percent of the original surface layer.

The surface soil is a brown to yellowish-brown cherty silt loam, 3 to 8 inches in thickness. In some places, the surface soil has a light reddish-yellow cast because tillage has mixed the topmost part of the subsoil with the surface layer. The subsoil is reddish-yellow to red firm cherty silty clay or cherty silty clay loam.

Use suitability (17).—All of this soil has been cleared. Most of it is now in pasture; some is in crops and some is idle. Crop and pasture yields are relatively low under ordinary management.

This soil is very poorly suited to crops, moderately suited to permanent pasture, and probably best suited to forestry. It is difficult to till because of the steep slopes. In addition, it is highly susceptible to erosion and moderately low in most plant nutrients. Fairly good pastures can be established and maintained by proper management, particularly if lime and phosphorus are applied and grazing is controlled.

Baxter cherty silty clay loam, severely eroded steep phase (25 to 60 percent slopes) (Bo).—This soil occurs in small but conspicuous areas scattered throughout the Dickson-Baxter-Greendale and Bodine-Baxter-Ennis soil associations. It differs from the eroded steep phase of Baxter cherty silt loam in degree of erosion. Most of the original surface soil has been lost, although some areas have several inches of surface soil left. In many places, the topmost part of the subsoil has been lost. The red to reddish-yellow subsoil is exposed in most places. Erosion has been uneven. Areas of exposed subsoil adjoin those on which several inches of the original surface soil remain. Numerous shallow gullies have formed.

Use suitability (18).—Most of this soil is temporarily idle or abandoned. In its present condition it is poorly suited to crops and pasture and is probably best suited to forest. Pastures can be established and maintained, but the expense and the risk of failure are likely to be high. Lime and phosphorus are required. Check dams and diversion ditches to control runoff may be necessary. Drought-resistant plants that are easy to establish should be selected for pastures.

Bodine cherty silt loam, steep phase (25 to 60 percent slopes) (Bp).—This excessively drained soil on steep uplands was derived from cherty limestone material. It is extensive and occurs in large areas, mainly in the Bodine-Baxter-Ennis soil association. In the highly dissected uplands it is associated with Baxter, Mountview, Dickson, Greendale, and Pace soils and with other Bodine soils. The forest cover consists mainly of oak and hickory.

Profile description:

0 to 2 inches, grayish-brown or dark grayish-brown friable cherty silt loam stained dark with organic matter.
2 to 14 inches, yellowish-brown or light grayish-brown friable cherty silt loam.
14 to 24 inches, brownish-yellow or yellowish-brown friable very cherty silt loam or cherty silty clay loam.,

24 to 30 inches, yellowish-brown friable very cherty silt loam or very cherty silty clay loam, splotched gray and reddish yellow.
30 inches +, yellowish-red friable cherty clay loam, splotched with gray; bedrock at depths of 5 feet or more.

Chert in various quantities occurs on the surface and throughout the profile of this soil. The chert fragments range from about ½ inch to 3 inches in diameter and are sharply angular in most places.

The soil is strongly to very strongly acid throughout the entire depth. It is low in plant nutrients and organic matter and low in moisture-supplying capacity. The soil is very permeable; but because of the steep slope, runoff is rapid to very rapid. Internal drainage is also rapid to very rapid.

A few areas that have darker surface soils and reddish subsoils are included with this soil.

Use suitability (17).—All of Bodine cherty silt loam, steep phase, is in forests that are poorly managed and of poor quality.

The soil is not suited to crops that require tillage because it is cherty, steep, and of low water-supplying capacity and fertility. Workability is very poor, and conservability of plant nutrients is poor. The soil is also poorly suited to pasture. It is best suited to forest but may be required for pasture on some farms. The north- and east-facing slopes and the lower slopes are believed to be the most productive sites for pasture. Lime, phosphorus, and potassium are needed to establish and maintain fair pastures. Nitrogen is also needed, as the supply is low in this soil.

Bodine cherty silt loam, eroded steep phase (25 to 60 percent slopes) (Br).—This soil is widely distributed throughout the roughest part of the Highland Rim and is mostly in the Bodine-Baxter-Ennis soil association. It differs from Bodine cherty silt loam, steep phase, mainly in having lost from 25 to 75 percent of the original surface layer through erosion. In some places it has lost all the original surface soil and part of the subsoil. Chert occurs throughout the profile and has accumulated on the surface because the finer soil particles surrounding it have been removed by erosion. In many places, drifts of chert have formed on the lower slopes.

The amount of material lost through erosion varies considerably. On some areas of this soil practically all the surface layer has been lost and shallow gullies are numerous. Degree of chertiness and size of chert fragments also vary. Small areas have slopes greater or less than the range given for this soil.

The soil is strongly to very strongly acid and very low in organic matter, plant nutrients, and moisture-supplying capacity. Internal drainage is rapid to very rapid, and runoff is very rapid.

Use suitability (17).—All of this soil has been cleared and used for crops or pasture. Most of it is now temporarily idle or abandoned. Some areas are in unimproved pasture or are used for corn. Yields are very low. The soil is very poorly suited to crops and pasture, and its best use is for forest. Reforestation may be difficult, and the soil may require preparation in advance of planting. Contour furrows, check dams, diversion ditches, fertilizers, and mulches are likely to be needed.

Bodine cherty silt loam, severely eroded steep phase (25 to 60 percent slopes) (Bs).—Erosion differentiates this phase from the steep phase of Bodine cherty silt loam. Most of the original surface soil and, in places, part of the subsoil have been lost. Shallow gullies are numerous. The finer particles of soil have been removed by erosion, and as a result chert has accumulated on the surface and in the plow layer.

The surface layer of this soil is light grayish-brown to yellowish-brown cherty or very cherty silt loam to silty clay loam. The subsoil is a brownish-yellow or yellowish-brown friable very cherty silt loam or cherty silty clay loam. Some areas between gullies still have much of the original surface layer.

Use suitability (18).—All of this soil has been cleared and used for crops and pasture. Most of it is now idle or abandoned.

This soil is very poorly suited to crops or pasture. It has a very low organic-matter content and moisture-supplying capacity and is difficult to work and conserve. It is best suited to forest, although reforestation will be difficult.

Bouldery colluvium, Jefferson soil material (12 to 60 percent slopes) (Bt).—This miscellaneous land type is on hilly and steep talus slopes in long narrow bands below sandstone escarpments. It consists of sandy colluvial materials and numerous stones and boulders ranging from a few inches to 20 feet across. Sandstone boulders normally are 3 to 6 feet in diameter and occupy 35 to 50 percent of the land surface. The material between stones and boulders is very sandy and variable in depth and color. There is no soil developed, except for a thin accumulation of organic matter on the surface. Nearly all of the material of this land type has washed or rolled from the Cumberland Plateau Escarpment, and much of it lies on limestone below the level of the sandstone escarpment.

This land type occurs in association with Hartsells and Muskingum soils, from which part of the material has washed or rolled. Most of it is in the Rockland, limestone — Rockland, sandstone — Stony land soil association.

Use suitability (18).—Nearly all of this land type is in timber. A few small isolated areas have been cleared and are used as pasture. The land type is unsuited to crops and poorly suited to pasture. It is low in fertility and too droughty to produce good forage. Pastures will not stand trampling, because the soil material is sandy. The control of weeds is difficult. The most suitable use is for forest.

Bruno loamy fine sand (0 to 3 percent slopes) (Bu).—This is an extremely sandy, excessively drained soil on almost level flood plains. Most of it occurs in the Jefferson-Sequatchie-Huntington and the Waynesboro-Holston-Whitwell soil associations. Along Elk River it is in the Bodine-Baxter-Ennis soil association. Small areas are scattered along all the larger streams in the county. The alluvium from which the soil has formed was washed chiefly from uplands that are underlain by sandstone, but it contains a mixture of limestone materials.

Profile description:

0 to 14 inches, grayish-brown to dark yellowish-brown loose loamy fine sand.
14 to 36 inches, yellowish-brown or brownish-yellow loose noncoherent fine sand.
36 to 48 inches +, yellow or pale-yellow loose noncoherent fine sand.

This soil varies considerably in distinctness, thickness, and color of soil layers. It is medium acid and low in content of organic matter and plant nutrients. Runoff is slow and internal drainage is very rapid. The water-supplying capacity is low. The soil is extremely permeable to air and roots.

Use suitability (1).—Most of this soil has been cleared and is used for crops and for pasture. An extensive acreage is idle because the soil is susceptible to flooding or is badly dissected by channels that were cut when streams changed their courses. Cultivated areas are used principally for corn, cotton, and lespedeza. A considerable acreage on bottom lands along the Elk River is used for melons. Pastures are generally poorly managed and consist mainly of broomsedge.

The soil is only fairly well suited to crops and pasture because of low productivity, susceptibility to flooding, and low moisture-supplying capacity. Cultivated crops are limited largely to summer annuals. The soil is easily worked with horse-drawn equipment, but its loose sandy surface furnishes poor traction for tractors. It can be worked within a wide range of moisture conditions. Nitrogen, phosphorus, and potassium are needed for most crops. Pasture sod is hard to establish and maintain; the yield of forage is low, especially in dry seasons.

Capshaw silt loam (2 to 5 percent slopes) (Ca).—This imperfectly to moderately well drained soil is on stream terraces. Most areas are nearly level or benchlike and are above the flood plain. The soil has developed from old general alluvium that consisted chiefly of limestone materials. Some of this soil occupies low terraces along streams, but most of it occurs in depressions on high terraces where it is associated with the Etowah and Cumberland soils. It is also closely associated with the Taft and Robertsville soils. It is widely distributed over the Highland Rim section, but it occurs mainly in the Decatur-Dewey-Cumberland and the Mountview-Baxter soil associations. The native vegetation was deciduous forest that included some water-tolerant trees.

Profile description:

0 to 7 inches, grayish-brown or yellowish-brown friable silt loam; surface 2 inches is dark brown in wooded areas.
7 to 16 inches, brownish-yellow friable heavy silt loam or silty clay loam; weak medium blocky structure.
16 to 25 inches, yellowish-brown to brownish-yellow or yellow friable silty clay loam, splotched with gray and yellow; weak medium blocky structure.
25 to 38 inches, mottled light-gray, yellowish-brown, and strong-brown moderately friable silty clay loam; moderate medium blocky structure.
38 inches +, reddish-brown and yellowish-red firm silty clay loam; bedrock at depths ranging from 8 to 15 feet.

This soil is medium or strongly acid, contains a moderate amount of organic matter, and is moderately low in content of plant nutrients. Runoff is medium, internal drainage is medium, and the moisture-supplying capacity is fair. The soil is permeable enough to permit penetration of plant roots, but the circulation of air and moisture is slow in the subsoil part of the time.

Included with this soil are some areas that differ principally in having a claypan. These areas also have mottling about 6 inches nearer the surface and a lighter color or grayish cast throughout. Other included areas, generally on the terrace escarpment, have slopes ranging from 5 to 12 percent. Most of Capshaw silt loam is uneroded or only slightly eroded, but some small areas with slopes greater than 5 percent have lost 50 to 75 percent of the original surface layer. A few small widely scattered areas are severely eroded and gullied.

Use suitability (6).—Practically all of Capshaw silt loam is cultivated. Small acreages are in permanent pasture and in forest. Most of the common field crops are grown, particularly corn and hay (fig. 2).

Figure 2.—**Sericea lespedeza on Capshaw silt loam. This crop grows well on this soil and is excellent for soil improvement.**

This soil is well suited to corn and most hay crops, including red clover, but is poorly suited to alfalfa. It is well suited to pasture. Soybeans and buckwheat are particularly suitable. The soil is apparently well suited to cotton, and a considerable acreage is grown. Wheat grows fairly well, except in places that get too much seepage from higher areas.

Artificial drainage would broaden the use suitability, but draining depressed areas may be impractical. The soil is easily worked and conserved. It is suited to intensive use if the supply of organic matter and the fertility level are maintained by use of crop residues, green and barnyard manures, and commercial fertilizers. Lime is necessary for the growth of red clover and is beneficial for other crops, including soybeans. Phosphorus and potassium are needed for high crop yields.

Colbert-Talbott silty clay loams, eroded rolling phases (5 to 12 percent slopes) (Cb).—The soils in this complex occur in such an intricate pattern that it is not feasible to map them separately. The mapping unit includes the shallow, tough, and plastic soils of uplands

that were derived from clayey limestone residuum. It is mainly on ridgetops or lower lying spurs that extend from the Cumberland Escarpment. It is associated with Rockland, limestone, and the stony land types. All areas are in the Rockland, limestone — Rockland, sandstone—Stony land soil association. Forested areas are covered with deciduous trees and cedars.

Profile description of Colbert silty clay loam, eroded rolling phase:

0 to 8 inches, brownish-yellow or light yellowish-brown slightly plastic silty clay loam.
8 to 12 inches, yellow or brownish-yellow plastic silty clay loam.
12 inches +, dominantly yellow very plastic silty clay or clay, splotched with gray, reddish brown, and light yellow; gray coloration increases with depth; limestone bedrock at depths of 2 or 3 feet.

Profile description of Talbott silty clay loam, eroded rolling phase:

0 to 8 inches, grayish-brown to yellowish-brown moderately friable silt loam to silty clay loam.
8 to 24 inches, yellowish-red to reddish-yellow plastic silty clay; moderately expressed medium or coarse blocky structure.
24 inches +, reddish-yellow to yellow very plastic silty clay or clay, splotched with gray, reddish brown, and light yellow; bedrock at depths of 3 to 5 feet.

The soils in this mapping unit are extremely variable in thickness of layers and in depth to bedrock. Flat limestone fragments and limestone rock outcrops are common on the lower slopes and very narrow ridgetops. Most areas of this complex have lost from 25 to 75 percent of the original surface layer. A large acreage has lost nearly all of the original surface layer; and in many places part of the subsoil is also gone. Shallow gullies are common in the severely eroded areas.

These soils are medium to strongly acid, low in organic matter, and moderate in content of plant nutrients. Most of the organic matter is in the 2- to 4-inch surface layer. Runoff is rapid, internal drainage is slow or very slow, and the moisture-supplying capacity is low. Air, water, and plant roots penetrate the heavy subsoil with difficulty.

A few areas are included in this complex that have slopes of less than 5 percent.

Use suitability (9).—The largest part of this complex has been cleared and used for crops and pasture. The cleared areas are mostly in pasture or idle. Crop and pasture yields are low. These soils are fairly well suited to corn, lespedeza, and cotton. They are probably better suited to pasture and such hay crops as alfalfa, sweet clover, and red clover. The soils are hard to use and manage efficiently because they occur in small areas associated with stony land types. Conserving and working these soils is difficult to very difficult. Tilth is poor. The soils are subject to puddling and clodding and can be worked within only a very narrow moisture range. Control of erosion is difficult if the land is used for intertilled crops.

Cotaco fine sandy loam (0 to 2 percent slopes) (Cc).—This is a moderately well drained to poorly drained soil of the colluvial lands. It occurs mainly in narrow bands along intermittent drainageways, but a considerable acreage is in saucerlike depressions. Individual areas are small and widely scattered over the Cumberland Plateau in close association with the Hartsells and Muskingum soils. Nearly all of the soil is in the Hartsells-Muskingum-Cotaco soil association. The soil was formed from local alluvium or colluvium that washed or rolled from the Hartsells and Muskingum soils.

The native vegetation consists of deciduous trees, a high proportion of which are water-tolerant species. This soil differs from the Barbourville soil in that it is more poorly drained, lighter in color, and finer textured throughout the profile.

Profile description:

0 to 2 inches, dark-gray friable fine sandy loam, high in organic-matter content.
2 to 18 inches, mottled gray and yellowish-brown friable sandy clay loam; low organic-matter content.
18 to 20 inches +, light brownish-gray, loose, noncoherent fine sand, underlain by sandstone bedrock.

The soil varies greatly in thickness of colluvial accumulation and in thickness of the soil layers. Some areas are better drained than the soil described.

Cotaco fine sandy loam is strongly to very strongly acid, and the content of organic matter and plant nutrients is low. Runoff and internal drainage are slow in areas along intermittent streams. Saucerlike depressions have no surface drainage and are ponded during the winter months and after heavy rains in spring and fall. Internal drainage is impeded by the underlying bedrock. The soil absorbs and retains moisture well but is quickly saturated.

Use suitability (16).—Most of this soil is in forests, some is in unimproved pasture, and a small acreage is in cultivation.

Poor drainage limits the use suitability of this soil. The better drained areas are fairly well suited to corn and many kinds of vegetables but not so well suited to small grains and alfalfa. The soil is easily tilled when moisture is favorable, but it is saturated with water during wet seasons. Ponded and other poorly drained areas of this soil are poorly suited to crops. Their best use is pasture or forest. Most areas of this soil are small and irregular in shape. They are generally in isolated locations, where their use for crops and pasture is not feasible.

Cumberland and Etowah silt loams, undulating phases (2 to 5 percent slopes) (Co).—These well-drained soils are on old high stream terraces and on old terracelike colluvial or local alluvial deposits that were left by the receding Cumberland Escarpment. They occur in small areas widely distributed over the Highland Rim section of the county. A small acreage also occurs in the Central Basin. These soils are associated mainly with the Decatur, Dewey, Waynesboro, Capshaw, and Emory soils. Most of the areas are in the Decatur-Dewey-Cumberland, the Whitwell-Holston-Cumberland, and the Cumberland-Waynesboro-Sequatchie soil associations.

The soils were formed from materials that washed mainly from uplands underlain by limestone. Some sandy material from the Cumberland Plateau was intermixed. Relief varies from nearly level to undulating, but it is mostly undulating. The Etowah soils are mainly on the smoother areas. Both soils in the complex do not always occur in each mapped area.

Profile description of Cumberland silt loam, undulating phase:

0 to 1 inch, dark-brown mixed minerals and partially decayed organic matter.
1 to 10 inches, dark reddish-brown friable silt loam, moderately high in organic matter; some rounded quartz gravel.
10 to 15 inches, reddish-brown friable silt loam; moderate amount of organic matter; some rounded quartz gravel.
15 to 34 inches, dark-red firm silty clay or silty clay loam; moderate, medium blocky structure; some hard black concretions and rounded quartz gravel.
34 to 72 inches, dark-red friable to firm silty clay or silty clay loam; some hard black concretions and rounded quartz gravel; much partially decomposed chert.

Profile description of Etowah silt loam, undulating phase:

0 to 1 inch, dark-brown loose very friable loam or silt loam.
1 to 10 inches, brown friable silt loam.
10 to 16 inches, yellowish-brown to reddish-brown friable heavy silt loam to silty clay loam; weak medium blocky structure.
16 to 32 inches, reddish-brown to yellowish-red firm silty clay loam; moderate medium blocky structure.
32 inches +, yellowish-red firm silty clay loam or silty clay, splotched and streaked with yellow, brownish yellow, and strong brown.

The amount of quartz gravel varies, and in many places it is almost absent.

These soils are medium to strongly acid and moderately high in content of organic matter and plant nutrients. They are easily permeable to air, moisture, and plant roots. Rainfall is readily absorbed and very well retained; the water-supplying capacity is high.

This unit includes some areas that are covered by a thin mantle of loesslike silt. The layer of silt has a maximum thickness of 20 to 24 inches and occurs only in the western part of the Decatur-Dewey-Cumberland soil association. The surface layer of this inclusion is a dark-brown very friable silt loam. The underlying material, to a depth at which the alluvium occurs, is a strong-brown very friable silt loam that has a weak medium blocky structure.

Use suitability (4).—Cumberland and Etowah silt loams, undulating phases, are in forest. However, they are well suited to all of the common field crops, including alfalfa. They are easily tilled and can be worked within a fairly wide range of moisture conditions. Soil and plant nutrients are easily conserved. Yields of crops are relatively high, but the soils respond well to additions of manure, lime, and commercial fertilizers. Lime and phosphorus are essential for red clover and alfalfa. The soils can be used intensively if management is good, and organic matter, lime, phosphorus, and nitrogen are applied. They are also well suited to early potatoes, but large applications of complete fertilizers are needed to produce high yields.

Cumberland and Etowah silty clay loams, eroded undulating phases (2 to 5 percent slopes) (Cp).—This mapping unit consists of red and brown well-drained soils on old high stream terraces. It occurs in large and small areas widely distributed over the Highland Rim section of the county. A much smaller acreage occurs in the Central Basin, where the soils are closely associated with other Cumberland soils and with Decatur, Dewey, Capshaw, and Emory soils. Most of the mapping unit is in the Decatur-Dewey-Cumberland, the Whitwell-Holston-Cumberland, and the Cumberland-Waynesboro-Sequatchie soil associations.

The mapping unit differs from Cumberland and Etowah silt loams, undulating phases, mainly in having lost from 25 to 75 percent of its original surface layer through accelerated erosion. However, some areas have lost more than 75 percent and others less than 25 percent.

In some places subsoil is mixed with surface soil, and consequently the surface layer varies greatly in color and texture within short distances. The texture ranges from silt loam to silty clay loam. Small severely eroded spots are common and conspicuous because the subsoil is exposed. A few shallow gullies have formed in some areas. A few small cobblestones are on the surface and throughout the profile in places. Small dark-brown concretions are common in the lower part of the soil.

The soils of this complex are medium to strongly acid, moderately supplied with organic matter, and moderately high in plant nutrients. Moisture, air, and roots penetrate the soil easily. Rainfall is readily absorbed and very well retained; the moisture-supplying capacity is high.

Some areas have a thin loesslike silt layer that is mixed in the plow layer with the underlying alluvium. The silt layer may be 15 to 20 inches thick as, for example, in small areas a few miles northwest of Winchester. Some nearly level areas are also included.

Use suitability (4).—Most of this mapping unit is used for crops and pasture and is productive of the crops commonly grown. Very little cleared land is idle. Cultivated areas are used mainly for corn, wheat, and hay; a large acreage is also used for cotton and potatoes. A very large proportion of the hay crop is alfalfa; other legumes are crimson clover, red clover, and lespedeza. Most of the commercial tree nurseries are located on these soils.

These fertile soils are easily worked and conserved. They are well suited to all commonly grown field crops, including alfalfa, and can be used intensively. For high yields, some crops need lime, phosphorus, and nitrogen. Red clover and alfalfa require lime and phosphorus.

Cumberland silt loam, rolling phase (5 to 12 percent slopes) (Ce).—This red well-drained soil was formed from old mixed alluvium on high terraces. It is associated with the other Cumberland soils and with their associates and is relatively unimportant in acreage. It occurs in very small areas widely distributed throughout the Highland Rim section. This soil differs from Cumberland silt loam, undulating phase, in occupying stronger slopes and in having slightly thinner soil layers. Areas are included in which the subsoil is yellowish red and the subsurface layer is lighter colored.

Use suitability (5).—All of Cumberland silt loam, rolling phase, is now in forest. The soil is well suited to many kinds of crops, including alfalfa. It is more difficult to conserve than the undulating phase of Cumberland silt loam and must be used less intensively. If the soil is cultivated, longer rotations that include more close-growing crops and practices for the control

of erosion are needed. The soil responds to good management. Fertilizers are essential for alfalfa and red clover.

Cumberland and Etowah silty clay loams, eroded rolling phases (5 to 12 percent slopes) (Cr).—These well-drained fertile red and brown soils are on high stream terraces. They occur in large and small tracts, mostly in the Decatur-Dewey-Cumberland, the Whitwell-Holston-Cumberland, and the Cumberland-Waynesboro-Sequatchie soil associations. They have formed from old general alluvium that washed chiefly from limestone but was mixed with materials from sandstone. Deposits range from 3 to 15 feet in thickness. This mapping unit differs from Cumberland and Etowah silt loams, undulating phases, in having lost from 25 to 75 percent of the original surface soil through erosion. It also occupies stronger slopes.

Erosion ranges from slight to severe, and the remaining surface layer varies in thickness. In some places the surface layer is less than 6 inches thick and some subsoil material has become mixed with it during tillage. Some gravel is on the surface and throughout the profile of these soils. Where the terrace deposit is less than 3 feet thick, the subsoil is shallower and less friable.

Use suitability (5).—Nearly all of this mapping unit has been cleared and is used for pasture and many kinds of crops. Systematic rotation of crops is not followed.

These soils are suited to many crops, including alfalfa and red clover, and to pasture. They are fairly easily worked and conserved, but runoff must be controlled and fertility maintained. Although fairly productive under ordinary management, these soils respond to improved management and fertilization. Amendments improve the yields of most crops and are essential for alfalfa and red clover.

Cumberland silty clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Cf).—This well-drained soil occurs on high stream terraces and is closely associated with other Cumberland soils. Most of it is in the Decatur-Dewey-Cumberland, the Whitwell-Holston-Cumberland, and the Cumberland-Waynesboro-Sequatchie soil associations. It has formed from old alluvium that washes chiefly from uplands underlain by limestone but included some material from sandstone. The soil differs from Cumberland silt loam, undulating phase, chiefly in having stronger slopes and severe erosion. Most of its original surface soil has been lost.

The surface layer is brown to reddish-brown moderately friable silty clay loam. It consists of remnants of the original surface layer mixed with the upper part of the subsoil. The subsoil is dark-red firm silty clay or heavy silty clay loam.

Use suitability (11).—All of this soil has been cleared and used for crops and pasture. Much of the acreage is now idle or abandoned.

This soil is suited to many crops, including alfalfa. It is inferior to Cumberland and Etowah silty clay loams, eroded rolling phases, because of its greater losses from erosion and its susceptibility to further losses. Furthermore, it has less organic matter and plant nutrients and cannot be worked over so wide a range of moisture conditions. Water is absorbed more slowly and runoff and erosion are more rapid.

Crop production can be increased or maintained by use of longer rotations that include more close-growing crops and by heavier fertilization. Shorter rotations probably could be used where terraces are properly constructed. However, contour tillage, in addition to use of proper crop rotations and fertilization, may be sufficient to control erosion on the shorter slopes.

Cumberland silty clay loam, eroded hilly phase (12 to 25 percent slopes) (Cg).—Most of this soil occupies short slopes on terrace escarpments. It occurs in widely scattered areas and is associated with the Decatur, Dewey, Baxter, and other soils. Most of it is in the Decatur-Dewey-Cumberland, the Whitwell-Holston-Cumberland, and the Cumberland-Waynesboro-Sequatchie soil associations. The old alluvium from which this soil was formed has been washed chiefly from uplands underlain by limestone, but some sandstone materials have been mixed with it.

This soil differs from Cumberland silty clay loam, eroded rolling phase, chiefly in slope. It also varies more in color, texture, stoniness, and depth. Runoff is more rapid, and most areas have lost more of the original surface soil. Small severely eroded spots are common.

The surface soil of this eroded hilly phase is brown to reddish-brown silt loam or silty clay loam. The subsoil is dark-red or reddish-brown firm silty clay loam or silty clay.

Some chert is scattered over the surface on lower slopes where this soil grades to residual soils, such as the Baxter or the cherty Dewey soils. Small areas that have an appreciable amount of sand in the surface soil are included with this soil. Also included are some areas with a yellowish-red subsoil.

Use suitability (13).—All of Cumberland silty clay loam, eroded hilly phase, has been cleared and cultivated. It is now used for general field crops and pasture. Crops are not systematically rotated. The use of this soil is somewhat restricted by erosion and by susceptibility to further erosion. The soil is moderately well suited to crops that require tillage.

The choice and rotation of crops and fertilization, tillage, and erosion control require more care on this soil than on the eroded rolling phase. Use of longer rotations that contain a greater proportion of close-growing crops, more use of leguminous green-manure crops for organic matter, and practice of contour tillage are necessary to maintain the productivity of this soil. The steeper more eroded areas are better suited to hay crops or permanent pasture.

Cumberland silty clay loam, severely eroded hilly phase (12 to 25 percent slopes) (Ch).—This soil occurs in small widely scattered areas in association with Dewey, Decatur, Baxter, and other soils. Most of it is in the Decatur-Dewey-Cumberland, the Whitwell-Holston-Cumberland, and the Cumberland-Waynesboro-Sequatchie soil associations. It differs from Cumberland silty clay loam, eroded hilly phase, chiefly in degree of erosion. Nearly all of the original surface soil and, in places, part of the subsoil have been lost.

Numerous shallow gullies and a few deep gullies have formed.

The surface layer is brown to reddish-brown moderately friable silty clay loam. It consists of remnants of the original surface layer mixed with the upper part of the subsoil. The subsoil is dark-red, reddish-brown, or yellowish-red firm silty clay or heavy silty clay loam.

Use suitability (14).—All of this soil has been cleared and used for crops and pasture. A considerable part is now idle or abandoned.

The soil is not suitable for tilled crops because of the loss of organic matter and plant nutrients and the hazard of further erosion. It is probably best used on most farms for semipermanent hay or for permanent pasture.

Cumberland and Etowah loams, undulating phases (2 to 5 percent slopes) (Ck).—These well-drained soils are on high terraces that are 90 to 175 feet above the flood plains of the Elk River. They are associated chiefly with the Whitwell, Tyler, and Capshaw soils and other Cumberland soils. They occur in small widely distributed areas in the Highland Rim section of the county. Most of this mapping unit, however, is on the eastern part of the Highland Rim in the Decatur-Dewey-Cumberland and the Cumberland-Waynesboro-Sequatchie soil associations. The old alluvial material from which these soils were formed was washed from uplands underlain by limestone but was heavily mixed with sandstone materials. The soils developed under a forest consisting largely of deciduous hardwood trees.

Profile description of Cumberland loam, undulating phase:

0 to 1 inch, dark-brown mixed mineral and partially decayed organic matter.
1 to 10 inches, dark reddish-brown friable loam moderately high in organic matter; some rounded quartz gravel.
10 to 14 inches, reddish-brown friable loam; some rounded quartz gravel.
14 to 34 inches, dark-red firm but moderately friable clay loam or silty clay loam; moderate medium blocky structure; some rounded quartz gravel.
34 to 60 inches, dark-red firm or friable clay loam; weak medium blocky structure; some rounded quartz gravel.

Profile description of Etowah loam, undulating phase:

0 to 1 inch, dark-brown or dark grayish-brown loose loam.
1 to 10 inches, brown very friable loam.
10 to 16 inches, yellowish-brown to reddish-brown friable heavy loam or clay loam.
16 to 32 inches, reddish-brown to yellowish-red firm to friable clay loam or silty clay loam; moderate medium blocky structure.
32 inches +, yellowish-red firm silty clay loam or clay loam, splotched and streaked with yellow, brownish yellow, and strong brown.

These soils are medium to strongly acid. Compared with other soils of the county, they are about moderate in content of organic matter and plant nutrients. Moisture, air, and plant roots penetrate the soils easily. Rainfall is readily absorbed and very well retained. The moisture-supplying capacity is high.

Use suitability (4).—All of this mapping unit is in forest. The soils are well suited, however, to all crops commonly grown, particularly early potatoes. Alfalfa will grow very well if lime and phosphorus are applied. The soils are easily worked, and soil and plant nutrients are easily conserved. The soils respond well to amendments and fertilizers, which are needed for continuous high yields.

Cumberland and Etowah loams, eroded undulating phases (2 to 5 percent slopes) (Cm).—These well-drained soils are on high terraces. They occur in large and small areas widely distributed over the Highland Rim, but they are mainly in the eastern part. Most of this separation is in the Decatur-Dewey-Cumberland and the Cumberland-Waynesboro-Sequatchie soil associations. These soils were formed from alluvium that consisted chiefly of materials from limestone mixed with materials from uplands underlain by sandstone.

These soils differ from Cumberland and Etowah loams, undulating phases, mainly in having lost 25 to 75 percent of the original surface layer through erosion. The surface layer now varies greatly in color and texture within short distances because subsoil material has been mixed with it. The surface layer ranges from brown to reddish brown and from loam to clay loam. In localized areas the subsoil is exposed; in a few places shallow gullies have formed.

The soils are medium to strongly acid and moderately well supplied with organic matter and plant nutrients. They can be worked within a wide range of moisture conditions, and favorable tilth is not difficult to maintain. They are permeable to air and moisture; rainfall is readily absorbed and well retained. The moisture-supplying capacity is high.

Use suitability (4).—All of these soils have been cleared and are used for crops and pasture. They are suited to wheat, corn, alfalfa, crimson clover, lespedeza, potatoes, soybeans, and oats. Amendments are essential for continuous high yields of alfalfa, red clover, and other crops. The soils are easy to work and conserve, and they respond very well to good management.

Cumberland and Etowah loams, eroded rolling phases (5 to 12 percent slopes) (Cn).—These well-drained soils are on high terraces, mostly in the northeastern part of the county. They are associated chiefly with the Whitwell, Tyler, and Capshaw soils and with other Cumberland and Etowah soils. They are mostly in the Decatur-Dewey-Cumberland and the Cumberland-Waynesboro-Sequatchie soil associations. They have formed from general alluvium that was washed from uplands underlain mainly by limestone but that was mixed with sandstone materials.

These soils differ from Cumberland and Etowah loams, undulating phases, in slope and erosion. They have lost 25 to 75 percent of the original surface layer. Many small areas have been more severely eroded, so that the remaining surface layer is mixed considerably with the subsoil. As a result the surface layer of these soils ranges in color from brown to reddish brown or red and in texture from loam to clay loam.

The soils are medium to strongly acid and moderately easy to work and conserve. They are permeable to air, water, and plant roots. Rainfall is not so readily absorbed as on the more gently sloping, less eroded soils, and runoff is somewhat greater. The moisture-supplying capacity is good.

Use suitability (5).—All of these soils have been

cleared and used for pasture or crops. They are well suited to pasture and to wheat, corn, alfalfa, lespedeza, soybeans, oats, and potatoes—the crops commonly grown. They are not so well suited to intensive use as the undulating phases of the Cumberland and Etowah soils. The soils can be used more intensively for row crops if runoff is controlled and fertilization and crop rotation are improved.

Cumberland clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Cd).—This well-drained soil is on old high terraces. It is associated with the Whitwell, Capshaw, Taft, and Tyler soils and with other Cumberland soils. Most of it occurs in the Decatur-Dewey-Cumberland and the Cumberland-Waynesboro-Sequatchie soil associations. It has formed from general alluvium that was washed chiefly from uplands underlain by limestone and was mixed with sandstone materials.

This soil differs from Cumberland loam, undulating phase, chiefly in having stronger slopes and more erosion. The soil has lost more than 75 percent of the original surface layer and, in places, part of the subsoil. A few shallow gullies have formed in most areas. The surface layer varies considerably within short distances. It is brown to reddish-brown or red moderately friable clay loam or gritty silty clay loam. The subsoil is a dark-red clay loam. On small localized areas, remnants of the original surface layer remain or have been mixed with the subsoil.

This soil is medium to strongly acid, low in organic matter, moderately low in plant nutrients, and moderately difficult to work and conserve. Erosion has caused the loss of organic matter and surface soil. These losses intensify the problems of controlling the increased runoff and of preventing further soil losses.

Use suitability (11).—All of this soil has been cleared and used for crops and pasture. A few small areas are now idle or abandoned.

This soil is suited to a wide variety of crops, including alfalfa, but it is poorly suited to intensive use or to row crops. Crops commonly grown include wheat, corn, alfalfa, lespedeza, soybeans, oats, rye, and vetch. Although seriously damaged by erosion, the soil responds well to good management and retains improvements in fertility when protected against further erosion.

Decatur silt loam, undulating phase (2 to 5 percent slopes) (Da).—This is a well-drained soil of the uplands. It occurs principally in association with the Dewey, Cumberland, and Emory soils and with other Decatur soils. Most of it is in the Decatur-Dewey-Cumberland soil associations. It was derived from the residuum of high-grade limestone or moderately cherty high-grade limestone. It has developed under a cover of deciduous trees. On the smoother parts of many areas, a thin layer of loesslike silt was part of the parent material (fig. 3).

Profile description:

0 to 8 inches, brown to dark-brown very friable silt loam, high in organic matter.
8 to 14 inches, brown, strong-brown, or reddish-brown, friable, heavy silt loam; weak fine blocky structure.
14 to 60 inches, dark-red very firm silty clay; moderate medium blocky structure.

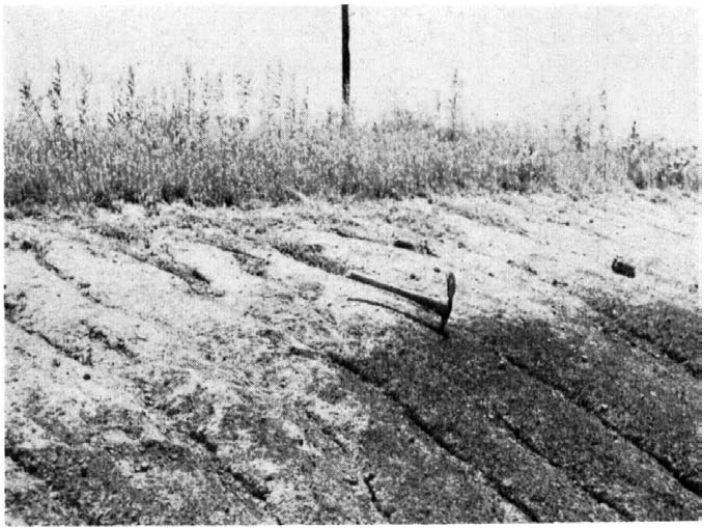

Figure 3.—Loesslike layer of silt on Decatur silt loam, undulating phase.

60 inches +, mottled yellowish-red and olive-yellow highly plastic silty clay; limestone bedrock at depths ranging from 10 to 20 feet.

This soil is medium to strongly acid and relatively high in content of organic matter and plant nutrients. It is permeable to air, moisture, and plant roots. Runoff and internal drainage are medium, and the moisture-supplying capacity is high.

The loesslike layer of silt present on many areas ranges from a very thin film to 30 inches in thickness, but usually the layer is less than 20 inches. Soil that formed over the deeper parts of the layer of silt is lighter colored and much more friable than typical for the Decatur series. This variation is more easily worked and better suited to some crops, especially small-seeded legumes and grasses, than the typical Decatur soil.

Use suitability (4).—All of Decatur silt loam, undulating phase, is now in forest. It is well suited to pasture and many kinds of crops. It is very easy to work and can be tilled within a fairly wide range of moisture conditions. This is one of the best soils in the county for alfalfa, but amendments are needed to establish or maintain the crop. However, the soil usually occurs in small tracts, and in locations where its use for crops is impractical. Row crops can be grown in short rotations if the management is good.

Decatur silty clay loam, eroded undulating phase (2 to 5 percent slopes) (Dc).—This is a well-drained soil on uplands. It occurs chiefly in association with Dewey, Cumberland, and Emory soils and with other Decatur soils. Most of it is in the Decatur-Dewey-Cumberland soil association. It was derived from materials that weathered from high-grade limestone or moderately cherty high-grade limestone. In many places loesslike silt was part of the parent material.

This soil differs from Decatur silt loam, undulating phase, in having lost a large part of the original surface soil through erosion (fig. 4). Remnants of the original surface layer are mixed with the subsoil in the plow layer. As a result, the surface layer now varies in

color and texture. It is brown, reddish brown, or red silt loam or silty clay loam. The subsoil is a dark-red very firm silty clay.

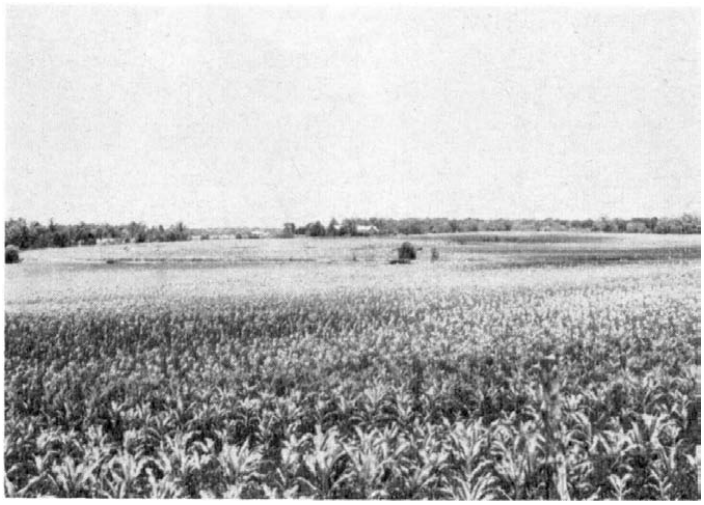

Figure 4.—**Decatur soils in a shallow karst landscape. Some areas are severely sheet eroded.**

Use suitability (4).—All of this soil has been cleared and used for pasture or crops. A small acreage is idle. The soil is very well suited to all the commonly grown crops, including alfalfa. If amendments are properly used, high yields of alfalfa can be easily maintained for 4 years or more. Although very well suited to pasture, the soil is preferred for crops that require tillage because it is easily worked and conserved. If other management practices are good, it can be used in moderately short rotations. Contour tillage will allow more intensive use of the longer slopes.

Decatur silty clay loam, eroded rolling phase (5 to 12 percent slopes) (Dd).—This is a well-drained soil of the uplands. It occurs in relatively large areas on the southwestern part of the Highland Rim. It is associated mainly with Cumberland, Dewey, and Emory soils and with other Decatur soils. Most of the acreage is in the Decatur-Dewey-Cumberland and the Mountview-Baxter soil associations. It has developed from weathered products of high-grade limestone that contained some chert in places. It differs from Decatur silt loam, undulating phase, mainly in slope and erosion. A large part of the original surface soil has been lost through erosion.

Profile description:

0 to 8 inches, reddish-brown to red friable silty clay loam.
8 to 60 inches, dark-red very firm silty clay; very plastic when wet; moderate medium blocky structure.
60 inches +, mottled yellowish-red and olive-yellow very plastic silty clay; moderate fine blocky structure; limestone bedrock at depths of 10 to 15 feet.

Because of erosion losses, the present surface layer is highly variable in thickness and in color. In some areas it is missing, and in others it is as much as 10 inches thick. The surface layer ranges from brown to reddish brown or dark red. In many small severely eroded spots, the dark-red subsoil is exposed.

The entire profile is medium to strongly acid. The content of organic matter is moderate, and that of plant nutrients is relatively high. Although this soil is nearly free of stones, small rock outcrops and narrow ledges of limestone occur in places. The soil is friable enough to permit moderately rapid penetration of plant roots and adequate movement of air and moisture. Runoff and internal drainage are medium, and moisture is readily absorbed and well retained. The moisture-supplying capacity is relatively high.

Boundaries between this soil and associated soils are not always distinct. Small areas of associated soil types are therefore included with this phase. Some of these inclusions are lighter colored, both in the surface and subsoil, than the soil described. In places thin deposits of alluvium overlie the limestone residuum, as is shown by rounded quartz gravel. Small areas in other places have been influenced by thin loess-like deposits of silt. A few fragments of chert are present.

Use suitability (5).—All of this soil has been cleared and used for pasture or crops. Wheat, corn, alfalfa, and crimson clover are the main crops.

The soil is well suited to the crops commonly grown and is one of the better soils for alfalfa. However, as a result of erosion, organic matter and plant nutrients have been lost and the moisture-supplying capacity has been lowered. In addition, good tilth has become more difficult to maintain. This phase is still one of the better soils of the county for crops. It has favorable characteristics and will respond excellently to improved management, especially to adequate fertilization and proper rotation of crops. It is moderately easy to work and conserve, but the management is considerably more exacting than that of the undulating phase of Decatur silt loam.

Decatur silty clay, severely eroded rolling phase (5 to 12 percent slopes) (Db).—This soil occurs in small widely scattered areas and is principally associated with the Cumberland, Dewey, and Emory soils and with other Decatur soils. Most of it occurs in the Decatur-Dewey-Cumberland and the Mountview-Baxter soil associations. It differs from Decatur silty clay loam, eroded rolling phase, chiefly in degree of erosion. Nearly all of the original surface soil and, in places, part of the subsoil have been lost. Shallow gullies have formed, many of which cannot be obliterated by tillage.

Use suitability (11).—All of this soil has been cleared and cultivated. Some areas have been abandoned, but most of the acreage is used for crops or pasture.

Erosion has caused the loss of much of the organic matter and plant nutrients. Good tilth is difficult to maintain, and the soil can be tilled within only a very narrow range of moisture content. The slow rate of moisture infiltration and rolling relief tend to cause rapid runoff of surface water and susceptibility to additional erosion. However, this soil is fairly well suited to intertilled crops if they are grown in fairly long rotations. Shorter rotations are possible if contour tillage, contour stripcropping, terracing, or all of these practices are used. The soil is better suited to small grains and semipermanent hay crops. On farms

where better soils are available, its best use may be for pasture. It is well suited to alfalfa if amendments are properly used.

Dellrose cherty silt loam, eroded hilly phase (12 to 25 percent slopes) (Df).—This is an excessively drained soil of the uplands. It occurs in small and widely separated areas along the boundary between the Highland Rim and Central Basin. It is closely associated with the Bodine, Baxter, and Mimosa soils. All of the soil is in the Bodine-Baxter-Ennis soil association. It has formed under a deciduous forest from material that weathered from cherty limestone and drifted or dropped on moderately phosphatic limestone residuum. The cherty materials are from the Baxter, Bodine, and Dickson soils. Seepage water and the underlying moderately phosphatic limestone contributed to formation of the parent materials.

Profile description:

0 to 3 inches, brown to dark-brown very friable cherty silt loam, high in organic matter.
3 to 32 inches, strong-brown or yellowish-brown to yellowish-red loose friable cherty silt loam or cherty silty clay loam; weak medium blocky structure.
32 to 50 inches, yellowish-brown plastic silty clay loam or silty clay, splotched with gray and yellow; contains moderate amount of chert fragments; moderate medium blocky structure.
50 inches +, mottled gray and yellowish-brown plastic silty clay.

Much of the upper part of this soil, especially the dark layer high in organic matter, has been lost through erosion. The lighter colored subsoil is exposed in many places. Shallow gullies are abundant, and there are a few deep gullies that cannot be crossed by farm machinery. The upper part of the profile consists of material that is 20 to 50 percent chert. The angular chert fragments are from ¼ inch to 4 inches in diameter.

This soil is medium to strongly acid. The content of organic matter and plant nutrients is normally moderate, but this depends mainly on the amount of soil that has been lost through erosion. The soil is very permeable to air and moisture and allows penetration of plant roots. The moisture-supplying capacity is fair to good.

Use suitability (13).—All of this soil has been cleared, and most of it is used for pasture or crops. An estimated 20 percent is now in permanent pasture, and a smaller percentage is idle. The rest is used for crops. Corn is the main intertilled crop. Rye is the main small grain, although a large acreage of wheat is grown.

This soil is only fairly well suited to crops that require tillage because it has moderately steep and irregular slopes, a high chert content, and a low moisture-supplying capacity. It has poor workability but is not difficult to conserve. The soil is deficient in lime, nitrogen, and potassium. Addition of phosphorus would increase the yields of some crops. Pastures are well suited to the soil, but they are usually poor and need improved use of amendments and reseeding (fig. 5).

Dellrose cherty silt loam, steep phase (25 to 60 percent slopes) (Dg).—This soil occurs in small, widely scattered areas in the Bodine-Baxter-Ennis soil association. It differs from the eroded hilly phase of Dellrose cherty silt loam mainly in being steeper. Other differences are its lack of erosion and shallower accumulation of material. Depth to bedrock ranges from 2 to 12 feet. The surface soil is brown to dark brown, and the subsoil is yellowish brown to yellowish red. To a depth of 20 or 30 inches, the soil is loose and friable, and about 30 percent of its total volume is chert.

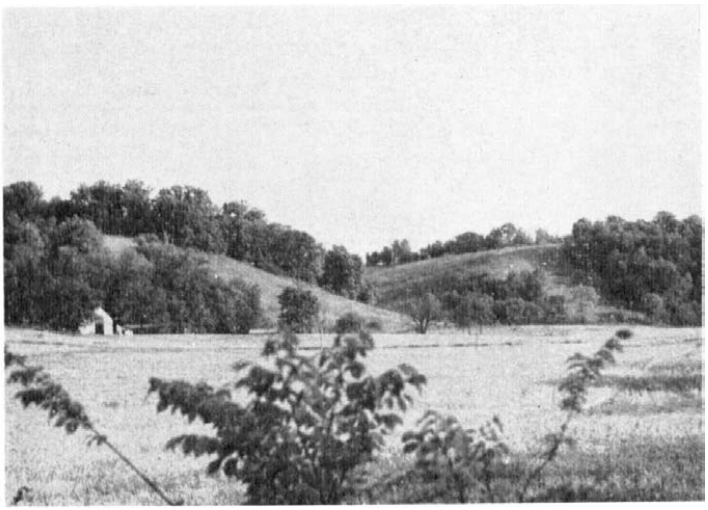

Figure 5.—**A good land-use pattern on a farm along the Elk River. The first bottoms (chiefly Huntington and Lindside soils) are used intensively for crops. The cleared slopes (Dellrose cherty silt loam, eroded hilly phase) are in improved pasture. The steep slopes (Dellrose cherty silt loam, steep phase) are in forest.**

Use suitability (17).—All of this soil is in forest and is probably best suited to this use. Fair pastures can be established and maintained if the soil is cleared. However, it will be hard to clip weeds because the soil is steep and cherty. Permanent pastures are difficult to maintain because brush grows rapidly.

Dellrose cherty silt loam, eroded steep phase (25 to 60 percent slopes) (Dh).—This cherty excessively drained soil is on steep uplands. It occurs near the boundary between the Central Basin and the Highland Rim. The soil occurs with the Bodine, Baxter, and Mimosa soils. All of it is in the Bodine-Baxter-Ennis soil association. It has formed from cherty limestone creep material that overlies moderately phosphatic limestone or limestone material. It differs from Dellrose cherty silt loam, eroded hilly phase, principally in having stronger slopes.

From 25 to 75 percent of the original surface layer has been lost through erosion. In localized small areas the subsoil is exposed. The soil has a few shallow gullies, and infrequently a deep one that cannot be crossed by farm machinery.

The surface layer consists of brown to yellowish-brown cherty silt loam. The subsoil is yellowish-brown to yellowish-red cherty silt loam or cherty silty clay loam. The soil mass is 25 to 50 percent chert.

The principal variations in this soil are due to differences in depth of the accumulated materials. The depth is less on the lower slopes.

Use suitability (17).—All of this soil has been

cleared and used for pasture or crops. About half is now used for crops that require tillage, and the rest is in unimproved pasture or is idle.

The soil is poorly suited to tilled crops but is fairly well suited to permanent pasture. Fairly good pastures can be developed by seeding proper pasture mixtures and by liming and fertilizing. Pasture yields can be increased by adding phosphorus fertilizers. Weeds are difficult to control because of the steep slopes and cherty surface of this soil. Brush rapidly invades cleared areas. The soil is probably better suited to a semi-permanent pasture, with a clean-cultivated crop grown at long intervals, than it is to permanent pasture. Row crops can be grown in a moderate to long rotation if stripcropping and adequate fertilization are practiced and other management is good.

Dellrose cherty silt loam, severely eroded steep phase (25 to 60 percent slopes) (Dk).—This soil differs from the eroded hilly phase of Dellrose cherty silt loam in having steeper slopes and more erosion. A large part of the original surface layer has been lost, and the soil has been severely damaged by erosion. Shallow gullies are common. An occasional deep gully has formed that cannot be crossed by farm machinery. Sheet erosion has not been severe in all places, and many intergully areas retain a large part of the original surface layer.

The present surface layer of this soil is a brown to yellowish-brown friable silt loam. The subsoil is yellowish-brown to yellowish-red friable cherty silt loam to silty clay loam.

Depth to the underlying heavy-textured material ranges from 1 to 5 feet or more. Color and amount of chertiness also vary widely. Loss of fine-textured soil materials has resulted in accumulations of chert on the surface of the more severely eroded sites.

Use suitability (18).—This soil has been used for crops and pasture, but a large part is now idle or in unimproved pasture. Some areas are reverting to forest.

This soil is very poorly suited to crops and pasture. It is very difficult to till because of its steep slopes and chertiness. In large part, the plant nutrients and organic matter have been lost through erosion. As a result, the susceptibility to further erosion has increased. Pastures can be established and maintained if management is good, but on many farms the soil is best used for forest.

Dellrose cherty silt loam, eroded rolling phase (5 to 12 percent slopes) (De).—This soil is closely associated with the Baxter and Bodine soils at the boundary of the Central Basin and Highland Rim sections of the county. All of it is in the Bodine-Baxter-Ennis soil association. It differs from the eroded hilly phase of Dellrose cherty silt loam chiefly in slope. In addition, it has surface soil and subsoil layers that are more distinct and its subsoil is heavier textured. Over most areas, from 25 to 75 percent of the surface soil has been lost through erosion. In many places the subsoil has been mixed with the surface soil. Shallow gullies have formed in some areas. Loss of surface soil has increased the chert content in the plow layer and made the soil more difficult to work.

The surface layer is now brown to yellowish-brown friable cherty silt loam. The subsoil is yellowish-brown to yellowish-red friable cherty silty clay loam or heavy cherty silt loam.

This soil is medium to strongly acid and contains a moderate amount of organic matter. Some organic matter has been lost through erosion. The soil is somewhat droughty for plants that mature during the hot summer months.

Some small areas that have lost all of their original surface soil and, in places, part of the subsoil are included with this soil.

Use suitability (10).—All of Dellrose cherty silt loam, eroded rolling phase, has been cleared and is now used for pasture or crops. A small acreage is idle. The main crops are corn, wheat, rye, alfalfa, and soybeans.

The soil is moderately productive. It is moderately well suited to crops that require tillage and well suited to pasture. Fertilizers are needed to produce high yields of all crops and are essential for alfalfa. Phosphorus will increase the yields of legumes, although the soil is not deficient in this element. Erosion can be controlled by using rotations of moderate length. The soil can be more intensively cultivated if contour tillage, stripcropping, terracing, or all of these practices are used. Pastures can be improved by applying lime and seeding the proper mixtures of legumes and grasses.

Dewey silt loam, undulating phase (2 to 5 percent slopes) (Ds).—This well-drained soil of the uplands has formed on the smooth low ridge crests under a forest consisting chiefly of oaks and hickories. It occurs in small individual tracts widely distributed in the Decatur-Dewey-Cumberland and the Mountview-Baxter soil associations. It was derived from materials that weathered from high-grade limestone. In many places a thin layer of loesslike silt has contributed to the parent materials.

Profile description:

0 to 10 inches, grayish-brown to brown friable silt loam; upper 2 inches in wooded areas stained dark with organic matter.
10 to 36 inches, red or yellowish-red firm silty clay; moderately expressed medium blocky structure.
36 inches +, mottled yellowish-red and olive-yellow very plastic silty clay; contains chert fragments and is very cherty in places; limestone bedrock at depths ranging from 8 to 20 feet.

In some places, angular chert fragments are on the surface and throughout the profile. Bedrock crops out in a few places.

The soil is medium to strongly acid and relatively well supplied with organic matter and plant nutrients. It is permeable to air, roots, and moisture. The moisture-supplying capacity is good. Runoff is slow, and internal drainage is medium.

Use suitability (4).—All of this soil is in forest that consists chiefly of oaks and hickories. The soil is well suited, however, to all the commonly grown crops, including alfalfa. Most areas are small and are so inconveniently located that clearing and cultivation are not practical. The soil is easy to work and conserve. Productivity can be maintained by use of short crop rotations if other management is good. Amendments

are needed to maintain high yields. They are essential for alfalfa and red clover. Areas of this soil that contain the silty layer are very easy to till and better suited to the small-seeded legumes.

Dewey silty clay loam, eroded undulating phase (2 to 5 percent slopes) (Dw).—This well-drained soil of the uplands was derived from materials that weathered from high-grade limestone. It differs from Dewey silt loam, undulating phase, chiefly in having lost a large part of the original surface layer through erosion. Considerable mixing of remnants of surface soil and the subsoil has occurred in the plow layer. The surface layer ranges from grayish brown to reddish brown or red in color and from silt loam to silty clay loam in texture.

This soil has a lower content of organic matter and a more variable content of plant nutrients than the undulating phase of Dewey silt loam. Water is absorbed more slowly, surface runoff is slightly higher, and the moisture-supplying capacity is lower.

Use suitability (4).—This soil has been cleared and is used rather intensively for crops. It is very well suited to nearly all crops grown in the county. Crop rotations can be short if other practices are good. Fertilization is needed to maintain high crop yields, and it is essential for the maintenance of alfalfa and red clover. The soil is easy to work and conserve. Some areas, generally those on the smoother slopes, have a thin silty covering. Such areas are easier to till and better suited to small-seeded legumes.

Dewey silt loam, rolling phase (5 to 12 percent slopes) (Dr).—This well-drained soil of the uplands occurs principally in the Decatur-Dewey-Cumberland and the Mountview-Baxter soil associations. It has formed from products that weathered from high-grade limestone. The plant cover was deciduous forest consisting of oaks, hickories, and associated kinds of trees. This soil differs from the Decatur soils in having a lighter brown surface soil and a lighter red, somewhat more friable subsoil.

Profile description:

0 to 10 inches, grayish-brown to brown friable silt loam; in many places the upper 2 inches is stained dark grayish brown by organic matter.
10 to 36 inches, red or yellowish-red firm silty clay; moderate medium blocky structure.
36 inches +, mottled yellowish-red and olive-yellow very plastic silty clay; moderate fine blocky structure; many chert fragments; limestone bedrock at depths ranging from 8 to 20 feet.

Some angular chert is on the surface and throughout the profile in many places. Small outcrops of rocks and narrow ledges of limestone occur infrequently.

The soil is medium to strongly acid and relatively well supplied with organic matter and plant nutrients. It is permeable to roots, water, and air. Runoff and internal drainage are medium, and the moisture-supplying capacity is high.

Use suitability (5).—All of this soil is in cutover forest. It is well suited, however, to practically all the common crops, including alfalfa. Most areas are small and are so situated that clearing or cultivating them is not feasible.

Dewey silty clay loam, eroded rolling phase (5 to 12 percent slopes) (Dx).—This well-drained soil of the uplands occurs in large and small areas, mainly in the southwestern part of the county on the Highland Rim. Most of it is in the Decatur-Dewey-Cumberland soil association. It has developed from materials that weathered from high-grade limestone. It differs from the rolling phase chiefly in erosion. A large part of the original surface soil, including the thin surface layer high in organic matter, has been lost through erosion.

The surface layer consists of remnants of the original surface layer and the upper part of the subsoil. It is grayish-brown to reddish-brown silt loam to silty clay loam. The subsoil is a red or yellowish-red firm silty clay. Small severely eroded spots are common, and they are conspicuous because the reddish subsoil is exposed.

Use suitability (5).—Most of this soil is used for crops and pasture. Very little is idle. This very desirable upland soil is well suited to all the common crops, including deep-rooted legumes such as alfalfa. Its moderate susceptibility to erosion is not a problem if management is good. Crop rotations of moderate length should be followed. Tillage should be on the contour if feasible. Contour stripcropping will permit more intensive use of the soil. Terraces may be effective on some fields if they are properly laid out and constructed, but irregular slopes and lack of suitable outlets prevent their use in most places.

Dewey silty clay, severely eroded rolling phase (5 to 12 percent slopes) (Du).—This soil has developed from materials weathered from high-grade limestone. It occupies small widely distributed areas, mainly in the southwestern part of the Highland Rim section of the county. Most of it is in the Decatur-Dewey-Cumberland soil association. It differs from Dewey silt loam, rolling phase, chiefly in having lost nearly all the original surface soil and, in places, part of the subsoil. Gullies crossable with farm machinery but not obliterated by ordinary tillage have formed in most areas.

The plow layer is reddish-brown to red moderately friable to firm silty clay loam or silty clay. The subsoil is red or yellowish-red firm silty clay.

This soil is medium to strongly acid. The content of organic matter and plant nutrients is low as a result of erosion. The soil can be tilled within a very narrow range of moisture content, and good tilth is difficult to maintain. Runoff is rapid, internal drainage is medium, and the moisture-supplying capacity is relatively low. The soil is permeable to air, moisture, and plant roots.

Use suitability (11).—All of this soil has been cleared and used for crops and pasture. Some of the less severely eroded parts of fields are still used for crops, but much of the acreage is now either idle or in unimproved pasture. Crop and pasture yields are rather low, especially for the plants that mature in the hot, dry season.

Because of the serious erosion, this soil is more suitable for close-growing crops or pasture than for intertilled crops. Much of the original supply of organic matter and available plant nutrients has been lost. The moisture-supplying capacity is considerably lower than in the uneroded soil. The soil is highly suscept-

ible to further erosion because permeability is low and slopes are moderately strong.

The soil can be maintained or improved by using long rotations that include many close-growing crops. If contour tillage, stripcropping, and terracing are practiced, the soil can be used more intensively, or for intertilled crops. Lime, phosphorus, and potassium are essential for good yields of deep-rooted legumes; all other crops need phosphorus and nitrogen.

Dewey silty clay, severely eroded hilly phase (12 to 25 percent slopes) (Dv).—This is a well-drained soil of the uplands that developed from high-grade limestone. It occurs in small, widely separated areas, mostly in the Decatur-Dewey-Cumberland soil association. It differs from Dewey silt loam, rolling phase, chiefly in slope and erosion. More than 75 percent of the original surface layer has been lost, and in places part of the subsoil is gone. Shallow gullies are common; some deep gullies that cannot be crossed by farm machinery occur.

The present surface layer is reddish-brown to red moderately friable to firm silty clay loam to silty clay. The subsoil is red to yellowish-red firm silty clay.

Use suitability (14).—All of this soil has been cleared and cultivated. A large part of it is now abandoned or in unimproved pasture. A small acreage is used for crops, but yields are very low under ordinary management.

The soil is not suitable for crops that require tillage because it is unproductive and hard to work and conserve. A minimum amount of tillage is desirable. Fair permanent pasture can be established and maintained if it is well managed. Fertilizer is generally needed to establish a pasture, and barnyard manure is helpful on galled spots. Barnyard manure and green manure, plowed under, improve the tilth of the soil, increase its permeability, and improve moisture-supplying capacity.

Dewey cherty silt loam, rolling phase (5 to 12 percent slopes) (Dm).—This is a well-drained cherty soil of the uplands. It occurs in large and small areas widely distributed over the Highland Rim section of the county. Most of it is in the Decatur-Dewey-Cumberland soil association. The soil has formed from products that weathered from cherty high-grade limestone; it developed under a forest of oaks, hickories, and associated trees. It differs from Dewey silt loam, rolling phase, chiefly in being cherty.

Profile description:

0 to 12 inches, grayish-brown to brown friable cherty silt loam; upper 2 inches in wooded areas stained dark grayish brown.

12 to 40 inches, red or yellowish-red firm cherty silty clay; moderate medium blocky structure.

40 inches +, yellowish-red plastic cherty silty clay, splotched with yellow, red, and gray; chert content very high; bedrock at depths ranging from 8 to 20 feet.

The amount of chert on the surface and throughout the soil varies, but it is generally not enough to interfere materially with tillage.

The soil is medium to strongly acid and relatively well supplied with organic matter and plant nutrients. It is permeable to roots, water, and air. Runoff and internal drainage are both medium, and the moisture-supplying capacity is high.

Some areas are included that have slopes of less than 5 percent and a higher content of chert. The surface soil of this inclusion is brown to dark-brown friable cherty silt loam, and the subsoil is dark-red very cherty silty clay.

Use suitability (10).—All of Dewey cherty silt loam, rolling phase, is in forest or small woodlots. Cleared of trees, it would be well suited to a wide variety of crops and to pasture. It would be moderately easy to work and to conserve.

Dewey cherty silty clay loam, eroded rolling phase (5 to 12 percent slopes) (Dp).—This is a well-drained cherty soil of the uplands. It is widely distributed over the Highland Rim, but most of the acreage occurs in the Decatur-Dewey-Cumberland soil association. It has formed from products that weathered from cherty high-grade limestone. The soil differs from Dewey cherty silt loam, rolling phase, in having lost from 25 to 75 percent of its original surface layer. The depth of the remaining surface layer varies greatly within short distances.

The surface layer generally consists of the remnants of the original surface layer mixed with the upper part of the subsoil. It is grayish-brown to reddish-brown cherty silt loam to cherty silty clay loam. The subsoil is a red or yellowish-red firm cherty silty clay. Enough chert occurs on the surface and throughout the soil to interfere with tillage.

Some areas are included that have slopes of less than 5 percent.

Use suitability (10).—All of Dewey cherty silty clay loam, eroded rolling phase, has been cleared and used for crops and pasture. Corn, wheat, alfalfa, and lespedeza are the crops most commonly grown, and they are well suited to the soil. Lime and fertilizers are necessary for continuous high yields of all crops and are essential for alfalfa. Rotations of moderate length can be used if other management is good. The soil can be used more intensively if stripcropped on the contour. Terraces are also of value in some areas, but the length and uniformity of slopes and presence of suitable outlets determine their practicability.

Dewey cherty silty clay, severely eroded rolling phase (5 to 12 percent slopes) (Dn).—The soil has developed from cherty high-grade limestone residuum. It differs from Dewey cherty silt loam, rolling phase, chiefly in having lost nearly all the original surface layer and, in places, part of the subsoil. Some gullies have formed in most areas, but they can be crossed with farm machinery.

The surface layer is brown to red moderately friable to firm cherty silty clay loam to cherty silty clay. The subsoil is red or dark-red firm cherty silty clay, high in content of angular chert fragments.

The soil is medium to strongly acid. Nearly all the organic matter has been lost through erosion. Runoff is rapid, internal drainage medium, and the moisture-supplying capacity low. The soil absorbs water slowly, but internal conditions are favorable for movement of air and moisture.

Use suitability (11).—All of this soil has been cleared and used for crops or pasture; a large part of it is now idle or in unimproved pasture.

The soil is poorly suited to row crops; it is better

suited to close-growing crops and pasture. Erosion has increased the chert content of the plow layer and thus made tillage difficult. Tillage is limited to a narrow range of moisture content. The soil is difficult to conserve, as rapid runoff and low nutrient content hinder the growth of a good plant cover. If this soil is used for intertilled crops, long rotations will be necessary. The soil can be improved and used more intensively if contour tillage and stripcropping are practiced and terraces are constructed. Soil amendments are necessary for satisfactory yields of all crops.

Dewey cherty silty clay loam, eroded hilly phase (12 to 25 percent slopes) (Dr).—This is a well-drained cherty soil formed from products that weathered from cherty high-grade limestone. It is widely distributed and occurs in close association with the other Dewey soils. Most of it is in the Decatur-Dewey-Cumberland soil association. It differs from Dewey cherty silt loam, rolling phase, chiefly in slope and in having lost part of its original surface soil through erosion.

The surface layer is grayish-brown or brown to reddish-brown cherty silty clay loam. The subsoil is red or yellowish-red firm cherty silty clay.

Angular chert fragments occur throughout the soil and interfere with tillage. Small severely eroded spots are common, and they are conspicuous because the subsoil is exposed. In some areas, the plow layer still consists of remnants of the original surface layer, but usually this layer is a mixture of surface soil and the upper part of the subsoil. The content of organic matter varies greatly within short distances, according to the degree of erosion.

The soil is medium to strongly acid and contains a moderate amount of plant nutrients. Runoff is rapid, and internal drainage is medium. The moisture-supplying capacity is about fair.

Use suitability (13).—All of this soil has been cleared and cultivated. Most of it is still used for crops, but a considerable acreage is in permanent pasture. A small part is idle or abandoned. The main crops are alfalfa, corn, wheat, and lespedeza.

This soil is fairly well suited to close-growing crops such as small grains, but it is poorly suited to intertilled crops. It is difficult to work and moderately difficult to conserve. Its best use is semipermanent hay crops and pasture. The use suitability can be broadened somewhat by practicing contour tillage and contour stripcropping where the slopes are suitable.

Dewey cherty silty clay, severely eroded hilly phase (12 to 25 percent slopes) (Do).—This is a well-drained cherty soil of the uplands. It occurs in small, widely separated tracts and is mainly in the Decatur-Dewey-Cumberland soil association. It differs from Dewey cherty silt loam, rolling phase, chiefly in slope and in having lost more than 75 percent of the original surface soil and in places part of the subsoil. Shallow gullies are common, and some deep gullies have formed.

The surface layer is reddish-brown or red moderately friable cherty silty clay loam or silty clay. The subsoil, a red or yellowish-red firm silty clay, contains many angular chert fragments.

This soil is medium to strongly acid and low in content of organic matter and plant nutrients. The moisture-supplying capacity is low. Most plants suffer from lack of water, particularly those that mature in the hot, dry season.

Use suitability (14).—All of this soil has been cleared and cultivated. A large part is now abandoned or in unimproved pasture. A small acreage is used for crops, but the yields are low. This soil is not suitable for crops that require tillage. It is very difficult to work and conserve and can be cultivated only within a narrow range of moisture content. The numerous limestone outcrops interfere with the use of farm machinery. The soil is best suited to pasture. Lime, phosphorus, and possibly nitrogen are needed to establish good permanent pastures. Unless pastures are properly managed, the soil should be returned to forest.

Dickson silt loam, undulating phase (2 to 5 percent slopes) (Dy).—This is a moderately well drained soil of the uplands. It occupies broad ridge crests in the northwestern part of the county in the area known locally as the Barrens. It is closely associated with the Lawrence, Baxter, and Guthrie soils, mainly in the Dickson-Baxter-Greendale soil association. It has a 24- to 36-inch chert-free layer over very cherty material. The parent material consisted chiefly of silt that was either wind deposited or weathered from the underlying cherty limestone material. The soil formed under a deciduous forest.

Profile description:

0 to 10 inches, light brownish-gray to light yellowish-brown very friable silt loam; surface 2 inches in undisturbed areas is stained dark with organic matter.
10 to 24 inches, yellowish-brown to brownish-yellow friable silt loam or silty clay loam, splotched with gray in the lower part.
24 to 30 inches, a siltpan, or compact silt loam mottled with gray and yellowish brown; a few chert fragments in lower part.
30 inches +, cherty limestone residuum, 8 feet or more in thickness.

The soil is strongly to very strongly acid and low in organic matter and plant nutrients. The upper part of the profile is permeable to air, roots, and water, but the siltpan is very slightly permeable. Runoff is slow and internal drainage is medium to slow. The moisture-holding capacity is fair.

A few slightly or moderately cherty areas are included with this soil. The chert is very fine and does not interfere seriously with tillage.

Use suitability (6).—Nearly all of Dickson silt loam, undulating phase, is in forest that consists chiefly of post, blackjack, red, and white oaks and some hickory.

The soil is fairly well suited to many crops that are commonly grown in the county. It is not suited to alfalfa. The soil is easy to work and conserve. Its use suitability is somewhat limited by low fertility, restricted drainage, and fair water-supplying capacity. It responds readily to good management, but only temporarily. Cultivated areas are susceptible to erosion, but short rotations can be used successfully if proper fertilization and contour tillage are practiced. Fertilizers are necessary for good production of nearly all crops.

Dickson silt loam, eroded undulating phase (2 to 5 percent slopes) (Dz).—This is a moderately well drained soil of the uplands. It occupies broad ridge

crests in the northwestern part of the county in the area known as the Barrens. It is closely associated with Lawrence, Baxter, Bodine, and Guthrie soils. Most of it is in the Dickson-Baxter-Greendale soil association. This soil has formed from an 18- to 24-inch layer of silt underlain by cherty limestone residuum. This soil differs from Dickson silt loam, undulating phase, in being eroded. In most areas, the plow layer is entirely within the original surface layer, but in places remnants of the original surface layer are mixed with the upper part of the subsoil.

The surface layer is now yellowish-brown to brownish-gray silt loam. The subsoil is yellowish-brown or brownish-yellow friable silt loam or silty clay loam. The subsoil is underlain by a compact, slowly pervious siltpan.

The soil is very strongly acid, low in content of organic matter and plant nutrients, and fair in moisture-supplying capacity. Runoff is slow, and internal drainage is medium to slow. The upper part of the profile is permeable to air, roots, and water, but the siltpan is only very slightly permeable.

Some areas are included that are slightly or moderately cherty, but the chert fragments are small and do not seriously interfere with tillage. Also included are areas with slopes of less than 2 percent.

Use suitability (6).—All of this soil has been cleared and is used for pasture or crops. Cotton, corn, lespedeza, soybeans, and sorghum are the principal crops grown.

The soil is fairly well suited to most crops grown in the county. It is better suited to small grains than to corn. It is low in fertility, and crop yields are only moderate. Fertilization is required for satisfactory yields of most crops. Legumes grown on this soil need lime and phosphorus. Alfalfa does not yield satisfactorily, even though it is grown under good management. Sericea lespedeza, however, is grown successfully with very little, if any, fertilization.

Dickson silt loam, rolling phase (5 to 12 percent slopes) (D2).—This soil occurs chiefly in small, widely separated areas in the Dickson-Baxter-Greendale soil association. Stronger slopes differentiate it from Dickson silt loam, undulating phase.

The surface layer is a brownish-gray or light yellowish-brown very friable silt loam. It is underlain by brownish-yellow to yellowish-brown friable silt loam or silty clay loam. A compact siltpan occurs at depths of 20 to 24 inches, and it is underlain by cherty limestone material at a depth of about 30 inches.

A few slightly to moderately cherty areas are included, but they do not materially interfere with tillage.

Use suitability (7).—All of Dickson silt loam, rolling phase, is in forest that consists chiefly of post, blackjack, red, and white oaks and some hickory.

Stronger slopes make this soil inferior to Dickson silt loam, undulating phase, for crops. All the common crops of the county, except alfalfa, can be successfully grown, but fertilizers will be needed for most of them. The soil is susceptible to erosion and is not suited to intensive use for row crops. Contour tillage, stripcropping, and terracing reduce erosion hazards and allow the soil to be used more intensively.

Part of this soil is on narrow ridge crests surrounded by the steep Bodine and Baxter soils. In general these areas are not suited to crops, chiefly because they are inaccessible.

Dickson silt loam, eroded rolling phase (5 to 12 percent slopes) (D3).—This moderately well drained soil of the uplands was derived from a relatively thin silt layer underlain by cherty limestone residuum. It is mainly in the Dickson-Baxter-Greendale soil association. It differs from Dickson silt loam, undulating phase, chiefly in occupying stronger slopes and in being moderately eroded. A considerable part of the original surface layer has been lost through erosion. Tillage has mixed the remnants of this layer with the upper part of the subsoil. Erosion losses have been uneven, however, and in many places the plow layer is entirely within the original surface layer.

The present surface layer is a yellowish-brown to brownish-gray silt loam. The subsoil, a yellowish-brown or brownish-yellow friable silt loam to silty clay loam, is underlain by a compact siltpan.

Included with this soil are a few areas that contain large amounts of fine, highly weathered fragments of chert. These few severely eroded spots are conspicuous because the subsoil is exposed.

Use suitability (7).—All of Dickson silt loam, eroded rolling phase, has been cleared and used for pasture or crops. Cotton, corn, lespedeza, soybeans, and sorghum are the principal crops. Alfalfa does not thrive; so farmers grow a high proportion of annual legumes.

Because of low fertility and fair moisture-supplying capacity, this soil is only fairly well suited to pasture and crops that require tillage. Yields of crops are low unless amendments are applied. The soil is easy to work but moderately difficult to conserve. Low natural fertility and susceptibility to erosion to some extent limit the selection and rotation of crops.

Dickson silty clay loam, severely eroded rolling phase (5 to 12 percent slopes) (D4).—This moderately well drained soil of the uplands has formed from loess underlain by products that weathered from cherty limestone. It occurs chiefly in the Dickson-Baxter-Greendale soil association. Besides having stronger slopes, it differs from Dickson silt loam, undulating phase, in being severely eroded. The surface layer is a mixture of the remnants of the original surface layer and the upper part of the subsoil. In many places the plow layer is entirely within the original subsoil layer. Shallow gullies are common.

The present surface layer ranges from a silt loam to a silty clay loam in texture and from brownish yellow to yellowish brown in color. The subsoil, a yellowish-brown to brownish-yellow friable silty clay loam, is underlain by a compact siltpan.

The soil is very strongly acid and very low in organic matter and plant nutrients. The upper part of the soil is permeable to air, water, and plant roots, but the siltpan is very slightly permeable. Runoff is rapid, and internal drainage is moderately slow. The water-supplying capacity is low or very low.

A few areas included with this soil differ by containing fine chert fragments that interfere with tillage in some places.

Use suitability (12).—All of Dickson silty clay loam, severely eroded rolling phase, has been used for pasture and crops. A considerable acreage is now idle or abandoned.

This soil is unsuitable for crops that require tillage because it is infertile, droughty, and hard to conserve. It is best suited to permanent pasture, although even under the best management, only fair pastures can be expected. After the soil has been used for several years as a well-managed pasture, it possibly can be used at intervals for intertilled crops. Natural reforestation is slow on this soil.

Dunning silty clay loam (0 to 3 percent slopes) (D5).—This is a poorly drained soil of the stream bottoms. It consists of recent alluvium washed chiefly from uplands that are underlain by clayey limestone. It occurs in large and small, widely separated areas on the Highland Rim and Central Basin sections of the county. The largest part is along the smaller streams that flow from coves at the base of the Cumberland Escarpment. The soil is closely associated with the Swaim, Egam, Taft, and Capshaw soils (fig. 6). It has formed under

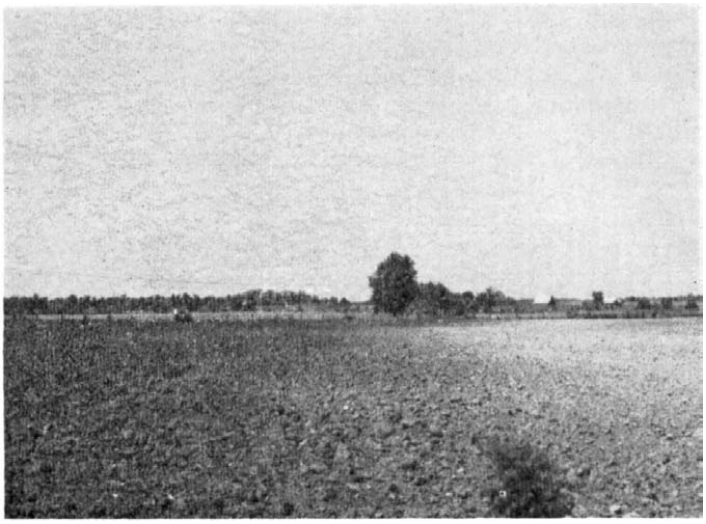

***Figure 6.*—Difference in cloddiness reveals boundary between Dunning silty clay loam (left) and Capshaw silt loam (right).**

a forest that consists mainly of water-tolerant trees.

Profile description:

0 to 8 inches, dark-gray to very dark-gray plastic silty clay loam, very high in organic matter.
8 to 20 inches, dark-gray very plastic silty clay, mottled with yellowish brown; contains many soft, brown concretions.
20 inches +, mottled light-gray and brownish-yellow very plastic silty clay; bedrock at depths of 4 to 8 feet.

The soil is neutral to slightly acid, very high in organic matter, and moderately well supplied with plant nutrients. Runoff and internal drainage are very slow. The fluctuating high water table restricts growth of plant roots and circulation of air. In many places seepage spots remain waterlogged most of the year.

Use suitability (16).—Most of this soil is in permanent pasture. Small acreages are in forest and in cultivation.

The soil is very poorly suited to crops. In its present undrained condition, pasture is the best use. The pasture is poor and usually contains many weeds, cattails, and rough swampgrasses. Grazing has made the wet soil surface very rough in many places. The use suitability could be broadened by artificial drainage, but the soil would still be limited mainly to summer annual crops such as corn, sorghum, and soybeans.

Dunning silty clay loam, better drained phase (0 to 3 percent slopes) (D6).—This imperfectly drained soil occurs on stream bottoms and nearly level areas at the base of stony and rocky limestone slopes. It occupies small and widely separated tracts, mainly in or near coves at the base of the Cumberland Escarpment. The soil is associated mainly with the Swaim, Lindside, and Egam soils and with limestone rockland. It has formed from alluvium or alluvial-colluvial materials that washed chiefly from uplands underlain by clayey limestone. This soil differs from Dunning silty clay loam in being somewhat better drained.

Profile description:

0 to 10 inches, dark-gray to very dark-gray plastic silty clay loam, high in organic matter.
10 to 32 inches, dark-gray very plastic silty clay, mottled with yellowish brown; contains many soft, brown concretions or buckshot; moderately high organic-matter content.
32 inches +, mottled light-gray and brownish-yellow very plastic silty clay; limestone bedrock occurs at depths of 4 to 8 feet.

The surface layer varies considerably in thickness. On alluvial positions the slopes are generally more than 2 percent and the surface drainage is better than in positions along streams.

The soil is neutral to slightly acid, high in organic-matter content, and moderately well supplied with plant nutrients. Runoff is slow to very slow, and internal drainage is slow. The water-holding capacity is high. The internal movement of moisture is slow, however, and the moisture-supplying capacity is therefore only moderate.

Some areas are included that have slopes as steep as 5 percent. These areas are subject to slight erosion.

Use suitability (2).—Most of Dunning silty clay loam, better drained phase, is used for crops, but some is in permanent pasture. Corn, soybeans, sorghum, and buckwheat are the crops commonly grown. Good yields are generally obtained without fertilization.

Corn, hay and forage, and other summer annuals are well suited to this soil. Good pastures can be obtained by seeding proper mixtures of legumes and grasses. However, poor tilth (fig. 7), imperfect drainage, and susceptibility to flooding on many areas limit the use suitability of this soil. Because of heavy texture, the soil can be worked only within a narrow range of moisture content. Large, very hard clods form if the soil is worked when too wet, and they interfere with further tillage and with seeding. When the soil becomes very dry, it hardens and forms large cracks. Poor areation and a fluctuating water table make the soil unsuitable for most deep-rooted legumes. Artificial drainage can broaden the use suitability but would not greatly reduce the susceptibility to flooding.

Egam silty clay loam (0 to 3 percent slopes) (Ea).—This is a dark-colored moderately well-drained soil of

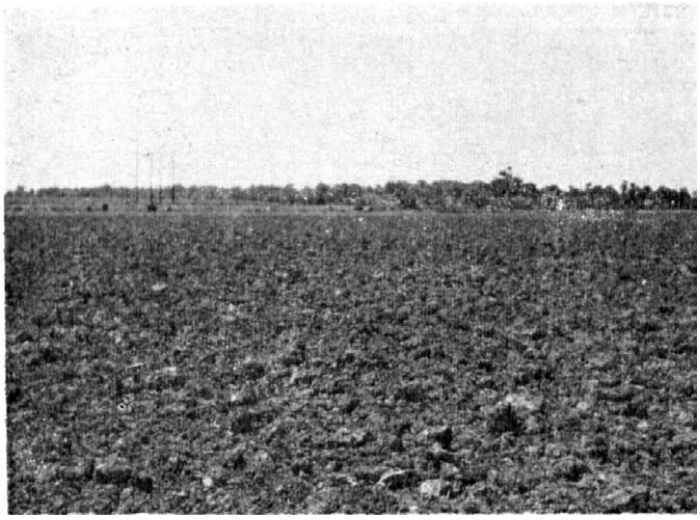

Figure 7.—**Large clods on a plowed field of Dunning silty clay loam. The clods are difficult to break and interfere with tillage and seedbed preparation.**

the first bottoms. It has developed on nearly level flood plains under a deciduous forest consisting chiefly of oak, hickory, elm, beech, and sycamore. The largest acreage of the soil occurs in coves at the base of the Cumberland Escarpment. Some of it is in the large sinks or coves on the Cumberland Plateau. The Huntington, Lindside, Melvin, and Dunning are closely associated soils. The parent material consists of mixed alluvium that has washed chiefly from uplands underlain by clayey limestone. In many places the soil occurs at distances from stream channels, where it was deposited in slack waters. The coarser textured areas occur along the streams. This soil differs from the Huntington soils in being darker, finer textured, and much less productive.

Profile description:

0 to 6 inches, dark grayish-brown moderately friable silty clay loam.
6 to 20 inches, dark-brown or brown moderately friable silty clay loam; plastic when wet.
20 inches +, yellowish-brown firm silty clay loam to silty clay; plastic when wet; moderate coarse granular structure; bedrock, in most places, is at depths ranging from 4 to 12 feet.

This soil varies considerably. The variations depend mainly on drainage and the length of time the materials have been in place. In some areas the soil may be dark grayish brown to depths of about 20 inches; in others it may be brown throughout the profile.

This soil is medium to slightly acid. The organic-matter content is moderate and the plant-nutrient content is high. Runoff is slow and internal drainage is medium. The amount of moisture available for crops is low. Plant roots penetrate the soil moderately well.

Included with this soil are areas that differ chiefly in occupying low-terrace or high-bottom positions and in having more distinct surface soil and subsoil horizons. Some areas are included that have slopes up to 5 percent.

Use suitability (2).—Nearly all of this soil has been cleared and used for crops. A small part is now idle or in unimproved pasture. The main crops are corn, lespedeza, soybeans, and buckwheat.

This soil is moderately well suited to the crops commonly grown. It is well suited to grain sorghum, lespedeza, soybeans, cowpeas, annual hay, and pasture. It is somewhat limited in use suitability by medium internal drainage and danger of winter flooding. It is therefore not well suited to wheat, barley, or alfalfa. Corn is damaged by lack of moisture during dry summer months. The soil is easily conserved because of favorable slopes but is moderately difficult to work. It can be tilled within only a very narrow range of moisture content. If plowed when too wet, the soil will puddle and become hard and cloddy on drying.

Emory silt loam (2 to 5 percent slopes) (Ec).—This is a well-drained soil of the colluvial lands. It is widely distributed in the Highland Rim section of the county, but it occurs mostly in the Decatur-Dewey-Cumberland, the Mountview-Baxter, and the Cumberland-Waynesboro-Sequatchie soil associations. It occupies relatively narrow, elongated, and gently sloping areas at the base of slopes or is in depressions. It was derived from recently deposited colluvium or local alluvium. This material was washed from soils whose parent material was chiefly from high-grade limestone. These soils, the Decatur, Dewey, and Cumberland, occupy slopes above this soil. Because its parent materials were rather recently deposited, Emory silt loam has not yet formed distinct surface-soil and subsoil layers.

Profile description:

0 to 20 inches, dark-brown to brown friable silt loam.
20 to 40 inches, dark reddish-brown to yellowish-brown moderately friable silt loam to silty clay loam, with a few yellow splotches, usually in the lower part.
40 to 60 inches, yellowish-brown or yellowish-red slightly plastic silty clay loam to silty clay; accumulation at least 18 inches and usually more than 3 feet thick.

The soil varies somewhat from place to place, depending largely on the source of parent materials. The color in most places is similar to that of the soil from which the parent material was washed.

This soil is medium to slightly acid, well supplied with organic matter, and high in content of plant nutrients. It is permeable to plant roots, air, and moisture. Water is readily absorbed and the moisture-supplying capacity is very high. Runoff and internal drainage are both medium.

Use suitability (3).—All of Emory silt loam has been cleared. Most of it is used for crops, and a very small acreage is in permanent pasture.

The soil is very well suited to pasture or to crops that require tillage, and it can be used rather intensively for row crops. It is relatively free of stones and is easy to work and very easy to conserve. Areas in sinks are subject to flooding or intermittent ponding and are poorly suited to wheat or alfalfa.

Emory cherty silt loam (2 to 7 percent slopes) (Eb).—This is a brown, cherty, well-drained soil of the colluvial lands. It occurs at the base of slopes that are occupied by Dewey cherty silt loam, Baxter cherty silt loam, and Dellrose cherty silt loam. Much of it is in long narrow areas along intermittent streams. It has formed from recent colluvium or local alluvium that

washed from soils whose parent materials were derived from moderately cherty limestone. The areas of this soil are small and widely separated and are in the Highland Rim and Central Basin sections of the county. A somewhat greater part is in the Central Basin in the Waynesboro-Holston-Whitwell soil association.

Emory cherty silt loam differs from Emory silt loam chiefly in having moderate amounts of angular chert on the surface and throughout the profile. The chert is mostly 1 to 2 inches in diameter, but there are a few larger fragments.

Use suitability (3).—Most of this soil has been cleared and used for pasture or crops. Since it occurs mainly in areas surrounded by hilly or steep uplands, it has a greater acreage in pasture than the less isolated Emory silt loam. The soil is well suited to a wide variety of crops and pasture and can be maintained by use of short crop rotations. Use suitability and management are the same as for Emory silt loam. The soil is moderately easy to work and very easy to conserve. The chert in the soil interferes with tillage but does not prevent the use of farm implements.

Ennis cherty silt loam (0 to 3 percent slopes) (Ed).—This is a well-drained brown soil on the first bottom lands and nearly level flood plains. It occurs mainly in narrow elongated areas along minor streams and is closely associated with the Lobelville, Huntington, and Lindside soils. Most of the acreage is in the Bodine-Baxter-Ennis and the Dickson-Baxter-Greendale soil associations.

This soil has formed from alluvium that washed almost entirely from uplands underlain by cherty limestone. The Dickson, Baxter, Bodine, and Dellrose soils of the uplands were the main source of the alluvium. In some places, however, the alluvium may be of local origin.

Profile description:

0 to 8 inches, grayish-brown to brown friable cherty silt loam.
8 to 24 inches, yellowish-brown to brown friable cherty silt loam.
24 inches +, dark yellowish-brown, gritty, very cherty silt loam; contains stratified gravel beds in places; 3 to 6 feet thick.

This soil is medium to strongly acid and medium in content of organic matter and plant nutrients. It is very permeable to air, roots, and water. Runoff is slow; internal drainage is rapid. The moisture-supplying capacity is variable but in most places is fair to good.

Use suitability (1).—Most of this soil has been cleared and used for pasture or crops. Corn is the principal crop, but a large acreage is used for hay and forage.

This soil is well suited to corn, lespedeza, and many summer annual crops grown for forage. Small grains, alfalfa, and red clover are hard to grow because most of the soil is periodically flooded in winter and spring. Nevertheless, many farmers grow these crops successfully where the soil is not flooded too long. The soil is moderately easy to work and very easy to conserve. Workability is somewhat impaired by numerous chert fragments. Fertilizers are required for satisfactory crop yields.

Greendale silt loam (2 to 7 percent slopes) (Gb).—This well drained to moderately well drained soil of the colluvial lands occurs in small irregular tracts widely distributed in the Dickson-Baxter-Greendale and the Bodine-Baxter-Ennis soil associations. It has formed from local alluvial or colluvial materials that washed mainly from the Dickson, Lawrence, and Bodine soils. It occurs at the base of the slopes from which the soil material was washed. The Baxter, Mountview, and Dellrose soils may have contributed also to the parent material. Distinct surface soil and subsoil layers have not yet developed because the parent materials were rather recently deposited.

Profile description:

0 to 8 inches, light grayish-brown to brown friable silt loam.
8 to 18 inches, yellowish-brown to strong-brown friable silt loam or light silty clay loam.
18 to 30 inches, brownish-yellow or light yellowish-brown friable silt loam or silty clay loam.
30 inches +, brownish-yellow slightly plastic silty clay loam, splotched with gray; contains chert fragments in considerable quantity.

This soil varies somewhat from place to place. The variations are the result of differences in texture, drainage, character of parent materials, and depth of accumulation. A few areas have gray mottlings at depths of 12 to 16 inches.

The soil is medium to strongly acid and contains a moderate amount of organic matter. Runoff and internal drainage are medium. The moisture-supplying capacity is high. The soil permits free movement of moisture and air and is very permeable to plant roots.

As mapped, this separation includes soils in narrow bottomlike areas along intermittent drainageways. Also included are soils on small alluvial-colluvial fans that form where small streams deposited materials on the flood plains of larger streams.

Use suitability (3).—Nearly all of Greendale silt loam has been cleared and used for crops. The soil is adapted to many crops, and yields of most of them are relatively high. It is well suited to vegetables but is not generally used for them. It is very well suited to pastures, but only small isolated areas are in pasture. Alfalfa is not so well suited to this soil as to the Cumberland, Decatur, and Dewey soils. The soil is moderately fertile and easily worked and conserved. It is suitable for intensive use if management is good. Phosphorus, nitrogen, and lime are deficient, and the response to these elements is good. Runoff and erosion are problems of minor importance.

Greendale cherty silt loam (2 to 7 percent slopes) (Ga).—This is a well drained to moderately well drained cherty soil of the colluvial lands. It occurs in narrow sloping areas at the foot of steep slopes, on narrow bottoms along deeply entrenched stream beds, and on gently sloping alluvial-colluvial fans formed where small streams emerge on the flood plains of larger streams. It was derived from local alluvium or colluvium that washed from uplands underlain by cherty limestone.

This soil is closely associated with Bodine, Baxter, Dellrose, and Dickson soils. It is widely distributed in small areas throughout the Dickson-Baxter-Greendale and the Bodine-Baxter-Ennis associations. It has de-

veloped under a deciduous forest that consisted chiefly of white and red oaks and hickory.

Profile description:

0 to 10 inches, light grayish-brown to brown friable cherty silt loam.
10 to 20 inches, brownish-yellow or light yellowish-brown friable cherty silt loam to light cherty silty clay loam.
20 inches +, brownish-yellow friable cherty silty clay loam, splotched with gray; chert fragments range from 1 to 3 inches in diameter.

The soil is medium to strongly acid throughout the profile. It is moderately low in organic matter, but it has more than the adjacent upland soils. It is very porous and freely permeable to air, roots, and water. The moisture-holding capacity is fair to good. Runoff is medium, and internal drainage is medium to rapid.

A few areas are included that have a cherty loam texture and a low moisture-supplying capacity but are otherwise similar to this soil.

Use suitability (3).—Practically all of Greendale cherty silt loam has been cleared. An estimated 80 percent is now used for crops, and the rest is in unimproved pasture or idle. Because it occurs in small irregular tracts, the soil is generally used in the same way as associated soils.

This soil is well suited to early vegetables but not generally used for that purpose. It is also well suited to pasture but needs lime and phosphorus for good yields. The moisture-supplying capacity is lower than that of Greendale silt loam, and coarse-textured areas may be somewhat droughty for corn.

The soil is moderately fertile, but is deficient in lime and somewhat deficient in nitrogen, phosphorus, and potassium. It is not particularly susceptible to erosion but will erode under poor management. Chert in the surface layer interferes with tillage and almost prevents it in a small included acreage. However, the soil in most areas is not hard to work, as slopes and texture are both favorable. Yields can be greatly improved if crop rotations and soil amendments are properly used.

Gullied land, limestone material (5 to 60 percent slopes) (Gc).—This land type is characterized by a close network of deep gullies. It occurs in small, widely separated areas that are mostly underlain by clayey limestone. Erosion has removed most of the original surface soil and subsoil. The exposed soil material now consists chiefly of red or yellowish-red silty clay, although remnants of the original soil remain between gullies. In many places, the limestone bedrock is exposed.

Use suitability (18).—Practically all this land type has been abandoned, but some areas are in pasture. Many areas have a sparse growth of cedar and other scrub trees. A few areas have been reforested. The land type is unsuited to crops or pasture and most areas should be reforested. Site preparation in advance of planting is needed to establish tree seedlings. Eroded areas could be healed more quickly by planting kudzu vines.

Guthrie silt loam (0 to 3 percent slopes) (Gd).—This is a poorly drained soil of the uplands. It occupies nearly level or depressed areas widely scattered over the Highland Rim section of the county. Most of it is in the Dickson-Baxter-Greendale soil association. The soil has formed chiefly from a relatively chert-free mantle that overlies cherty limestone residuum. The forest cover had a high proportion of water-tolerant trees.

Profile description:

0 to 6 inches, light-gray or gray friable silt loam or silt; low in organic matter; has an ashy feel; surface 1 inch, in undisturbed areas, is gray to grayish-brown silt loam high in partially decayed organic matter.
6 to 20 inches, mottled light-gray, yellow, and yellowish-red firm silty clay loam.
20 inches +, gray, mottled with yellow and yellowish red, compact silty clay; contains chert fragments; cherty limestone residuum at a depth of about 6 feet in most places.

The soil is strongly to very strongly acid and low in content of organic matter and plant nutrients. Runoff is usually ponded or very slow, and internal drainage is very slow. The soil is waterlogged for extended periods, particularly in winter and spring. The compact silty clay layer is almost impervious to plant roots and water. The soil is not subject to erosion.

Some areas are included that have parent materials consisting of local wash from the associated Dickson, Baxter, and other soils. In these areas the compact plow layer may be only weakly developed or entirely absent. Such areas are more easily drained and are more fertile and productive after draining than the soil described. Other included areas have a thin brown layer deposited from higher areas.

Use suitability (16).—This soil is used mainly for forest. A large acreage is in pasture, but only a very small acreage is in crops; yields of both are very low.

Under natural drainage the soil is unsuited to crops and only fairly well suited to pastures. During wet seasons, water stands on the surface much of the time, and during prolonged dry seasons the soil becomes rather hard. Artificial drainage would improve this soil for pasture in some areas. However, the soil occurs mostly in depressed areas where the construction of suitable drainage outlets is not practical. Improvement by artificial drainage is restricted by the compact, impervious subsoil. The soil is deficient in lime, nitrogen, phosphorus, and potassium.

Application of amendments may be expected to stimulate plant growth to some extent.

Hartsells fine sandy loam, rolling and undulating phases (2 to 12 percent slopes) (Ha).—This undifferentiated mapping unit consists of strongly acid sandy soils of the uplands. It occurs in large areas in the Cumberland Plateau and is closely associated with the Muskingum and Cotaco soils. Nearly all of it is in the Hartsells-Muskingum-Cotaco soil association. The soils of this unit have formed under a predominantly deciduous forest from the weathered products of nearly level bedded acid sandstone. The soils differ chiefly in slopes. Generally, however, the undulating soil is deeper to bedrock and has thicker, more distinct horizons. Any area mapped in this undifferentiated separation may consist entirely of the undulating or of the rolling soil, or it may include both.

These soils are strongly acid and low in content of plant nutrients and organic matter. Runoff is me-

dium, and internal drainage is medium. The moisture-supplying capacity is fair. The soils are permeable to air, moisture, and plant roots.

Included with this separation are some small areas with reddish-colored subsoils. The surface soil in these areas is a grayish-brown fine sandy loam, and the subsoil is generally a yellowish-red friable clay loam. However, the intensity of the red coloration in the subsoil varies considerably.

Use suitability (7).—All of this separation is in cut-over forest. Timber stands are usually poor because of poor forest management. If cleared, these soils would be moderately well suited to most field crops and very well suited to potatoes and most vegetables. Cleared areas are subject to erosion, especially the more sloping parts, but requirements for conservation of soil material are only moderately exacting. The soils can be worked within a wide range of moisture content, and good tilth can be maintained. Most crops would require fertilizer for satisfactory yields. Lime and fertilizer are necessary for most legumes, especially red clover and alfalfa, and for establishing pastures of good quality. The feeding zone for deep-rooted legumes is somewhat restricted by the shallowness of the soils.

Hartsells fine sandy loam, eroded rolling and undulating phases (5 to 12 percent slopes) (Hb).—This mapping unit consists of well-drained, strongly acid sandy soils of the uplands. It occurs in large and small, widely separated areas on the Cumberland Plateau. It is in the Hartsells-Muskingum-Cotaco soil association. It has formed from products that weathered from acid sandstone.

This separation differs from Hartsells fine sandy loam, rolling and undulating phases, in being moderately eroded. In most areas the plow layer consists of remnants of the original surface layer mixed with subsoil. In many places, however, tillage is in the original surface layer. In some small areas all the original surface layer has been removed by accelerated erosion and the subsoil is exposed. Numerous shallow gullies and a few deep gullies have formed.

The present surface layer is a grayish-yellow to yellowish-brown fine sandy loam. The subsoil is a brownish-yellow to yellowish-brown friable clay loam.

These soils are strongly acid, low in plant nutrients and organic matter, and very permeable to moisture, air, and plant roots. Runoff is medium, and internal drainage is medium. The moisture-supplying capacity is fair.

The principal variation in this mapping unit is in depth to bedrock, which ranges from 2 to 6 feet. Some small widely scattered areas with reddish subsoils are included.

Use suitability (7).—All of Hartsells fine sandy loam, eroded rolling and undulating phases, has been cleared. Most of the acreage is used for crops. About 30 percent is in permanent pasture, and 15 percent is idle. Corn is the principal crop, but some small grains and hay are grown. Yields of corn are low. Farms on this soil produce for home use.

These soils are especially well suited to potatoes and many kinds of vegetables, and they are moderately well suited to many other field crops. They are fairly well suited to pasture. Fertilizers are necessary for satisfactory yields of nearly all crops. In addition, lime is essential for most legumes, such as red clover. The soils respond well to proper fertilization. Erosion and runoff can be controlled by using rotations of moderate length along with contour tillage.

Hermitage silt loam, eroded undulating phase (2 to 5 percent slopes) (Hc).—This is a well-drained soil of the colluvial lands. It was derived from materials that washed or rolled from soils underlain by limestone. It occurs in small, widely separated areas at the base of steeper slopes that are occupied by the Dewey, Decatur, or Baxter soils. The parent material rolled or was washed from these slopes. This soil is closely associated with the Dewey, Decatur, Swaim, Baxter, and Pace soils and is mainly in the Decatur-Dewey-Cumberland soil association. It was formed under a deciduous forest.

Profile description:

0 to 9 inches, brown to reddish-brown friable silt loam.
9 to 24 inches, yellowish-red to reddish-brown friable heavy silt loam; contains a few small black concretions.
24 to 32 inches, yellowish-red firm silty clay loam; moderate medium blocky structure.
32 inches +, mottled yellowish-red and light-gray friable heavy silt loam or silty clay loam; occasional chert fragments; very firm silty clay material that weathered from underlying limestone may be at depths below 3 feet; bedrock at depths ranging from 4 to 15 feet in most places.

The soil is moderately eroded, and the thickness of the surface layer varies greatly within short distances. In timbered or slightly disturbed areas the surface layer is from 12 to 14 inches thick. Most areas, however, have lost from 25 to 75 percent of the original surface soil through erosion and have a few shallow gullies. On very small areas all the surface soil is gone and the subsoil is exposed. Other variations consist chiefly of slight differences in color, texture, and consistence. Depth of the accumulated materials varies considerably. It decreases with distance from the upland slope.

The soil is medium to strongly acid, moderately high in content of organic matter and plant nutrients, and permeable to moisture, air, and plant roots. Rainfall is readily absorbed and well retained; the moisture-supplying capacity is high. The soil is easily worked and can be tilled throughout a fairly wide range of moisture content.

Use suitability (4).—Most of this soil has been cleared and is now used for pastures and crops. A small acreage is in timber. Corn, wheat, alfalfa, and lespedeza are the principal crops.

This soil is very well suited to pasture and to crops that require tillage. Red clover and alfalfa are very well suited if properly fertilized. Nearly all crops need fertilizer for continuous high yields. The soil can be maintained by using short rotations if other management is good. It is generally free of chert, but in places enough chert occurs to interfere materially with tillage.

Hermitage silt loam, eroded rolling phase (5 to 12 percent slopes) (Hd).—This is a well-drained soil of the colluvial lands. It has formed from materials that

washed or rolled from soils underlain by limestone. It differs from Hermitage silt loam, eroded undulating phase, chiefly in slope. The soil is medium to strongly acid and contains a moderate supply of plant nutrients and organic matter. It is permeable to moisture, air, and plant roots. Runoff is somewhat greater than on the undulating phase, because the slopes are stronger. Rainfall is readily absorbed, however, and the moisture-supplying capacity is moderately high.

Color, texture, and consistence of the soil vary within narrow limits. Depth of the accumulated materials varies most but usually is adequate for plant root development. A few small areas have slopes up to about 16 percent.

Use suitability (5).—Most of this soil is cleared and used for pasture or crops. A small acreage is in timber; very little, if any, is idle.

This soil is well suited to a wide variety of crops, including alfalfa, and to pasture. Fertilizers are needed for continuous high yields of nearly all crops. Lime and phosphorus are essential in establishing alfalfa. Most crops grown on this soil respond very well to fertilization and other good management. Controlling runoff and maintaining fertility are important management practices. Row crops can be safely grown in rotations of moderate length. The rotations can be shorter where contour tillage, stripcropping, and terracing are practiced.

Holston loam, undulating phase (2 to 5 percent slopes) (Hf).—This well-drained soil is on old, high stream terraces along many of the larger streams in the county. It is mostly in the Whitwell-Holston-Cumberland and Waynesboro-Holston-Whitwell soil association areas. It is closely associated with Nolichucky, Whitwell, and Tyler soils of the terrace lands, and with Huntington, Lindside, and Melvin soils of the bottom lands. The soil was developed under a deciduous forest from a mixture of materials derived chiefly from sandstone and shale.

Profile description:

0 to 10 inches, pale-brown to light yellowish-brown or brownish-yellow very friable loam; top 1 or 2 inches in wooded areas stained dark gray with organic matter.
10 to 32 inches, brownish-yellow to yellowish-brown friable heavy loam or clay loam; weak medium blocky structure; occasional rounded quartz pebbles.
32 inches +, yellow moderately friable but slightly compact sandy clay to clay loam, highly mottled with gray, yellow, and brown; alluvial deposit from 5 to 15 feet or more in thickness; many rounded quartz pebbles.

Thin beds of gravel or cobblestones occur in the profile in places. They are at various depths but are usually near the base of the deposit.

This soil is strongly to very strongly acid and moderately low in organic matter and most plant nutrients. It is permeable to plant roots, air, and moisture. Water is readily absorbed by the surface soil and subsoil layers, but its absorption and movement are retarded in the slightly compact substratum. Runoff is medium, and internal drainage is medium to slow. The moisture-supplying capacity is fair. Most of this soil is uneroded.

Some of the associated terrace soils are included with this mapping unit because the soil boundaries are indistinct in most places.

Use suitability (6).—All of Holston loam, undulating phase, is now in forest. It is, however, well suited to crops.

If cleared and used for crops, the soil would respond well to good management. The response, however, would not be as lasting as on such soils as the Cumberland. Good tilth could be easily maintained, and the cleared soil would be only moderately erosive.

Apparently small grains, such as wheat, are suited to this soil, and corn could be grown with fair success. Yields, however, would probably be low. Hay crops could be successfully grown, but alfalfa is not well suited. Truck crops, including potatoes, would grow well, and tobacco could be produced. The soil is well suited to cotton.

Most crops would need a complete fertilizer. If crops are properly fertilized, production can be maintained on this soil under a fairly short rotation. Pastures are well suited but should be limed and fertilized to obtain desirable results.

Holston loam, eroded undulating phase (2 to 5 percent slopes) (Hg).—This well-drained soil is on old high stream terraces that occur along many of the large streams, but mainly along the Elk River. It is closely associated with Nolichucky, Whitwell, and Tyler soils of the terrace lands, and with Huntington, Lindside, and Melvin soils of the bottom lands. Most of it is in the Whitwell-Holston-Cumberland and the Waynesboro-Holston-Whitwell soil associations. This soil was derived from a mixture of materials, chiefly sandstone and shale.

The soil differs from Holston loam, undulating phase, in having lost a part of its original surface layer through erosion. On a considerable acreage the plow layer still consists entirely of surface soil, but over most of the area remnants of the original surface layer and the subsoil have been mixed by tillage. In some spots the subsoil is exposed. Occasional shallow gullies have formed, but most of them can be obliterated by normal tillage.

The present surface layer is pale-brown to brownish-yellow loam. The subsoil is brownish-yellow to yellowish-brown heavy loam or clay loam.

Use suitability (6).—All of this soil has been cleared and used for pasture and crops. Most of it is now used for intertilled crops. Small parts are in permanent pasture or are idle. Corn, wheat, cotton, crimson clover, potatoes, rye and vetch mixed, and oats are the main crops. About 40 percent of the cultivated area is used for corn.

This soil is well suited to most crops and fairly well suited to intensive use. It is well suited to small grains, cotton, and potatoes. It is somewhat droughty for corn and not well suited to alfalfa. Melons are grown on a large acreage and are apparently fairly well suited. Pasture is moderately well suited to this soil, although grazing is poor during hot, dry summer months. Fertilizers are necessary for good yields of nearly all crops and essential for alfalfa and red clover. The response to fertilization is good but not so durable as that of the Cumberland soils.

Holston loam, eroded rolling phase (5 to 12 percent slopes) (Hh).—This is a well-drained soil on old stream terraces. It is closely associated with the Nolichucky, Whitwell, Waynesboro, Tyler, and other Holston soils. Most of the soil is in the Whitwell-Holston-Cumberland and Waynesboro-Holston-Whitwell soil associations. It was derived from materials that washed chiefly from uplands underlain by sandstone and shale.

This soil differs from Holston loam, undulating phase, chiefly in having steeper slopes and moderate erosion. In most places a considerable part of the original surface layer has been lost. The surface soil and subsoil have been mixed in the plow layer but the texture has not been changed significantly except on the more severely eroded areas. The yellowish-colored subsoil is exposed on many small severely eroded spots.

The present surface layer is pale-brown to brownish-yellow loam. The subsoil consists of brownish-yellow or yellowish-brown friable heavy loam or clay loam.

The soil is somewhat gravelly on the surface and throughout the profile. A few local areas are gravel-free. Thin beds of gravel or cobblestones may occur at various depths within the soil, but they are usually near the base of the alluvial deposit.

This soil is strongly to very strongly acid, low in organic matter, and moderately low in plant nutrients. It is permeable to plant roots, air, and moisture. Water is readily absorbed by the surface and subsurface layers, but its absorption and movement is retarded in the slightly compact substratum. Runoff and internal drainage are medium. The moisture-holding capacity is moderately low.

As mapped, this soil includes small areas of the associated Nolichucky and Waynesboro soils. Some uneroded and a few severely eroded areas are also included.

Use suitability (7).—Nearly all of Holston loam, eroded rolling phase, has been cleared and used for crops and pasture. An estimated 20 percent is idle. The soil is well suited to crops, but systematic rotations are not followed. Cotton is usually fertilized, but other crops are not.

This soil is apparently well suited to small grains. The yields of corn are generally low. Hay crops can be successfully grown. Alfalfa, however, is not well suited. Truck crops, such as potatoes, grow well, and good cotton can be produced. All crops need fertilization to produce high yields.

This soil is responsive to good management, although fertility is somewhat difficult to maintain. Erosion control is not a serious problem, and good tilth is easily maintained. However, the soil is susceptible to erosion in most places, and rotations of at least moderate length are needed. The rotations can be shorter where contour tillage, stripcropping, or terracing, or some combination of these practices, are used.

Holston clay loam, severely eroded rolling phase (5 to 12 percent slopes) (He).—This is a well-drained soil on high stream terraces. The old alluvium from which it has formed washed largely from uplands that are underlain by sandstone and shale. This soil differs from Holston loam, undulating phase, chiefly in erosion and stronger slopes. It is also more variable in color, texture, depth, and content of gravel. Nearly all of the original surface layer has been lost through erosion. Shallow gullies are abundant, and an occasional deep gully has formed that is not crossable by heavy farm machinery.

Use suitability (12).—Much of this soil is used for pasture, a large acreage is idle, and the rest is used for crops. It has been severely damaged by erosion and is poorly suited either to crops or pastures. It is not well suited to intertilled crops because it is susceptible to further erosion and low in fertility and moisture-supplying capacity. The best use of the land is for pasture. Although it is not too well adapted to forage plants, fair pastures can be obtained by applying fertilizers and controlling runoff. If the soil is cultivated, long rotations that consist mainly of close-growing crops are needed. Contour tillage, contour stripcropping, or terracing, or some combination of these practices, are needed to rebuild the soil and permit more intensive use.

Humphreys cherty silt loam (1 to 5 percent slopes) (Hk).—This well-drained soil is on low terraces, chiefly in the Bodine-Baxter-Ennis soil association. It occupies small to medium-sized tracts and is mainly associated with the Ennis, Greendale, Baxter, and Bodine soils. It has formed from alluvium that washed from uplands underlain by cherty limestone. The original forest consisted mainly of red and white oaks, hickory, yellow-poplar, beech, and maple.

Profile description:

0 to 10 inches, pale-brown to brown very friable cherty silt loam; weak medium crumb structure.
10 to 30 inches, brown to yellowish-brown friable heavy cherty silt loam or silty clay loam; weak to moderate medium blocky structure.
30 inches +, brown, yellowish-brown, or brownish-yellow cherty or very cherty silt loam to cherty silty clay loam; may be mottled with gray and strong brown; mottles more prominent as depth increases.

Chert fragments from ½ inch to 3 inches in diameter make up 25 to 50 percent of the soil volume. In some places an appreciable amount of the surface layer has been lost through erosion. Some areas included with this soil have a cherty loam texture.

The soil is medium to strongly acid throughout and medium in content of organic matter and plant nutrients. It is very permeable to air, roots, and moisture. Runoff is slow, and internal drainage is medium to rapid. The moisture-supplying capacity is fair.

Use suitability (3).—An estimated 90 percent of this soil has been cleared and is used for crops and pasture.

This soil is suited to nearly all crops grown in the county. The soil is only moderately fertile, and crop yields are generally rather low. Amendments increase the yields of all crops, but are essential for alfalfa and red clover. The soil is slightly susceptible to erosion but is easy to conserve. It can be worked within a wide range of moisture content. The plow layer, however, contains enough chert to interfere with cultivation.

Huntington silt loam (0 to 3 percent slopes) (Hn).—This well-drained highly productive soil is on first bottoms. It occupies long narrow strips along streams

on the Highland Rim, in mountain coves, and in the Central Basin. It is closely associated with the Egam, Dunning, Lindside, Melvin, and Sequatchie soils and is mainly in the Jefferson-Sequatchie-Huntington soil association. It formed from mixed recent alluvium that has washed chiefly from uplands underlain by limestone. The original forest was deciduous trees. The soil is young, and the difference between the surface soil and subsoil is slight.

Profile description:

0 to 12 inches, dark-brown or light-brown friable silt loam or heavy silt loam.
12 to 30 inches, dark yellowish-brown to dark-brown friable heavy silt loam or silty clay loam.
30 inches +, light-brown to dark-brown friable silt loam, splotched with gray; contains an appreciable amount of sand.

Huntington silt loam is slightly acid to neutral throughout the profile. It is high in organic matter and plant nutrients; moisture-supplying capacity is high; and permeability to air, roots, and water is moderate. Runoff is slow, but internal drainage is medium.

Use suitability (1).—Nearly all of this soil has been cleared and used for crops. An estimated 70 to 80 percent of the cleared land is used for corn; most of the rest is in annual hay. Very little of the soil is idle. On most areas corn is grown year after year without fertilizers. Fertilizers are rarely if ever used on any crops, because the fertile and durable soil produces reasonably large yields year after year. In addition, its high normal fertility is supplemented almost every year by flood-deposited sediments.

The use suitability of this soil is somewhat restricted by its susceptibility to flooding and high fertility. Many hay and forage crops are grown in rotation with the corn on less productive areas. Since the soil is suited to almost continuous corn production without fertilization, improved management practices should consist of maintaining good tilth and fertility and selecting higher yielding varieties or hybrids. The soil is easily worked and conserved. In many places large yields can be obtained by proper fertilization.

Huntington fine sandy loam (0 to 3 percent slopes) (Hm).—This well-drained sandy soil is on stream bottoms. It occupies nearly level flood plains in almost all parts of the county except the Cumberland Plateau. It is closely associated with the Lindside, Sequatchie, Whitwell, and other Huntington soils. The parent materials consisted of mixed general alluvium that washed chiefly from uplands underlain by sandstone and limestone. This soil differs from Huntington silt loam chiefly in texture of surface soil and in being sandier throughout the profile. It has formed under a deciduous forest.

Profile description:

0 to 10 inches, grayish-brown to dark-brown very friable fine sandy loam.
10 to 24 inches, yellowish-brown to dark-brown friable heavy loam, silt loam, or fine sandy loam.
24 inches +, light-brown to yellowish-brown friable sandy loam to silt loam or silty clay loam, splotched with gray below 36 inches.

The soil is slightly acid in most places, but in some it is medium acid. It is moderately high in content of organic matter and most plant nutrients. Plant roots penetrate the soil very easily, and air and water circulate freely. Water is readily absorbed and fairly well retained. Runoff is slow, but internal drainage is medium to rapid. Most of the soil is subject to overflow. Some gravel and cobblestones occur on the surface and throughout the profile but do not interfere with tillage. The soil is easily worked and can be tilled within a wide range in moisture content.

Some areas are included that have a sandy loam surface layer. They occur mostly on the Highland Rim.

Use suitability (1).—Practically all of Huntington fine sandy loam has been cleared and is used chiefly for corn. Small acreages of hay, small grains, and market vegetables are also grown. Fertilizers are not ordinarily used except on market vegetables.

This soil is well suited to intensive use for crops, but susceptibility to flooding restricts its suitability. Flooding maintains the fertility by depositing sediments high in organic matter and plant nutrients. The soil is well suited to corn and many kinds of hay. Small grains tend to lodge and mature late and are susceptible to disease. Although the productivity of this soil is relatively high, yields can be improved by applying phosphorus and possibly nitrogen and by using short rotations that include legumes.

Jefferson fine sandy loam, eroded rolling phase (5 to 12 percent slopes) (Jb).—This is a sandy well-drained soil on colluvial lands. It is in small, widely separated, irregularly shaped areas at the base of slopes from which it was worked. It occurs on the Cumberland Escarpment and in limestone sinks or coves within the Cumberland Plateau. It is closely associated with the Allen and Colbert soils and with Bouldery colluvium; Rockland, limestone; Stony steep land; and Rockland, sandstone. Most of it is in the Jefferson-Sequatchie-Huntington and Rockland, limestone—Rockland, sandstone—Stony land soil associations. It has formed from local alluvium or colluvium that washed mainly from the Hartsells and Muskingum soils on uplands underlain by sandstone. In most places, this material is spread out a considerable distance over the valley floor.

Profile description:

0 to 10 inches, grayish-brown to brownish-yellow very friable fine sandy loam; has a thin surface layer stained dark with organic matter in wooded areas.
10 to 30 inches, yellowish-brown to brownish-yellow friable sandy clay loam or clay loam; weak medium blocky structure.
30 inches +, yellowish-red to reddish-yellow moderately friable sandy clay; rounded quartz pebbles and sandstone fragments; accumulations range in depth from 4 to 20 feet.

Most areas have lost much of the original surface soil. In places the present surface layer is a mixture of subsoil and remnants of original surface soil and is therefore highly variable in thickness, color, and texture. Some severely eroded areas have lost most of the original surface layer and have numerous shallow gullies.

The soil is strongly acid and low in organic matter

and plant nutrients. Surface runoff and internal drainage are medium. The soil is permeable, plant roots penetrate it easily, and air and moisture circulate normally. The moisture-supplying capacity is fair.

Use suitability (7).—Most of this soil has been cleared and is cultivated. Some is used for permanent pasture, and some is idle. Corn, wheat, and lespedeza are the principal crops.

This soil is moderately well suited to crops and pasture. The yields of most crops are low because of the naturally low fertility and fair moisture-supplying capacity of the soil. Lime, phosphorus, nitrogen, and potassium are needed for most crops, and the response to these elements is good. Workability is very good. The soil is not highly susceptible to erosion, and it can be maintained by using rotations of moderate length if it is properly fertilized and tilled on the contour. The soil can be used more intensively if terracing and stripcropping are used where feasible.

Jefferson clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Jc).—This is a sandy well-drained soil of colluvial lands. It occurs in small, widely separated areas in the Jefferson-Sequatchie-Huntington, and Rockland, limestone—Rockland, sandstone—Stony land soil associations. It differs from Jefferson fine sandy loam, eroded rolling phase, in degree of erosion. In most areas the surface soil has been completely removed by accelerated erosion and tillage is now in the subsoil. In a few places the plow layer consists of remnants of the original surface layer mixed with subsoil. Many shallow gullies and occasional deep gullies that cannot be crossed by farm machinery have formed.

The surface layer is brownish-yellow to yellowish-brown friable fine sandy loam to clay loam. The subsoil is a yellowish-brown to brownish-yellow friable sandy clay loam.

Use suitability (12).—All of this soil has been cleared and used for crops. A large proportion is now in unimproved pasture or is idle or abandoned.

This soil is poorly suited to crops that require tillage because of very low fertility, low moisture-supplying capacity, and susceptibility to further erosion. On most farms its best use is for pasture, but to obtain even fair pastures, moderate to heavy applications of lime are required. If the soil is used for crops, long rotations are needed that consist chiefly of close-growing crops. In addition, contour tillage, contour stripcropping, and terracing will help maintain the soil. Fertilizers are needed for satisfactory growth of both crops and pastures.

Jefferson stony fine sandy loam, eroded rolling phase (5 to 12 percent slopes) (Jf).—This soil consists of alluvial and colluvial materials that occur below and adjacent to areas of hilly and steep Muskingum soils. It is closely associated with Rockland, sandstone, Rockland, limestone, Allen soils, and other Jefferson soils. Most of it is in the Rockland, limestone—Rockland, sandstone—Stony land soil association, which forms the Cumberland Escarpment section of the county.

This soil differs from Jefferson fine sandy loam, eroded rolling phase, chiefly in being stony. Enough stones are in the plow layer to interfere with tillage. A considerable part of the surface soil has been lost through erosion. The plow layer is made up of surface soil over most of the area but is mixed with subsoil in small spots. Small severely eroded areas are common.

The surface layer is a grayish-brown to brownish-yellow stony fine sandy loam, and the subsoil is a yellowish-brown to brownish-yellow friable stony sandy clay loam.

A small acreage of uneroded soil is included.

Use suitability (7).—All areas of Jefferson stony fine sandy loam, eroded rolling phase, have been cleared and used for crops or pasture. A considerable part is now idle, and some of this is reverting to forest. Corn, small grains, and lespedeza are grown in very irregular rotations; fertilizers ordinarily are not used.

The soil is moderately well suited to crops and pasture, but it is not naturally productive of either. Its usefulness is greatly limited by slopes, stones, low moisture-supplying capacity, and low fertility. Fertilizers are needed for good yields of most crops. Heavy applications of lime and fertilizers are required for alfalfa and red clover. The soil is moderately susceptible to erosion and requires runoff control.

Jefferson stony fine sandy loam, hilly phase (12 to 25 percent slopes) (Jd).—This is a stony well-drained soil of the colluvial lands. It occurs in small irregularly shaped areas on foot slopes in the Cumberland Escarpment section and is mainly in the Rockland, limestone—Rockland, sandstone—Stony land soil association. It has formed from materials that have washed or rolled chiefly from Hartsells and Muskingum soils. This soil differs from Jefferson fine sandy loam, eroded rolling phase, chiefly in being stony and uneroded and in having stronger slopes. In addition, it is somewhat more variable, especially in depth to the underlying material.

Profile description:

0 to 8 inches, grayish-brown or brownish-yellow very friable stony fine sandy loam.
8 to 24 inches, yellowish-brown to brownish-yellow friable stony sandy clay loam or clay loam.
24 inches +, light-brown or yellowish-red to reddish-yellow stony sandy clay loam; depth of colluvial deposit ranges from 2 to 5 feet or more.

Rounded and angular stone fragments, 2 to 10 inches in diameter, are numerous on the surface and throughout the soil. A few large stones more than 10 inches in diameter are on the surface.

This soil is strongly acid and low in organic matter and plant nutrients. It absorbs moisture readily but is too porous to retain it well. The soil is permeable to plant roots, air, and moisture.

A few small areas having slopes up to 60 percent are included with this soil as mapped.

Use suitability (15).—Jefferson stony fine sandy loam, hilly phase, is now almost all in forest. It is unsuitable for crops and poorly suited to pasture. Productivity for both crops and pasture is low because of low fertility and low moisture-supplying capacity. Stones and strong slopes make the soil hard to till and add to the difficulty of controlling weeds in pastures. Growing a clean-cultivated crop at long intervals is considered a good practice. Moderate to heavy applications of lime and phosphorus are generally required

to establish and maintain good pastures. On many farms the soil is best used for forest.

Jefferson stony fine sandy loam, eroded hilly phase (12 to 25 percent slopes) (Je).—This soil is similar to the hilly phase of Jefferson stony fine sandy loam in distribution and associations. It differs from Jefferson stony fine sandy loam, hilly phase, chiefly in having lost a large part of the original surface soil through erosion. Some mixing of the remnants of the surface soil with the subsoil has occurred. The subsoil is exposed in a few places.

The present surface soil is slightly heavier in texture and lower in plant nutrients and organic matter than the original surface soil. It ranges from 4 to 10 inches in thickness and is a grayish-brown to brownish-yellow friable stony fine sandy loam. The subsoil is yellowish-brown to brownish-yellow stony sandy clay loam.

A few small included areas differ in having slopes greater than 25 percent.

Use suitability (15).—All of Jefferson stony fine sandy loam, eroded hilly phase, has been cleared and used for crops or pasture. Much of it is now in hay, in pasture, or idle. Some is used for crops. Yields of crops and pasture are generally very low.

This soil is unsuitable for crops that require tillage; it is also rather poorly suited to pasture. Fair pastures can be established and maintained by good management that includes adding moderate to heavy applications of lime and phosphorus. On most farms, pasture is probably the best use for this soil. Stones prevent clipping pastures and make the control of weeds difficult.

Jefferson stony clay loam, severely eroded hilly phase (12 to 25 percent slopes) (Jc).—This is a well-drained stony soil of the colluvial lands. It occurs in small, widely separated areas, principally in the Rockland, limestone—Rockland, sandstone—Stony land soil association. It has formed from materials that washed or rolled mainly from Hartsells and Muskingum soils. Severe erosion differentiates this soil from Jefferson stony fine sandy loam, hilly phase. Most of the original surface soil and, in places, part of the subsoil have been lost. Shallow gullies are abundant.

The surface layer varies greatly in thickness, color, and texture. In most places it is a brownish-yellow or yellowish-brown friable stony clay loam or fine sandy loam. The subsoil is yellowish-brown or brownish-yellow friable stony sandy clay loam.

A few small areas are included that have slopes stronger than 25 percent.

Use suitability (15).—All of Jefferson stony clay loam, severely eroded hilly phase, has been cleared and used for crops and pasture. Much of the acreage is now idle or abandoned; some is reverting to forest. This soil is very poorly suited to crops or pasture because of stoniness, low fertility, and low moisture-supplying capacity. Heavy applications of lime and phosphorus are needed to establish and maintain permanent pastures. Diversion ditches and other conservation practices may be needed to check the gully erosion. On most farms the best use of this soil is for forest.

Lawrence silt loam (0 to 3 percent slopes) (La).—This is an imperfectly drained light-colored soil of the uplands. It occurs in large and small areas in close association with Dickson and Guthrie soils; it is intermediate between these soils in drainage and in many associated characteristics. Most of it is in the northwestern part of the county on what is locally called the Barrens. Practically all the soil is in the Dickson-Baxter-Greendale soil association. The soil formed on nearly level or slightly depressed areas under a deciduous forest that included a high proportion of water-tolerant trees. The material from which the soil formed was a thin relatively chert-free silt mantle overlying the weathered products of cherty limestone.

Profile description:

0 to 10 inches, light-gray to gray friable silt loam with strong-brown splotches; low in organic matter; surface 1 to 2 inches in undisturbed areas stained dark with organic matter.
10 to 18 inches, light yellowish-brown to pale-yellow friable silt loam or silty clay loam, splotched with light gray and strong brown; very weak medium blocky structure.
18 to 24 inches, compact silt loam, dominantly light gray but mottled with brownish yellow and strong brown.
24 inches +, mottled gray and reddish-yellow silty clay; occasional chert fragments; cherty limestone bedrock at depths ranging from 4 to 10 feet or more.

This soil is strongly to very strongly acid and low in organic matter, plant nutrients, and moisture-supplying capacity. Runoff is very slow or ponded, and internal drainage is very slow. During winter and spring, water saturates the soil much of the time. Once the soil becomes saturated, it stays wet a long time because the compact layer restricts downward movement of water. During long dry periods the soil is droughty. The soil is easy to work, and the control of erosion is not difficult. Air and moisture circulate very slowly. The compact layer is almost impervious to plant roots.

Use suitability (8).—About half this soil is in forest; the rest is used for pasture or crops. Tilled crops are poorly suited to this soil. Hay and pasture are probably better suited, but only fair yields can be expected. This soil is deficient in lime, nitrogen, phosphorus, and potassium, and the response to these elements is not particularly good. In some places the soil might be improved by artificial drainage. This practice cannot be applied generally, because the soil has a compact, impervious layer and suitable drainage outlets are lacking. Hay and the pasture plants such as redtop, orchardgrass, and lespedeza grow reasonably well. The soil is poorly suited to wheat because it is susceptible to heaving and drowning out; it is poorly suited to corn because it is infertile and droughty. Attempts to grow alfalfa are generally unsuccessful, even when the soil is heavily fertilized.

Lindside silt loam (0 to 3 percent slopes) (Lc).—This is an imperfectly drained to moderately well drained brown soil that occupies long narrow areas along many streams on the Highland Rim and in the Central Basin. It is associated chiefly with the Huntington, Melvin, and Egam soils on the first bottoms, the Capshaw soil of the low terraces, and the limestone soils of the uplands. It occurs in several associations, but most of it is in the Jefferson-Sequatchie-Huntington and Cumberland-Waynesboro-Sequatchie. It is on

nearly level or slightly depressed areas and has formed under a cover of water-tolerant trees. The soil consists of mixed recent alluvium that washed chiefly from uplands underlain by limestone. Drainage and associated characteristics are between those of the well-drained Huntington soils and those of the poorly drained Melvin.

Profile description:

0 to 8 inches, dark grayish-brown to brown friable silt loam.
8 to 14 inches, dark yellowish-brown friable silt loam or heavy silt loam, splotched with gray and pale yellow.
14 inches +, friable silt loam or silty clay loam, mottled with gray, yellow, and strong brown; predominantly dark gray in some places; some soft black concretions; bedrock at depths ranging from 4 to 12 feet.

The soil is medium to slightly acid throughout the profile. It is well supplied with plant nutrients and organic matter, which are replenished periodically by flood-deposited sediments. The mottled subsoil indicates that the water table is alternately high and low. Runoff is very slow and internal drainage is slow. In most places the soil is free of gravel throughout the profile, and it is permeable to air, roots, and water. The growth of plant roots and the movement of air and moisture are restricted when the lower layers are saturated with water. The soil is not difficult to work, except that excessive moisture commonly interferes with tillage and other fieldwork.

A few small poorly drained areas are included with this soil.

Use suitability (2).—Practically all of Lindside silt loam has been cleared and cultivated. About half is used for corn. The rest is used mainly for small grains, hay, and pasture. A small percentage is idle.

This is a productive soil for certain crops, but its use suitability is limited by an intermittent high water table and susceptibility to overflow. It is well suited to corn and certain hay and pasture crops but is not well suited to alfalfa and small grains. The water table is too high for successful growth of alfalfa, and small grains commonly lodge. The productivity of the soil probably could be increased by drainage. However, the use suitability would not be broadened unless the soil were protected from flooding.

Lindside silty clay loam (0 to 3 percent slopes) (Ld).—This is an imperfectly drained soil on nearly level to slightly depressed areas on low first bottoms. It occupies long narrow sloughlike tracts. It is associated with the Egam, Melvin, or Huntington soils along the streams flowing from the Cumberland Escarpment and those in the Central Basin. Some of it is in limestone sinks on the Cumberland Plateau, but most of it occurs in the Jefferson-Sequatchie-Huntington and the Cumberland-Waynesboro-Sequatchie soil associations. The soil consists of mixed recent alluvium washed chiefly from uplands underlain by limestone. It has formed under a forest vegetation consisting chiefly of water-tolerant trees.

Profile description:

0 to 12 inches, dark grayish-brown to brown moderately friable silty clay loam.
12 to 22 inches, brownish-gray moderately friable silty clay loam, splotched with gray and rust brown.
22 inches +, slightly compact silty clay loam, highly mottled with gray, rust brown, and yellow.

This soil is medium to slightly acid. It is relatively high in content of organic matter and plant nutrients and in moisture-supplying capacity. Runoff is very slow, and internal drainage is slow. The water table is alternately high and low. The soil is free of gravel in most places. It is moderately permeable to air, roots, and water except when the lower layers are saturated.

Use suitability (2).—Most of this soil has been cleared. It is used mainly for crops, but a considerable acreage is idle each year. Corn is the main crop, but some lespedeza, soybeans, buckwheat, and sorghum are grown. Only a small acreage is used for pasture.

This soil is fairly well suited to corn, annual hay, and other feed and forage crops. Its suitability for many crops is limited by an intermittent high water table and susceptibility to flooding. Artificial drainage would increase average crop yields but not significantly broaden the use suitability of this soil. The soil has poor tilth, and the moisture range over which it can be worked is narrow. If plowed when too wet, it puddles and then becomes hard and cloddy on drying. It also clods badly if plowed when too dry. In most places fertility is renewed by periodic deposits of sediments. This soil is well suited to pasture.

Lindside fine sandy loam (0 to 3 percent slopes) (Lb).—This is an imperfectly drained to moderately well drained sandy soil of the bottom lands. It occupies narrow elongated areas along streams in the Central Basin and on the Highland Rim. Some of it occurs in coves within the Cumberland Plateau. Lindside fine sandy loam is closely associated with the Huntington, Melvin, Sequatchie, and Whitwell soils. It consists of mixed alluvium that washed from uplands underlain by limestone and sandstone. It was formed under a deciduous forest that contained a high proportion of water-tolerant trees.

Profile description:

0 to 14 inches, grayish-brown to yellowish-brown loose very friable fine sandy loam.
14 to 32 inches, brown to yellowish-brown friable or very friable fine sandy loam to silt loam, splotched with gray, yellow, and brown.
32 inches +, friable fine sandy loam or clay loam, highly mottled with rust brown, yellow, and gray.

The soil varies chiefly in color, texture, and depth to the water table. Gravel and cobblestones are on the surface and throughout the soil in many places, but they do not interfere seriously with tillage. The lower soil layers vary considerably in gravel content. Many areas of this soil along the Elk River have a finer texture (much of it loam) than that described in the profile.

Lindside fine sandy loam is medium to slightly acid and moderately well supplied with organic matter and plant nutrients. In most places plant nutrients and organic matter are less abundant than in Lindside silt loam and the reaction is more variable. Some areas included are strongly acid and others are nearly neutral. The soil is very permeable, and plant roots penetrate easily. Circulation of air and moisture is good when the soil is not saturated. Runoff is slow, internal drainage is medium, and the moisture-supplying capa-

city is high. The soil is subject to flooding but is not generally subject to erosion.

Use suitability (2).—This soil has been practically all cleared and is used chiefly for corn and hay. It is moderately productive of these crops. Imperfect drainage and susceptibility to flooding limit the use suitability of this soil mainly to summer crops. The soil is well suited to hay crops that are moderately tolerant of wet conditions, and to corn and many kinds of vegetables. It is not well suited to alfalfa or small grains. It is especially valuable for pasture because forage is good during extended dry periods when that on upland soils is short. Artificial drainage may broaden the use suitability of this soil to some extent. Lime is not ordinarily required for the crops adapted to this soil, but phosphorus and nitrogen are likely to be needed.

Lobelville cherty silt loam (0 to 3 percent slopes) (Le).—This is an imperfectly drained to moderately well drained soil on first bottoms. It is in small narrow areas along large streams in the Central Basin and in the adjacent part of the Highland Rim. It is closely associated with the Ennis soil of the bottom lands, Greendale soils of the colluvial lands, and Bodine, Baxter, and Dickson soils of the uplands. Most of this soil is in the Dickson-Baxter-Greendale and Bodine-Baxter-Ennis soil associations. It formed under a deciduous forest that consisted mainly of water-tolerant trees. The alluvium from which it has formed was washed chiefly from uplands underlain by cherty limestone.

Profile description:

0 to 14 inches, grayish-brown to brownish-gray friable cherty silt loam.
14 to 24 inches, grayish-brown, light yellowish-brown, or brownish-gray friable cherty silt loam or heavy silt loam, splotched with gray and strong brown.
24 inches +, gray or light-gray, cherty, moderately friable silt loam or silty clay loam, splotched with strong brown; a few to numerous concretions; a large amount of chert gravel in most places.

Chert in the plow layer interferes somewhat with cultivation. Fragments range from ½ to 6 inches across but are mainly less than 3 inches. The soil is strongly to very strongly acid and moderately low in organic matter and plant nutrients. The water table is alternately high and low, but mottles in the subsoil indicate that it is high much of the time. Runoff is very slow, internal drainage is slow, and the moisture-supplying capacity is fair. The soil is porous and, when not saturated with water, it allows growth of plant roots and circulation of air and water. Slopes are favorable, and the control of erosion is not a problem.

Included with this soil are some poorly drained areas that have a mottled gray or brown surface layer.

Use suitability (2).—Most of Lobelville cherty silt loam has been cleared and is used for crops or pasture. Most of the cleared acreage is now used for corn, lespedeza, and miscellaneous crops. Some is in pasture or is idle.

This soil is fairly well suited to intertilled crops and moderately well suited to pasture. However, chert, an intermittently high water table, and susceptibility to overflow limit its use suitability. Lime and phosphorus improve the productivity of the soil, but the response to these elements is not expected to be great. When the soil is used for pasture, the control of weeds is difficult because of chert.

Melvin silt loam (0 to 3 percent slopes) (Mb).—This is a poorly drained soil of the bottom lands. It is chiefly in long narrow areas along large drainageways in the Highland Rim and Central Basin. The areas are small and widely separated and are associated with Lindside, Egam, and Huntington soils. The greatest acreage occurs in the Jefferson-Sequatchie-Huntington and the Whitwell-Holston-Cumberland soil associations. This soil was formed under a deciduous forest cover that consisted largely of water-tolerant trees. The alluvium from which the soil formed washed from uplands underlain chiefly by limestone.

Profile description:

0 to 6 inches, gray to light brownish-gray friable silt loam.
6 to 16 inches, mottled gray and brownish-yellow friable heavy silt loam or silty clay loam.
16 inches +, light-gray slightly plastic silty clay loam, mottled with brownish yellow; bedrock at depths ranging from 4 to 12 feet.

This soil varies somewhat in texture, especially in the lower part of the profile. It is medium acid, low in organic matter, and moderate in plant nutrients. It has a very high moisture-supplying capacity. The soil material is permeable, but growth of plant roots and circulation of air and moisture are restricted by a fluctuating high water table. During wet seasons the soil is waterlogged and in places it is ponded. It is fairly easy to work and in most places is free of gravel or stones. Conservation of soil material is not a problem because slopes are nearly level. New materials may be deposited on the surface by floods.

Use suitability (16).—Most of this soil has been cleared and is used for pasture or crops; some of it is in forest. Corn, soybeans, lespedeza, and sorghum are the main crops.

The soil is poorly suited to intertilled crops, but some hay crops grow well. It is best suited to permanent pasture. In its present undrained condition, it produces a fair amount of pasture of low quality. Where feasible, artificial drainage would improve the productivity of the soil for crops and pasture.

Melvin loam (0 to 3 percent slopes) (Ma).—This is a poorly drained soil of the bottom lands. It occurs mainly in long narrow belts a little higher than the normal level of the streams. Many areas, especially those on the river bottoms, are old stream channels. This soil occurs in small areas widely distributed in the Highland Rim and Central Basin sections of the county, mainly in the Jefferson-Sequatchie-Huntington and the Whitwell-Holston-Cumberland soil associations. It consists of young alluvium washed from uplands underlain by limestone and sandstone. The native vegetation was largely water-tolerant oaks, willow, and sweetgum.

Profile description:

0 to 6 inches, gray to light grayish-brown friable loam; low in organic matter.
6 to 18 inches, mottled gray, brownish-gray, and yellowish-brown friable heavy loam or clay loam.

18 inches +, light-gray moderately plastic to friable silty clay loam or clay loam; the alluvium ranges from 4 to 10 feet or more in thickness.

The soil is nearly neutral to slightly acid and low in plant nutrients and organic matter. External and internal drainage are slow. Water stands on the surface most of the time, and the water table is always near the surface. When not saturated, the soil is relatively permeable to air and roots and is easily worked. The development of the root system of many crops is restricted by the high water table. Control of erosion is not a problem.

Some areas are included that have a sandy loam surface layer.

Use suitabilty (16).—A large part of Melvin loam has been cleared. Most of it is now in pasture, but some has grown up in thickets of alders and willows. Some areas are in crops, mainly corn. Average yields of corn are low, and total failures are common.

The soil is very poorly suited to crops but is fairly well suited to pasture because it will support vegetation during prolonged dry periods. Permanent pasture is its best use in its present condition. Artificial drainage would broaden use suitability, but the soil would still be limited mainly to summer annuals, such as corn, soybeans, and sorghum.

Mimosa silty clay, severely eroded hilly phase (12 to 25 percent slopes) (Mc).—This is a shallow well-drained upland soil. It occurs in widely separated areas along the boundary between the Central Basin and Highland Rim. It is closely associated with the Bodine and Dellrose soils and is practically all on lower slopes in the Bodine-Baxter-Ennis soil association. It formed from products that weathered from clayey phosphatic limestone under a predominantly deciduous forest cover that included some cedar. This soil has lost practically all its original surface layer, and in places part of the subsoil is gone. The plow layer is now largely in what formerly was the subsoil. Shallow and deep gullies are common. In places gullies have eroded to bedrock.

Profile description:

0 to 9 inches, brown to yellowish-brown moderately friable to plastic silty clay loam or silty clay.
9 to 22 inches, strong-brown, splotched with gray and yellow, very plastic silty clay; aggregates coated with reddish brown.
22 inches +, mottled strong-brown, yellow, and gray plastic silty clay; has slick or soapy feel; depth to bedrock ranges from 1 to 6 feet or more.

This soil varies greatly in degree of erosion, depth to bedrock, and slopes. Most of the soil has been severely eroded, but some of it is uneroded and some moderately eroded. A small acreage has slopes that range from 5 to 12 percent.

Mimosa silty clay, severely eroded hilly phase, is low in plant nutrients, very low in organic matter, and low in productivity. Runoff is rapid, and the moisture-supplying capacity is low. Internal movement of air and moisture and the penetration of plant roots are slightly restricted.

Use suitability (14).—All this soil has been cleared and used for pasture or crops. Most of it is now in unimproved pasture, but a large part is idle or abandoned (fig. 8).

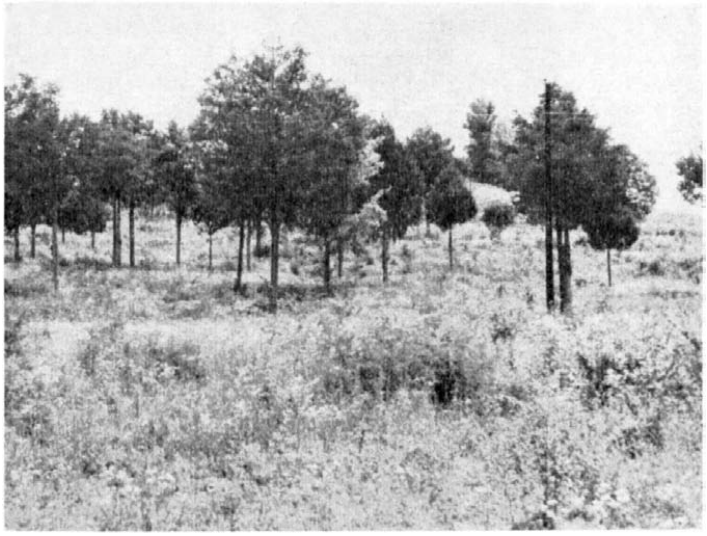

Figure 8.—**Scattered cedar trees on unimproved pasture on Mimosa silty clay, severely eroded hilly phase.**

This soil is not suitable for crops that require tillage. It is difficult to work and extremely difficult to conserve. Outcrops of limestone are common and interfere somewhat with tillage. Permanent pasture is the best use.

This soil is moderately well supplied with phosphorus, but the content of this element varies considerably. Moderate amounts of lime and phosphorus and an initial application of nitrogen are needed to establish pastures. Pastures are hard to establish because the soil is droughty and highly susceptible to further erosion. Until a vegetative cover is grown, structures for controlling runoff and preventing further gullying may be necessary.

Mimosa silty clay, severely eroded steep phase (25 to 60 percent slopes) (Md).—This soil occurs in small, widely separated areas in the Bodine-Baxter-Ennis soil association. It differs from Mimosa silty clay, severely eroded hilly phase, in having steeper slopes and thinner and more variable soil layers. Shallow gullies are common in places, and in some areas deep gullies have cut down to bedrock. Outcrops of limestone are numerous enough to interfere with tillage.

The surface layer is yellowish-brown or strong-brown plastic silty clay or silty clay loam. The subsoil is a yellowish-brown or strong-brown very plastic silty clay.

The dense, very plastic subsoil restricts penetration of plant roots, and the movement of air and moisture. Absorption of water is slow, runoff is very rapid, and the moisture-supplying capacity is very low. The soil is very droughty.

A few small areas are included that have been only slightly or moderately damaged by erosion.

Use suitability (18).—A very small acreage of Mimosa silty clay, severely eroded steep phase, is still wooded, but most of it has been cleared and cultivated. A large part of the cleared land has been abandoned; some is now used for pasture.

This soil is unsuitable either for pasture or for crops requiring tillage, because of its low productivity, susceptibility to further erosion, and droughtiness. Its best use is forestry. Considerable site preparation is needed in advance of planting seedlings.

Mines, pits, and dumps (Me).—This land type consists of open mine pits, quarries, and dumps. The areas are practically worthless for agriculture.

Mountview silt loam, undulating phase (2 to 5 percent slopes) (Mf).—This is a well-drained soil on the uplands of the Highland Rim. It is associated with the Dickson, Baxter, and Bodine soils. It occurs in small areas on the Highland Rim, principally in the Mountview-Baxter soil association. It has formed under deciduous forest from a relative y thin silt layer underlain by cherty, or moderately cherty, limestone residuum. The loessal silt deposit ranges from 10 to 30 inches in thickness, but on undulating areas it is about 18 inches thick.

Profile description:

0 to 10 inches, grayish-brown to light yellowish-brown friable silt loam, low in organic matter; surface inch in wooded areas stained dark with organic matter.
10 to 22 inches, yellowish-brown friable heavy silt loam or silty clay loam; weak medium blocky structure.
22 to 30 inches, yellowish-brown to yellowish-red firm silty clay loam; moderate medium blocky structure.
30 inches +, yellowish-brown cherty silty clay loam to dark-red plastic silty clay or silty clay loam, mottled with gray and yellow; limestone bedrock at depths ranging from 8 to 16 feet.

This soil is relatively chert free to depths ranging from 10 to 30 inches, but in places the layers below this depth contain numerous chert fragments. It is strongly to very strongly acid, low in organic matter, and moderately low in plant nutrients. Runoff is slow, internal drainage is medium, and the moisture-supplying capacity is fair to good. The soil is permeable to air, roots, and water.

Some areas are included that have a strong-brown to yellowish-red subsoil and a slightly darker colored surface soil than that described. A few small tracts of Dickson soil are also included.

Use suitability (6).—All of Mountview silt loam, undulating phase, is wooded. If cleared, the soil would be well suited to either pasture or intertilled crops. Many kinds of crops could be grown, but the soil would be only moderately productive of most of them. Alfalfa and red clover would require amendments, and most other crops could be expected to respond to complete fertilizers. The soil is very easy to work and moderately easy to conserve. Intertilled crops could be grown in a moderately short rotation if other management was good.

Mountview silt loam, eroded undulating phase (2 to 5 percent slopes) (Mg).—This is a well-drained soil formed from loess that lies over chert free, or moderately cherty, limestone residuum. It occurs in large areas on the Highland Rim and is closely associated with the Dickson, Baxter, and other Mountview soils. It differs from Mountview silt loam, undulating phase, principally in having lost a part of its original surface layer through erosion. On some broad ridges the plow layer is in the original surface soil, but on most areas it consists of remnants of the original surface layer mixed with subsoil. In a few very small areas the subsoil is exposed.

The surface layer is now yellowish-brown to light yellowish-brown friable silt loam; on severely eroded areas the texture is slightly heavier. The subsoil is yellowish-brown heavy silt loam or silty clay loam.

A few areas included with this soil have a thinner loess cover than the soil described and a moderate amount of angular chert scattered throughout the profile.

Use suitability (6).—All of Mountview silt loam, eroded undulating phase, has been cleared and is used for pasture or crops. Corn, cotton, lespedeza, wheat, and rye are the main crops.

The soil is well suited to pasture and many kinds of crops. Liberal use of amendments is needed to produce and maintain high yields of most crops. Lime and phosphorus are essential for alfalfa and red clover. Row crops can be grown in moderately short rotations if other management is adequate. The soil is very easy to work and moderately easy to conserve.

Mountview silt loam, eroded rolling phase (5 to 12 percent slopes) (Mh).—This well-drained soil occupies ridge slopes in the less-dissected parts of the Highland Rim and ridge crests in the dissected parts. It is chiefly in the Mountview-Baxter soil association, where it occurs in small, widely separated areas. It was derived from a thin silt deposit that lies over cherty or moderately cherty limestone residuum. The soil differs from Mountview silt loam, undulating phase, in slopes and erosion. Part of the original surface soil has been lost through erosion, and the remaining surface soil varies in thickness. Small areas of exposed subsoil are common. Some small severely eroded spots have angular chert fragments in the plow layer.

The surface layer is now yellowish-brown to light yellowish-brown friable silt loam. The subsoil is yellowish-brown heavy silt loam or silty clay loam; in places it contains angular chert fragments.

The soil is strongly to very strongly acid, low in organic matter and plant nutrients, and moderately low in moisture-supplying capacity. It is permeable to air, roots, and water. Runoff and internal drainage are medium.

Use suitability (7).—All of this soil has been cleared and is used for pasture or crops. Corn, cotton, lespedeza, wheat, and rye are the principal crops grown. This soil is moderately well suited to pasture, and many kinds of crops, including red clover and alfalfa, can be grown if the soil is properly fertilized. For high yields the soil needs the addition of most major plant nutrients. It is easy to till but satisfactory productivity is moderately difficult to maintain. Its high susceptibility to erosion limits intensive use.

Mountview silty clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Mk).—This well-drained soil formed from a thin layer of silt underlain by cherty or moderately cherty limestone residuum. It occurs in small, widely separated areas, chiefly in the Mountview-Baxter soil association. It differs from Mountview silt loam, undulating phase, in having stronger slopes and

severe erosion. Many shallow gullies have penetrated the subsoil.

In most areas the original surface layer has been lost through erosion, and, consequently, the present surface layer consists of remnants of the original surface layer mixed with the upper part of the subsoil. The surface layer has not been uniformly removed, and in some places the plow layer may be entirely within the original surface layer. The present surface layer consequently ranges from silt loam to light silty clay loam in texture and from yellowish brown to light yellowish brown in color. In many places erosion has exposed the underlying chert layers.

This soil is strongly to very strongly acid, low in organic matter and plant nutrients, and low in moisture-supplying capacity. It is permeable to air, water, and plant roots. Runoff is rapid and internal drainage is medium.

Use suitability (12).—All of this soil has been cleared and used for crops. Most of it is now idle or in pastures that are unimproved and very low in carrying capacity.

This soil has been severely damaged by erosion and is poorly suited to crops and pasture. It is moderately easy to work but difficult to maintain, mainly because of extreme susceptibility to further erosion. Gullies interfere with the use of heavy farm machinery. The soil is restricted in use suitability, and its management requirements are very exacting. Cultivated crops grow very poorly, and yields are very low. Under present conditions the best use for this soil is for pasture. Fair pastures can be established and maintained under good management. Properly managed pastures should restore the physical properties and fertility of the soil so that it can again be used as cropland.

Muskingum stony fine sandy loam, steep phase (25 to 60 percent slopes) (Mr).—This excessively drained sandy soil was derived from products that weathered from acid sandstone. It occurs chiefly along deep V-shaped drainageways near the escarpment of the Cumberland Plateau. Practically all of it is in the Hartsells-Muskingum-Cotaco soil association.

Profile description:

0 to 6 inches, pale-brown to yellowish-brown, loose, very friable stony fine sandy loam; top 1 or 2 inches in wooded areas stained dark grayish brown by organic matter.
6 to 16 inches, light yellowish-brown to yellowish-brown friable stony fine sandy loam to stony light sandy clay loam; weak medium blocky structure.
16 inches +, sandstone bedrock or very stony sandstone residuum.

The soil varies in degree of stoniness and depth to bedrock. It is generally stony or very stony, but a few places are relatively free of stones. In most places bedrock is less than 2 feet deep, but in some places it is at depths of 3 or 4 feet. Outcroppings of bedrock are common. Occasional rounded quartz pebbles are scattered throughout the soil. A few small areas have yellowish-red subsoils.

This soil is low in organic matter and plant nutrients, and strongly to very strongly acid. Runoff and internal drainage are very rapid. The moisture-supplying capacity is low. The soil is permeable but is shallow to bedrock and very droughty under cultivation. It is also very difficult to work and conserve.

Use suitability (18).—All of this soil is in forest. It is unsuitable for crops or pasture because it is shallow, steep, stony, and susceptible to erosion. Its best use is for the production of timber. The poor quality of forest stands is caused by excessive grazing and burning. Good management practices are needed to improve the forests.

Muskingum stony fine sandy loam, hilly phase (12 to 25 percent slopes) (Mo).—This excessively drained soil occurs in large areas along drainageways near the escarpment of the Cumberland Plateau. Practically all of it is in the Hartsells-Muskingum-Cotaco soil association. It was derived from products that weathered from acid sandstone. It developed under deciduous forest. It differs from Muskingum stony fine sandy loam, steep phase, principally in slope.

Profile description:

0 to 8 inches, pale-brown to yellowish-brown loose very friable stony fine sandy loam; surface inch occasionally stained dark grayish brown by organic matter.
8 to 18 inches, light yellowish-brown to yellowish-brown friable stony fine sandy loam or stony light sandy clay loam; very weak medium blocky structure.
18 inches +, sandstone bedrock or very stony sandstone residuum.

Occasional small quartz pebbles are scattered throughout the soil; outcrops of sandstone bedrock are common. Bedrock varies considerably in depth. In places it is at depths of 3 to 4 feet. In most areas it is close to the surface and prevents the use of tillage implements.

This soil is strongly to very strongly acid and low in organic matter and plant nutrients. Runoff is rapid and internal drainage is very rapid. The soil is permeable to air, water, and roots. Shallowness of the profile causes the soil to have a low moisture-supplying capacity; it also prevents the normal development of deep-rooted plants.

Use suitability (15).—This soil is all in forest. It is not suitable for crops and only fairly well suited to permanent pasture. The soil is very difficult to work and conserve. If cleared for pasture, proper fertilization and other good management practices are needed to develop and maintain good stands. Weed control will be difficult because of rock outcrops and stones. No more than fair pastures can be expected from the best kind of management because of the low moisture-supplying capacity of the soil. Land that is left in trees should be improved for the production of timber.

Muskingum stony fine sandy loam, eroded hilly phase (12 to 25 percent slopes) (Mp).—This excessively drained soil was derived from products that weathered from acid sandstone. Practically all of it is in the Hartsells-Muskingum-Cotaco soil association. This soil differs from Muskingum stony fine sandy loam, hilly phase, mainly in erosion. From 25 to 75 percent of the original surface soil has been lost, including the thin surface layer high in organic matter. Shallow gullies are abundant, and occasional deep gullies have formed that cannot be crossed by farm machinery.

The present surface layer is a pale-brown to yellowish-brown stony fine sandy loam. The subsoil is a yel-

lowish-brown or light yellowish-brown stony fine sandy loam or stony sandy clay loam.

The soil is extremely variable in depth. It is generally shallow, and outcrops of sandstone bedrock are common.

Use suitability (15).—All of this soil has been cleared and used for pasture or crops. A large proportion is now idle and abandoned or in unimproved pasture.

This soil is unsuitable for crops that require tillage but is fairly well suited to pasture. Pasture production is generally low, because the soil is droughty and of low fertility. To establish even fair pasture, applications of lime, phosphorus, and possibly potassium are necessary. On some areas, special erosion control methods are needed until the vegetation is dense enough to stabilize the soil.

Muskingum stony fine sandy loam, rolling phase (5 to 12 percent slopes) (Mm).—This excessively drained upland soil is on the Cumberland Plateau. It occurs chiefly at the heads of drainageways and on narrow interstream divides and is nearly all in the Hartsells-Muskingum-Cotaco soil association. It has formed from products that weathered from acid sandstone. It developed under a deciduous forest consisting mainly of oaks.

Profile description:

0 to 8 inches, pale-brown to yellowish-brown, loose, very friable stony fine sandy loam, low in organic matter; surface 1 or 2 inches in wooded areas stained dark grayish-brown by organic matter.
8 to 20 inches, light yellowish-brown or yellowish-brown friable stony fine sandy clay loam or stony fine sandy loam; weak medium blocky structure.
20 inches +, very stony sandstone residuum or sandstone bedrock.

Fragments of bedrock are on the surface and throughout the profile; a few rounded white quartz pebbles are scattered throughout the soil. Outcroppings of bedrock are common.

The soil is strongly to very strongly acid and low in organic matter and plant nutrients. Runoff is medium, internal drainage is rapid, and the moisture-supplying capacity is low. The soil is very permeable to air, roots, and water. This soil is difficult to work because of stones and rock outcrops, but it can be worked within a wide range of moisture content.

Use suitability (15).—All of this soil is in forest, but if cleared, it would be fairly well suited to pasture. The soil would be poorly suited to crops that require tillage because it is stony, droughty, and susceptible to erosion. It also has outcrops of bedrock. Fertilizers are needed to establish and maintain productive pastures. Weeds would be difficult to control on this soil because of the rock outcroppings and loose stones on the surface.

Muskingum stony fine sandy loam, eroded rolling phase (5 to 12 percent slopes) (Mn).—This excessively drained soil was formed from products that weathered from acid sandstone. It occurs in small widely scattered areas on the Cumberland Plateau and is associated with the Hartsells and Cotaco soils and with other Muskingum soils. Erosion differentiates it from Muskingum stony fine sandy loam, rolling phase. Most of the original surface layer has been lost as a result of erosion. The surface layer has not been uniformly removed, and in many places the plow layer consists of remnants of the original surface layer mixed with the upper part of the subsoil; in others it may be entirely within the original surface layer. The present surface layer ranges from pale brown to yellowish brown. Shallow gullies are numerous, and there are occasional deep gullies. Outcroppings of sandstone bedrock are common, and fragments of sandstone are scattered throughout the soil.

Use suitability (15).—All of this soil has been cleared and used for pasture or crops. A large proportion is now in unimproved pasture or idle. Corn is the principal crop, and the yields are low.

This soil is poorly suited to crops because it is droughty, is susceptible to further erosion, and has loose stones and outcrops of bedrock. It is best suited to permanent pasture. Establishing and maintaining good pastures require the use of fertilizer and other proper management. Weed control is difficult.

Nolichucky loam, eroded undulating phase (2 to 5 percent slopes) (Nb).—This is a sandy well-drained soil on high stream terraces. It is associated with the Whitwell, Waynesboro, and Holston soils, chiefly along the Elk River in the northern part of the county and in coves at the base of the Cumberland Escarpment. Most of the soil occurs in the Waynesboro-Holston-Whitwell soil association. The old alluvium from which the soil was derived was mainly from uplands underlain by sandstone. It included, however, some material from limestone. The soil was formed under a deciduous forest. A large part of the original surface layer has been lost as a result of erosion. Over much of the area, the plow layer is still within the original surface layer, but in places it is mixed with the subsoil. In a few severely eroded spots the subsoil is exposed. Shallow gullies have formed in a few places.

Profile description:

0 to 10 inches, light brownish-gray to light yellowish-brown friable loam; surface inch in wooded areas stained dark by organic matter.
10 to 24 inches, brownish-yellow or yellowish-brown friable clay loam or silty clay loam; weak medium blocky structure.
24 to 45 inches, reddish-yellow or yellowish-red firm fine sandy clay or sandy clay loam, splotched with brownish yellow and strong brown; moderate medium blocky structure.
45 inches +, mottled yellowish-red, yellow, and gray friable sandy clay or sandy clay loam; limestone bedrock at depths of 5 to 15 feet.

A small amount of gravel is on the surface and throughout the soil. The soil is strongly acid and moderately low in organic matter and plant nutrients. It is permeable to air, roots, and water. Runoff is medium to slow; internal drainage is medium. The moisture-supplying capacity is fair.

Use suitability (4).—All of this soil has been cleared and is used for crops and pasture. Corn, small grains, and cotton are the principal crops.

The soil is well suited to crops and pastures. All the common crops can be successfully grown if management is good. Fertilizers and proper crop rota-

tions are necessary for satisfactory yields. Adequate amounts of lime and phosphorus are essential for good yields of alfalfa and red clover. All crops respond well to proper amounts of fertilizers. Although the soil responds well to improved management, the results are not so lasting as on the Waynesboro or Cumberland soils. The soil is easy to work and moderately easy to conserve.

Nolichucky loam, eroded rolling phase (5 to 12 percent slopes) (Nc).—This is a well-drained soil on high stream terraces. Most of it is in the Waynesboro-Holston-Whitwell soil association; some areas are in the Whitwell-Holston-Cumberland soil association. The old alluvium from which this soil was formed was washed chiefly from the Hartsells and Muskingum soils. However, some material from many other soils was included. This soil differs from the eroded undulating phase of Nolichucky loam chiefly in slope. A large part of the original surface layer has been lost. In spots all the original surface layer is gone and the subsoil is exposed. The plow layer is usually mixed with subsoil and is highly variable in color, texture, and thickness. A few shallow gullies have formed in the more severely eroded areas.

The surface layer is now light brownish-gray to yellowish-brown friable loam. The subsoil is brownish-yellow or yellowish-brown (grades to reddish yellow or yellowish red between 18 and 30 inches) firm clay loam or silty clay loam. Rounded white quartz pebbles are scattered throughout the soil.

Use suitability (5).—Practically all this soil has been cleared and cultivated. Corn, small grains, lespedeza, and cotton are the principal crops. Only a few farmers follow systematic crop rotations.

The soil is well suited to crops and pastures, but the use of proper rotations and fertilizers is necessary for satisfactory yields. Rotations of moderate length that include a deep-rooted legume are desirable under ordinary conditions. The soil needs lime and most of the major plant-food elements for high crop yields. It responds to fertilization, but the effect is not so lasting as it is on the Cumberland soils. Adequate amounts of lime and phosphorus are essential for alfalfa and red clover. The soil is moderately susceptible to erosion and should be cultivated on the contour. Terraces, where feasible, may allow the use of shorter rotations.

Nolichucky clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Nc).—This well-drained soil occurs on high stream terraces in small, widely distributed areas. Most of it is in the Waynesboro-Holston-Whitwell soil association; some is in the Whitwell-Holston-Cumberland association. The old alluvium from which it has formed washed mainly from uplands underlain by sandstone but was considerably mixed with material from limestone. Slopes and severe erosion differentiate this soil from Nolichucky loam, eroded undulating phase. Most of the original surface layer is gone, and the present surface layer consists of remnants of the original surface layer mixed with the upper part of the subsoil. Erosion has not been uniform. In some places the plow layer is entirely in the subsoil, whereas, in others it may be entirely within the original surface layer. Shallow gullies are common, and occasional deep gullies have formed. The surface layer ranges from light yellowish-brown to reddish-yellow friable loam to a moderately friable clay loam.

The soil is strongly acid and very low in organic matter and plant nutrients. Runoff is rapid, internal drainage is medium, and the moisture-supplying capacity is low. The soil is permeable to air, water, and plant roots.

Use suitability (11).—All of this soil has been cleared and used for pasture and crops, but most of it is now idle or in unimproved pasture. A small acreage is used mainly for corn, small grains, and lespedeza.

This soil is only fairly well suited to pasture or crops. It is difficult to conserve but not difficult to work. It cannot be worked, however, within so wide a range in moisture content as Nolichucky loam, eroded undulating phase. Gullies interfere somewhat with the use of tillage implements. This soil needs lime and most of the major plant nutrients for high crop yields. It can be maintained when used for intertilled crops, if the management is good. Rotations should be moderately long and include a high proportion of close-growing and sod-forming crops because the soil is highly susceptible to erosion. Contour tillage, stripcropping, and terraces will make more intensive use for crops possible. Fair pasture can be established by use of large amounts of lime and phosphorus, but grazing will be poor during extended dry periods.

Ooltewah silt loam (0 to 5 percent slopes) (Oa).—This is an imperfectly drained nearly level soil of the depressions. It is closely associated with the Emory and Guthrie soils and has intermediate drainage characteristics. It is also associated with the Decatur and Dewey soils of the uplands, and with the Cumberland and Etowah soils of the terraces. Practically all of it is in the Highland Rim section, principally in the Decatur-Dewey-Cumberland and Mountview-Baxter soil associations. This soil was derived from local alluvial or colluvial materials washed from soils that are underlain by limestone or that had parent materials mainly of limestone origin. The native vegetation was deciduous forest containing a high proportion of willows and other water-tolerant trees.

Profile description:

0 to 14 inches, grayish-brown to yellowish-brown friable silt loam.
14 inches +, mottled gray, strong-brown, and brownish-yellow friable silt loam or moderately friable silty clay loam; texture is heavier as depth increases; limestone bedrock at depths of 5 feet or more.

The surface layer ranges from 12 or 14 inches in thickness. In places, mottling may be absent to a depth of 16 or 18 inches. Very small black or brown concretions are common in the profile.

As mapped, this soil includes areas in which the boundary of the gray layer is not abrupt and mottling occurs almost to the surface. In these areas the profile is increasingly gray with depth. Some long narrow areas along drainageways, where runoff is slow, are also included.

The soil is medium acid in most places but ranges from slightly to strongly acid. It is moderate in organic-matter content and moderately high in plant-nutrient content. The soil is permeable, but the sub-

soil and substratum are waterlogged during winter and other wet periods. Runoff is slow to ponded, and internal drainage is slow. The moisture-supplying capacity is very high.

Use suitability (2).—Practically all of Ooltewah silt loam has been cleared, and most of it is used for crops. The soil is very well suited to pasture and to crops that require tillage, such as corn, sorghum, and soybeans. It is poorly suited to alfalfa and small grains because of its imperfect drainage and susceptibility to ponding. Drainage would broaden the use suitability, but it is impractical in most places because outlets are lacking. The control of erosion is not a problem, but new soil materials from uplands may be deposited. The soil is very easy to work except after wet periods.

Pace cherty silt loam, eroded undulating phase (2 to 5 percent slopes) (Pa).—This is a cherty moderately well drained to well-drained soil of the colluvial lands. The parent material washed from the adjacent upland slopes, underlain by cherty limestone. This soil occurs in fanlike areas at the base of the slopes from which the material washed. It is in small, widely separated areas, principally in the Pace-Baxter-Greendale and Whitwell-Holston-Cumberland soil associations. The soil differs from Greendale cherty silt loam chiefly in that it is older and has well-developed surface-soil and subsoil layers. A considerable part of the original surface soil has been lost through erosion. In many places remnants of the original surface layer have been mixed with subsoil.

Profile description:

0 to 10 inches, light yellowish-brown to light brownish-gray friable cherty silt loam; top 1 or 2 inches in wooded areas stained dark by organic matter.
10 to 28 inches, brownish-yellow or yellowish-brown friable cherty silty clay loam; moderate medium blocky structure.
28 inches +, strong-brown slightly compact cherty silty clay, splotched with gray and yellow; bedrock at depths of 4 to 12 feet in most places.

The soil is strongly to very strongly acid, low in organic matter, and moderately low in plant nutrients. It is permeable to air, roots, and water. Runoff and internal drainage are medium, and the moisture-supplying capacity is good.

Use suitability (6).—Most of this soil has been cleared and is used for crops and pasture. An estimated 5 to 10 percent is idle. The rest is in corn, lespedeza, orchards, gardens, miscellaneous crops, and pasture. A small acreage is used for potatoes. Fertilization and systematic crop rotations ordinarily are not followed.

The soil is well suited to pasture or to crops that require tillage. It is well suited to early potatoes and vegetables that need a soil that warms up early in spring. Lime and phosphorus are needed to establish and maintain alfalfa and red clover. The soil is moderately easy to work, but chert in the plow layer and throughout the soil interferes with tillage. Good tilth is fairly easily maintained, and the moisture range over which the soil can be safely tilled is comparatively wide. Runoff is easily controlled, and erosion is not a serious problem. If adequately fertilized, the soil can be used fairly intensively, but the response to amendments is not so lasting as it is for other soils.

Pace cherty silt loam, eroded rolling phase (5 to 12 percent slopes) (Pb).—This is a well-drained to moderately well drained cherty soil of colluvial lands. It occurs in widely separated areas along the base of the Cumberland Escarpment and in coves or limestone sinks in the Cumberland Plateau. Most of it is in the Pace-Baxter-Greendale and the Whitwell-Holston-Cumberland soil associations. The parent material consists of local alluvium that washed from uplands underlain by cherty limestone. A substantial part of the original surface soil has been lost through erosion. Chert has accumulated on the surface and in the plow layer as a result of losses of finer materials (fig. 9). Some soil material has been mixed with the surface layer. The present surface layer varies in color and in places is somewhat finer textured than the original surface layer. On the more severely eroded spots, it ranges from yellowish-brown to light brownish-gray cherty silt loam or cherty silty clay loam. In places, it is a cherty loam.

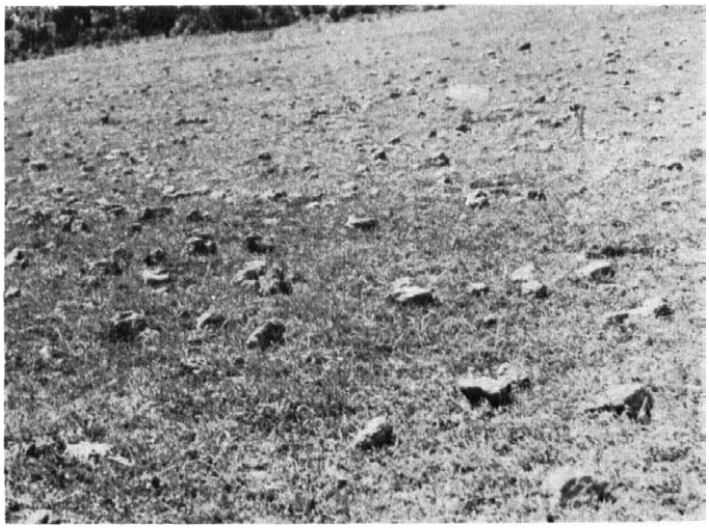

Figure 9.—**Pasture of poor quality on Pace cherty silt loam, eroded rolling phase. Large fragments of chert on the surface and in the plow layer interfere with tillage.**

Use suitability (7).—All of this soil has been cleared and used for crops or pasture. About 15 percent is idle each year. Corn and lespedeza are the principal crops. A considerable acreage is in orchards, gardens, miscellaneous crops, and pasture. Regular crop rotations and fertilizers ordinarily are not used.

The soil is suited to crops and pasture. Practically all crops common to the county are grown successfully, except possibly alfalfa. Alfalfa is grown with some success in places but is much better suited to the Decatur, Dewey, and Baxter soils. This soil is susceptible to erosion and is not so well suited to intensive use as the eroded undulating phase. It is moderately easy to work and conserve. Lime and major plant nutrients are needed for continuous high yields of most crops. The response to amendments is good.

Pace cherty silt loam, eroded hilly phase (12 to 25 percent slopes) (Pc).—This well-drained or moderately well drained cherty soil is at the base of steep upland slopes. It occurs in small, widely distributed areas in

the Pace-Baxter-Greendale, the Dickson-Baxter-Greendale, and the Bodine-Baxter-Ennis soil associations. The parent materials for this soil washed or rolled from the adjacent Bodine or Baxter soils. This soil differs from Pace cherty silt loam, eroded undulating phase, in having steeper slopes, better drainage, and thinner, less distinct horizons. In addition, the depth of the colluvial deposit is generally less.

A large part of the original surface layer has been lost as a result of erosion. Chert has accumulated on the surface and in the plow layer. The present surface layer ranges from yellowish brown to light brownish gray in color and from cherty silt loam to cherty silty clay loam in texture. The subsoil is yellowish-brown or brownish-yellow friable cherty silty clay loam.

A small acreage included with this soil differs in not being eroded. A much larger included acreage differs in having a cherty loam texture. This inclusion, although extensive, does not differ significantly in use and management from the soil described.

Use suitability (15).—Most of this soil has been cleared and is used for crops and pasture. Part of the acreage is idle or abandoned.

This soil is poorly suited to crops, chiefly because it is susceptible to erosion and low in fertility. It is moderately difficult to work, and it is difficult or very difficult to conserve when used for intertilled crops. Fair pastures can be established and maintained with adequate fertilization. Pasture yields will not be high, even though management is good, because the moisture-supplying capacity of the soil is low.

Purdy silt loam (0 to 3 percent slopes) (Pd).—This poorly drained soil is on stream terraces. Most of it is in small, elongated areas in the northeastern part of the county along small streams that are tributary to the Elk River. It is closely associated with the Whitwell and Tyler soils and is mostly in the Whitwell-Holston-Cumberland and the Waynesboro-Holston-Whitwell soil associations. The old alluvium from which the soil has formed washed chiefly from uplands underlain by sandstone, but it was mixed with some material from limestone. The soil has developed on nearly level to slightly depressed areas, under a forest of water-tolerant trees.

Profile description:

0 to 5 inches, gray or light brownish-gray friable silt loam or loam, low in organic matter; surface 1 inch in undisturbed areas is grayish-brown, underlain by mottled light-gray and strong-brown friable loam or silt loam.
5 to 18 inches, mottled light-gray and strong-brown friable silty clay loam or clay loam; weak coarse blocky structure.
18 to 36 inches, light-gray compact silty clay loam or silty clay, mottled with strong brown; contains numerous small dark concretions.
36 inches +, mottled gray and reddish-yellow firm silty clay or silty clay loam; limestone bedrock at depths ranging from 5 to 15 feet.

This soil varies somewhat in thickness of the surface layer, in compactness of the claypan, and in texture. In places the surface layer is browner and thicker than usual because of the addition of local alluvial material. All areas where these variations occur are poorly drained, however, and have about the same use and management as the rest of the soil.

Purdy silt loam is strongly to very strongly acid and low in content of organic matter and plant nutrients. Runoff and internal drainage are very slow. The compact layer greatly retards or almost prevents movement of water and causes the water table to be high most of the time. In dry periods, the layers above the compact claypan are permeable to air, roots, and water. The soil is usually free of gravel, but some areas contain waterworn chert in the lower layers.

Use suitability (16).—A small acreage of this soil is cultivated, but most of it is in forest or pasture. Cultivated areas are generally used for corn, soybeans, or lespedeza; yields are very low.

This soil is too poorly drained for most crops that are commonly grown in the county. Summer annual crops, such as sorghum, soybeans, and lespedeza, require moderately heavy applications of fertilizer for satisfactory yields. Surface drainage by use of open ditches or by bedding the soil would probably broaden use suitability somewhat. A satisfactory drainage system is moderately hard to maintain. The soil is easy to work when moisture is right, but it is too wet for tillage most of the time. Soil material is easy to conserve.

Riverwash (0 to 3 percent slopes) (Ra).—This land type consists of stony, gravelly, and sandy materials that are deposited by fast-flowing water along the channels of streams. Most of it occurs along the Elk River, principally in the Waynesboro-Holston-Whitwell soil association. The areas are flooded frequently and are subject to scouring or to the deposition of new materials. The deposited alluvium is seldom in place long enough for vegetation to become firmly established or for organic matter to accumulate. The areas are slightly undulating.

Use suitability (18).—Practically all of this mapping unit is idle or included in pastures. Some of it is partly grown up in willows. Riverwash has very little value for crops or pastures, and in most places it is best used for forest.

Robertsville silt loam (0 to 3 percent slopes) (Rb).—This poorly drained soil occurs mainly on low terraces along tributaries of the Elk River in the Highland Rim section. Much of it is in depressed areas not related to the present drainage pattern. This soil is associated with the Cumberland, Taft, and Capshaw soils and is mainly in the Decatur-Dewey-Cumberland soil association. It developed under a forest of water-tolerant trees from old alluvium that washed from uplands underlain chiefly by limestone.

Profile description:

0 to 8 inches, light-gray to brownish-gray friable silt loam, mottled with strong brown; contains a few small concretions; upper 1 or 2 inches in wooded areas may be stained dark gray by organic matter.
8 to 20 inches, light-gray friable silt loam or silty clay loam, highly mottled with strong brown; contains many small brown concretions.
20 to 30 inches, light-gray compact silty clay loam or silty clay; contains many soft yellowish-red concretions.
30 inches +, predominantly yellowish-red extremely compact silty clay, mottled with light gray; contains many large, soft, black concretions; limestone bedrock at depths ranging from 6 to 12 feet.

The profile varies somewhat in depth to the compact

claypan but not enough to affect the use suitability of the soil. In places the soil appears to have formed from local wash rather than stream alluvium.

Robertsville silt loam is strongly to very strongly acid and low in organic matter and plant nutrients. The highly mottled gray color of the profile indicates that the water table is high much of the time. The soil is waterlogged for extended periods, particularly in winter and spring. The relatively impermeable compact layer greatly retards or almost prevents passage of water. The surface soil and subsoil are permeable to air, roots, and water in dry periods. Runoff is slow or ponded, and internal drainage is very slow.

Use suitability (16).—Most of this soil is pastured woodland or permanent pasture; a few areas are used mainly for corn, sorghum, or soybeans. Yields of crops are very low, and failures are common.

This soil is too poorly drained for most crops. It is fairly well suited to crops that are planted late in spring, such as sorghum and soybeans. Lespedeza does moderately well on areas that have fairly good surface drainage. Pastures are fairly well suited, but they are generally of very poor quality. Pastures are not feasible in many places, because this soil occurs in small irregularly shaped areas in association with soils that are suitable for crops.

Surface drainage by the use of open ditches or by bedding would somewhat broaden the use suitability and increase the production of pasture and some forage crops. A satisfactory drainage system would be moderately difficult to maintain. Tile drainage will not be effective, because of the relatively impermeable compact layer. The soil is moderately easy to work when moisture conditions are right, but it is dry enough to be tilled only for limited periods. It is moderately easy to conserve. Erosion is not a problem.

Rockland, limestone, hilly and rolling (3 to 25 percent slopes) (Rc).—This land type occurs in large areas on the lower slopes of the Cumberland Escarpment. Practically all of it is in the Rockland, limestone—Rockland, sandstone—Stony land soil association. It is characterized by ledges and outcroppings of clayey limestone that occupy 50 percent or more of the surface. The prevailing slopes range from 12 to 25 percent. A shallow covering of soil material occurs in places, but generally such material is only in cracks and crevices. This material varies considerably in color and texture, but it is predominantly dark in color and of a silty clay texture. Enough of this material is present to support a thin stand of trees. The forest is a mixture of post, red, and blackjack oaks, redbud, redcedar, and other kinds of trees.

Use suitability (18).—This land type is all in cutover forest. It is practically worthless for crops or pasture. In many places it is of little value for forestry because most of the area is exposed rock. There are numerous cedar glades where some cedar is cut for market.

Rockland, limestone, steep and very steep (25 to 60+ percent slopes) (Rd).—This land type is on the steep lower slopes of the Cumberland Escarpment. It is all in the Rockland, limestone—Rockland, sandstone—Stony land soil association. It is characterized by ledges and outcroppings of clayey limestone that occupy 50 percent or more of the land surface. This land type differs from Rockland, limestone, hilly and rolling, principally in slope.

Use suitability (18).—All of this land type is in cutover or burnedover forest. It is practically worthless for crops or pasture and of little value for forestry. Enough soil material is in cracks and crevices of rocks to support a thin stand of deciduous and coniferous trees. The forest yields a small amount of marketable cedar.

Rockland, sandstone, very steep (12 to 60+ percent slopes) (Re).—This land type consists of the nearly vertical sandstone escarpments of the Cumberland Plateau. The sandstone rock is bare of soil and practically devoid of vegetation. A few scattered oaks, hickories, redcedars, and dogwoods are on the lower slopes. Nearly all of this land type is in the Rockland, limestone—Rockland, sandstone—Stony land soil association. A small proportion of Bouldery colluvium, Jefferson soil material, is so intricately associated with Rockland, sandstone, very steep, that it could not be mapped separately.

Use suitability (18).—This type has no agricultural value because about 75 percent of its exposed surface is bare rock. It is used only to harvest a small amount of timber.

Sequatchie fine sandy loam, undulating phase (2 to 5 percent slopes) (Sa).—This well-drained soil is on low stream terraces. It occurs along the Elk River and most of the large streams in the Highland Rim and Central Basin; a considerable acreage is in the valley that extends from northwest of Sherwood to the Alabama line. The large and small irregularly shaped areas of this soil are closely associated with the Huntington, Lindside, Melvin, Whitwell, Jefferson, Holston, and Nolichucky soils. Most of the acreage is in the Jefferson-Sequatchie-Huntington soil association. The parent material consisted of general alluvium that washed largely from uplands underlain by sandstone but contained some material from limestone. This soil is underlain by limestone at a depth of 4 feet or more It developed under a deciduous forest vegetation.

Profile description:

0 to 10 inches, yellowish-brown or brown very friable fine sandy loam.
10 to 30 inches, yellowish-brown to brownish-yellow friable light clay loam or sandy clay loam.
30 inches +, brownish-yellow or yellow very friable sandy loam or sandy clay loam, splotched with gray and yellowish brown in most places.

In some areas the subsoil is reddish brown rather than yellowish brown or brownish yellow. In many parts of the valley that extends from northwest of Sherwood to the Alabama line the subsoil is a heavy clay loam. In that section the soil has a higher moisture-supplying capacity and is more productive than elsewhere.

Sequatchie fine sandy loam, undulating phase, is generally medium to strongly acid but in some areas is only slightly acid. It is moderately well supplied with most plant nutrients and organic matter. The soil is permeable to roots, air, and moisture. The moisture-supplying capacity is good. Runoff and internal drainage are medium.

Use suitability (3).—Practically all of this soil has been cleared and is used for pasture or for corn, cotton, hay, and small grains. A small acreage is used for melons, and about 10 percent is idle.

This soil is well suited to pasture and many kinds of crops. It can be used intensively for intertilled crops if amendments are used. Lime, phosphorus, potassium, and nitrogen are needed for high yields of most crops. The soil can be maintained by use of short rotations that include a deep-rooted legume to supply nitrogen. It is only slightly susceptible to erosion. Water control is not a problem when crops are rotated and adequately fertilized. In localized areas a few cobblestones are on the surface and throughout the soil, but they do not interfere materially with tillage. Good tilth is maintained easily, and tillage can be practiced over a fairly wide range of moisture content.

Sequatchie fine sandy loam, severely eroded rolling phase (5 to 12 percent slopes) (Sb).—This is an inextensive well-drained soil on low stream terraces. It occupies very small and narrow areas on terrace escarpments and is associated with the Huntington, Lindside, Whitwell, Bruno, and other Sequatchie soils. The parent materials were washed largely from uplands underlain by sandstone but included material from limestone. The soil differs from the undulating phase of Sequatchie fine sandy loam in erosion and slope. Erosion has removed most of the original surface soil and in places part of the subsoil. The surface layer is now a yellowish-brown friable fine sandy loam or clay loam. The subsoil is yellowish-brown or brownish-yellow friable clay loam or sandy clay loam.

This soil has less organic matter and available plant nutrients and a lower moisture-supplying capacity than the undulating phase of Sequatchie fine sandy loam.

Use suitability (11).—All of this soil has been cleared, and most of it used for crops or pastures. Part is idle or abandoned. Use and management is similar to that on the associated soils.

The soil is suited to many kinds of crops, but it cannot be used so intensively as the undulating phase of Sequatchie fine sandy loam. It is best suited to close-growing crops or pasture unless adequate controls for runoff are provided. Contour tillage, terracing, and diversion ditches will be very effective in controlling runoff on this permeable soil. If these practices are applied, the soil can be maintained by use of rotations that include intertilled crops. Crop yields much higher than those now obtained may be expected if water-control practices, rotations, and fertilizers are properly used.

Stony hilly land, Mimosa soil material (12 to 25 percent slopes) (Sc).—This land type is in the Central Basin and is closely associated with the Dellrose and Mimosa soils. All of it is in the Bodine-Baxter-Ennis soil association. From one-third to one-half of the exposed land surface consists of phosphatic limestone outcrops and loose limestone fragments. Dark-brown or grayish-brown friable silt loam or plastic silty clay fills the spaces between outcroppings. This soil ranges from a few inches to several feet in depth. Where this material is deepest, the surface soil and subsoil are somewhat similar to those of the Mimosa soils. Runoff is very rapid and internal drainage is slow.

Use suitability (14).—All of this land type is either in pasture or in pastured woodland that consists chiefly of cedars. It is not suited to crops because of the many limestone outcrops. Pastures are suitable but droughty. Weed control is difficult because bedrock outcrops interfere with clipping. Some areas are best suited to forest.

Stony rolling land, Talbott and Colbert soil materials (5 to 12 percent slopes) (Sd).—This land type is chiefly in the southern and eastern parts of the county and occupies a position at or near the base of the Cumberland Escarpment. Practically all of it is in the Rockland, limestone—Rockland, sandstone—Stony land association. It is associated chiefly with the Colbert-Talbott silty clay loams, and with the Swaim soils and Rockland, limestone. About one-third to one-half the land surface is limestone outcrops. The spaces between the outcrops (fig. 10) are filled with fine-textured soil material that has properties similar to those of the Colbert soils. The material is yellow or red silty clay or silty clay loam and ranges from a few inches to 3 feet in thickness. Over the surface in most places are loose limestone fragments in addition to the bedrock outcroppings.

Figure 10.—**Limestone outcrops on Stony rolling land, Talbott and Colbert soil materials.**

Use suitability (14).—Most of this land type is in forest consisting chiefly of cedar. Deciduous trees predominate in a few places. The forests have been cut over several times, and the trees are now sparse and small.

This stony land type is unsuited to crops and poorly suited to pasture. It is best suited to forest, but a few of the less stony areas may be suitable for very limited grazing.

Stony hilly land, Talbott and Colbert soil materials (12 to 25 percent slopes) (Se).—This land type is chiefly in the southern and eastern parts of the county and forms a large part of the Cumberland Escarpment. Practically all of it is in the Rockland, limestone—Rockland, sandstone—Stony land association. About

one-third to one-half of the surface is covered by outcroppings of argillaceous limestone bedrock. Yellowish or reddish silty clay loam to silty clay fills the spaces between outcroppings to depths ranging from a few inches to 3 feet. This material has properties similar to those of the Colbert soils. In addition to rock outcrops, loose limestone fragments are on the surface in most places. A few small areas of hilly Colbert soils are included with this separation.

Use suitability (14).—Practically all of this land type is in forests consisting chiefly of cedars. In some places deciduous trees predominate. The forests have been cut over several times, and the trees are sparse and small.

This land type is unsuited to crops and poorly suited to pasture. It is best suited to forest, but a few of the less stony areas may be suitable for very limited grazing.

Stony steep land, Talbott and Colbert soil materials (25 to 60+ percent slopes) (Sf).—This land type is characterized by numerous limestone outcrops. It is chiefly in the southern and eastern parts of the county and forms part of the Cumberland Escarpment. Practically all of it is in the Rockland, limestone—Rockland, sandstone—Stony land association.

About one-third to one-half the surface is covered by outcroppings of limestone bedrock. Yellowish or reddish silty clay loam to silty clay material fills the spaces between outcrops to depths ranging from a few inches to 3 feet. Most of this material has properties similar to those of the Colbert soils. In addition to bedrock outcrops, there are loose limestone fragments on the surface in many places.

Use suitability (18).—Nearly all of this land type is in forest consisting chiefly of cedars. The forests have been cut over many times, and the trees are sparse and small.

The land type is unsuitable for both crops and pasture. It is probably best suited to forest, but a few of the less stony areas may be suitable for very limited grazing.

Swaim silty clay loam, eroded rolling phase (5 to 12 percent slopes) (Sg).—This is a moderately well drained heavy-textured soil of the colluvial lands. It was derived from old colluvium that washed chiefly from uplands occupied by Colbert soils and is underlain by clayey limestone. It occurs chiefly at the foot of the Cumberland Escarpment on fanlike areas at the base of the slopes from which the parent material has washed. These areas are relatively small and widely separated and are closely associated with Jefferson, Pace, and Hermitage soils. The soil has formed under a deciduous forest that included some cedars.

Profile description:

0 to 6 inches, grayish-brown to light-brown friable silt loam or firm silty clay loam.
6 to 16 inches, yellowish-brown firm silty clay loam.
16 to 40 inches, yellowish-brown or brownish-yellow very firm silty clay, splotched with gray, yellow, and brown; contains soft black concretions.
40 inches +, brownish-yellow plastic silty clay, splotched with gray and yellow; limestone bedrock at depths ranging from 3 to 9 feet.

In most areas of this soil, remnants of the original surface layer have been mixed with the upper part of the subsoil. In many small areas the plow layer is entirely in the original subsoil. A few small tracts have little or no erosion. Shallow gullies have formed in most areas, and deep ones are common.

The soil is medium acid and contains a moderate amount of organic matter and plant nutrients. Runoff is rapid, internal drainage is medium, and the moisture-supplying capacity is fair. The soil is moderately permeable to plant roots, but circulation of air and moisture is moderately slow.

A few small areas included with this soil have slopes that range from 12 to 25 percent. This soil merges gradually into Stony hilly land or Stony rolling land in most places, and the boundaries are not always distinct. Consequently, many rock outcrops occur on the upper slopes of this soil; they are indicated on the soil map by symbols. On long gentle slopes, this soil often merges into the Hermitage soils, and as a result, some reddish-brown soils are included.

Use suitability (9).—Most of this soil has been cleared and used for pastures and crops. Somewhat less than half the area is now abandoned or in brushy pasture, and a small part is in forest. Corn, wheat, soybeans, lespedeza, and red clover are the main crops.

Susceptibility to erosion and fair to low moisture-supplying capacity limit the usefulness of this soil. Runoff from the mountain slopes increases the erosion problem. The control of runoff generally requires long rotations and engineering devices, or both. Many kinds of crops can be grown successfully if the management is good. However, because the soil is droughty, wide variations in yields can be expected. Average yields will be less than on the associated Hermitage soils. Fertilization is necessary for alfalfa and red clover. The soil is somewhat difficult to work. It tends to puddle if plowed when too wet and to become cloddy if plowed when too dry. The moisture range for satisfactory tillage is narrow. Many areas are best suited to permanent pasture or semipermanent hay.

Swaim silty clay loam, eroded undulating phase (2 to 5 percent slopes) (Sh).—This is a moderately well drained heavy-textured soil of the colluvial lands. It was derived from old colluvium that washed chiefly from uplands underlain by clayey limestone. These uplands are occupied by Colbert soils and the associated stony lands or rocklands. This soil differs from Swaim silty clay loam, eroded rolling phase, chiefly in slope. It has less rapid runoff and is less susceptible to erosion.

Most of this soil is moderately eroded. In some places most of the original surface layer remains, but generally the plow layer consists of remnants of the original surface layer mixed with the upper part of the subsoil. In places, the subsoil is exposed and many shallow gullies have formed. The present surface layer is grayish-brown to light-brown friable silt loam or firm silty clay loam. The subsoil is yellowish-brown or brownish-yellow very firm silty clay. It is splotched with gray, yellow, and brown and contains soft black concretions.

Limestone bedrock outcrops in places but does not seriously interfere with tillage. In some places the subsoil is reddish brown, highly plastic, and slowly per-

meable. A few forested areas that are included are only slightly eroded.

The soil is generally medium acid and has a moderate amount of organic matter and plant nutrients. It is permeable to plant roots, but circulation of air and water is moderately slow. Runoff is medium, and internal drainage is moderately slow. The moisture-supplying capacity is fair. The soil is easily worked, but the moisture range for satisfactory tillage is narrow.

Use suitability (9).—Most of this soil has been cleared and is now used for pasture or crops. A very small acreage is pastured woodland. Corn, wheat, soybeans, lespedeza, red clover, and buckwheat are the principal crops.

This soil is fairly well suited to pasture and crops. It is susceptible to erosion, but soil losses can be controlled by shorter rotations than those used on Swaim silty clay loam, eroded rolling phase. Amendments are needed to establish good pastures and to grow deep-rooted legumes successfully; a fair to low moisture-supplying capacity restricts the response to good management.

Taft silt loam (0 to 3 percent slopes) (Ta).—This imperfectly drained soil occurs mainly in slight depressions on old high terraces. Some areas are on low terraces along practically all the large streams in the county. Most of Taft silt loam is in the Decatur-Dewey-Cumberland soil association, but some areas are in the Mountview-Baxter soil association. This soil is closely associated with Capshaw, Robertsville, Cumberland, Etowah, Lindside, and Melvin soils. It was derived from old alluvium that washed from uplands underlain by many kinds of rocks. Material from limestone predominates. This soil is better drained than the Robertsville and less well drained than the Capshaw soils.

Profile description:

0 to 8 inches, gray to light brownish-gray mellow silt loam; surface 1 or 2 inches in undisturbed areas stained dark gray and underlain abruptly by mottled light-gray and yellowish-brown material.
8 to 22 inches, brownish-yellow or pale-yellow friable silty clay loam or heavy silt loam, splotched with gray; highly mottled in lower part.
22 to 48 inches, compact silt loam, silty clay loam, or in places silty clay; highly mottled with light brownish gray and strong brown; soft black concretions, very numerous in some places.
48 inches +, yellowish-red to brownish-yellow friable heavy silt loam or silty clay loam; gray mottlings; limestone bedrock at depths ranging from 6 to 12 feet.

This soil varies considerably in profile characteristics. In many places it has a brownish-gray surface soil and a finer textured profile than that described. The depth to the compact layer ranges from 18 to 30 inches. In use and management requirements, areas with these variations do not differ significantly from the soil described.

The soil is medium to strongly acid. It is low in organic matter, plant nutrients, and moisture-holding capacity. Runoff is very slow to medium and internal drainage is slow. The surface soil and subsoil are permeable, but the compact layer is relatively impermeable. The water table is at or near the surface in rainy seasons, especially during winter and early in spring.

Use suitability (8).—A large part of this soil is in forest and pasture, and some is idle. Forests consist of sweetgum, blackgum, beech, ash, hickory, and willow oak. In most places, this soil is used and managed like the adjacent Capshaw or Robertsville soils. Crop failures are more common, and average yields are less on this soil than on the adjacent better drained soils. Crops that are more water tolerant are usually planted on areas of this soil that are large enough to be used as a unit. In such areas, corn, lespedeza, soybeans, and sorghum are the principal crops.

Imperfect drainage limits the use suitability of this soil. Pasture is well suited, but crops that require tillage are only fairly well suited. Small grains and alfalfa are poorly suited. In most places, the soil is free of stones or gravel and easy to work when not waterlogged.

Tyler silt loam (0 to 3 percent slopes) (Tb).—This is a poorly drained to imperfectly drained soil of the stream terraces. It is widely distributed in the Highland Rim section, but it is mainly in the northeastern part of the county. Most of it is in the Whitwell-Holston-Cumberland soil association. This soil consists of old alluvium that washed from uplands underlain chiefly by sandstone. Most of it occurs in depressed areas and is associated with the Whitwell, Sequatchie, Waynesboro, and Purdy soils. The native vegetation consisted mainly of water-tolerant trees.

Profile description:

0 to 8 inches, light brownish-gray to gray friable silt loam.
8 to 20 inches, light yellowish-brown to pale-yellow moderately friable silty clay loam or clay loam.
20 to 40 inches +, light-gray compact silty clay or silty clay loam, mottled with strong brown; numerous chert fragments and yellowish-red hard concretions; material below a depth of 40 inches is less compact in most places.

This soil is strongly to very strongly acid and low in organic matter, fertility, and productivity. Runoff is slow to very slow, and internal drainage is very slow. The compact layer is relatively impermeable to air, roots, and water, and the layers above it are saturated with water much of the time. The soil varies in moisture-supplying capacity, and crops often are damaged either by extended wet or dry weather. Although most of this soil is poorly drained, a few very poorly drained areas that resemble the Purdy soil are included.

Use suitability (8).—Most of Tyler silt loam is in permanent pasture or in forest. Corn, hay, and sorghum are grown on a few areas, but generally yields are low. Pastures consist mainly of water-tolerant vegetation.

In its present condition, this soil is probably best suited to pasture and hay, but corn, sorghum, and soybeans are grown with varying degrees of success. Artificial drainage would broaden the use suitability and increase average yields of crops now grown, but the soil is hard to drain adequately. Tile drains would not likely be effective because of the compact layer in the subsoil. In many places open ditches, bedded soil, improved slope of field rows, and diversion ditches or terraces on adjacent soils will help drain off surface water. Lime and fertilizer requirements are high. The response to these soil amendments may not be so favorable on this soil as it is on the associated Waynes-

boro and Whitwell soils, because of the poor drainage and the relatively impervious layer. Pastures and hay crops can be improved by using lime, phosphorus, and possibly potassium.

Waynesboro loam, undulating phase (2 to 5 percent slopes) (Wc).—This well-drained friable soil is on old high stream terraces in the Highland Rim section. Most of it is in the northeastern part of the county near the Elk River, but it also occurs in coves where streams flow from the Cumberland Plateau. This soil is mainly in the Cumberland-Waynesboro-Sequatchie and the Waynesboro-Holston-Whitwell soil associations. It is closely associated with the Nolichucky, Holston, and Cumberland soils. Like the Nolichucky soils, it consists of old alluvium that washed mainly from sandstone but that includes some materials from limestone. It is somewhat coarser textured, more friable, and lighter colored than the Cumberland soils. The native vegetation was deciduous forest.

Profile description:

0 to 12 inches, grayish-brown to brown very friable loam.
12 to 36 inches, red to yellowish-red firm clay loam.
36 inches +, red to dark-red firm sandy clay or clay loam; some yellowish streaks or splotches; limestone bedrock at depths ranging from 10 to 20 feet.

This soil is medium to strongly acid and moderately well supplied with plant nutrients and organic matter. It is permeable to air, roots, and moisture. The moisture-holding capacity is high. Runoff is slow to medium and internal drainage is medium.

Use suitability (4).—This soil is now in forest. If cleared, it would be well suited to pasture and many kinds of crops. If propertly fertilized, it will also produce red clover and alfalfa. Row crops can be grown in fairly short rotations that include close-growing crops. The soil is very easily worked and easily conserved. Some cobblestones and gravel are on the surface and throughout the profile, but they do not interfere with tillage.

Waynesboro loam, eroded undulating phase (2 to 5 percent slopes) (Wd).—This well-drained friable soil occurs on old high stream terraces. It is for the most part in the Cumberland-Waynesboro-Sequatchie and Waynesboro-Holston-Whitwell soil associations. The old alluvium from which it was derived was washed chiefly from uplands underlain by sandstone, but some materials from limestone are included. Most of this soil has lost a small part of the original surface layer, including the thin layer high in organic matter. A few areas have lost a considerable part of the surface layer, and on some very small areas the subsoil is exposed. Occasional shallow gullies have formed.

The present surface layer ranges from brown or grayish-brown to yellowish-red loam to clay loam. The subsoil is red to yellowish-red firm clay loam or silty clay loam.

Use suitability (4).—The soil has been cleared and is used for crops and pasture. Corn, small grains, lespedeza, crimson clover, cotton, and soybeans are the most commonly grown crops.

This soil is well suited to all the common crops of the county, including alfalfa and red clover. Fertilization is necessary for continuous high yields of all crops and is essential for alfalfa and red clover. The soil is suited to moderately intensive use and could be maintained if the rotations included row crops not more than half the time. It is easy to work and conserve. It is well suited to pasture, but lime and phosphorus are needed for high yields.

Waynesboro loam, rolling phase (5 to 12 percent slopes) (We).—This friable well-drained soil is on high stream terraces. It occurs on the Highland Rim, chiefly along the Elk River and in the eastern part of the county. Most of the soil is in the Cumberland-Waynesboro-Sequatchie and Waynesboro-Holston-Whitwell soil associations. It was derived from old alluvium that washed from uplands underlain chiefly by sandstone, but some limestone material is included.

The surface soil is a grayish-brown to brown friable loam. The upper 1 to 2 inches is stained dark-grayish brown by organic matter in most places. The subsoil is red to yellowish-red firm to friable clay loam or silty clay loam.

Use suitability (5).—This soil is in forest consisting mainly of oaks and hickories.

If cleared, the soil would be easy to work, fairly easy to conserve, and productive of most of the common crops of the county. Areas of the soil are generally small and isolated from other croplands. Use and management would be similar to that of Waynesboro loam, eroded rolling phase.

Waynesboro loam, eroded rolling phase (5 to 12 percent slopes) (Wf).—This well-drained soil is on high stream terraces in the Cumberland-Waynesboro-Sequatchie and Waynesboro-Holston-Whitwell soil associations. The parent material was washed mainly from uplands underlain by sandstone but included some material from limestone. This soil differs from Waynesboro loam, undulating phase, in being somewhat more eroded and in having stronger slopes.

A considerable part of the original surface soil has been lost, and the surface layer is now mixed with subsoil material. The amount of mixing is quite variable, however, and consequently the present surface soil varies in depth, color, and texture. The color ranges from brown or grayish brown to yellowish red and the texture from loam to clay loam. The subsoil is red to yellowish-red firm clay loam or silty clay loam. Small severely eroded spots are conspicuous because the reddish subsoil is exposed. Shallow gullies are numerous.

Use suitability (5).—This soil has been cleared and is cultivated. Most of the acreage is used for corn, small grain, hay, and miscellaneous crops. Very little soil is abandoned or idle; less than a tenth of it is in permanent pasture. Many kinds of crops are grown, but systematic rotations are not followed.

The soil is well suited to pasture and moderately well suited to crops commonly grown in the area. Management requirements are more exacting than for Waynesboro loam, undulating phase, chiefly because slopes are stronger.

Fertilizer and lime requirements, however, are similar. Crop rotation must be longer or supported by measures that control runoff, such as terraces, contour

tillage, or stripcropping. The soil is susceptible to erosion when not covered by vegetation.

Waynesboro clay loam, severely eroded rolling phase (5 to 12 percent slopes) (Wa).—This well-drained soil is on old high stream terraces. It occurs in small, widely separated areas on the Highland Rim, mainly in the Cumberland-Waynesboro-Sequatchie and Waynesboro-Holston-Whitwell soil associations. It was derived from old alluvium that washed from uplands underlain chiefly by sandstone but that included material from limestone. This soil differs from Waynesboro loam, undulating phase, principally in slopes and erosion. The degree of erosion varies greatly within short distances. In most places the plow layer is entirely in the original subsoil or consists of remnants of the original surface layer mixed with the upper part of the subsoil. Many shallow gullies and a few deep gullies have formed.

The present surface layer is brown to yellowish-red loam or clay loam. The subsoil is red to yellowish-red firm clay loam or silty clay loam.

Use suitability (11).—This soil has been cleared and used for pasture and crops. A large part of the acreage is now idle or abandoned.

The soil has been severely damaged by erosion, and is only fair for crops and pastures. A number of crops can be grown, but yields are generally low. Good tilth is hard to maintain, but the soil is easy to work. It is hard to conserve because of susceptibility to further erosion. Gullies interfere with the use of heavy farm equipment. Management requirements are very exacting. Fair to good pastures can be established and maintained if management is good. Properly managed pastures should restore the fertility and physical properties so that the soil can again be used for crops.

Waynesboro clay loam, severely eroded hilly phase (12 to 25 percent slopes) (Wb).—This soil occurs in small, widely separated areas in the Cumberland-Waynesboro-Sequatchie and Waynesboro-Holston-Whitwell soil associations. It differs from Waynesboro loam, undulating phase, chiefly in slope and erosion. In addition it varies more in profile characteristics, especially in thickness of the terrace deposit. The loss of water by runoff is higher, and the moisture-supplying capacity is considerably lower. Most of the original surface soil, and in places part of the subsoil, have been lost as a result of accelerated erosion. Many shallow gullies have formed, and there are a few too deep to be crossed by heavy machinery. On some intergully areas the plow layer is a mixture of the remains of the original surface soil and the subsoil.

The present plow layer consists of brown to yellowish-red friable clay loam. The subsoil is red to yellowish-red firm clay loam or silty clay loam. Included are a few small areas that are less eroded than the soil described.

Use suitability (14).—Large parts of this soil are in unimproved pasture and in idle and abandoned land. Some areas are used for crops. Yields of crops and of pasture are very low.

This soil is less suitable for crops and pasture than the severely eroded rolling phase of Waynesboro clay loam chiefly because it has stronger slopes. It is also difficult to work and conserve. Ordinarily it is better suited to permanent pasture than to field crops. Lime and phosphorus are essential for the establishment and maintenance of good pastures, which can be improved in quality if the soil is properly managed.

Whitwell loam (1 to 5 percent slopes) (Wg).—This is an imperfectly drained to moderately well drained soil of the low stream terraces. It occurs on the low terraces of many of the larger creeks in the Highland Rim section, but most of the acreage is along Elk River. An important part is along creeks flowing from the coves of the Cumberland Escarpment. Whitwell loam is closely associated with Sequatchie, Holston, Waynesboro, Tyler, and Purdy soils in the Whitwell-Holston-Cumberland and Waynesboro-Holston-Whitwell soil associations. The soil was derived from alluvium that was washed from uplands underlain chiefly by sandstone. It developed under a deciduous forest that included some water-tolerant trees. The soil is underlain by limestone at depths of 5 feet or more.

Profile description:

0 to 8 inches, brown to grayish-brown very friable loam.
8 to 18 inches, brownish-yellow to yellowish-brown friable heavy loam, clay loam, or silty clay loam.
18 to 30 inches, mottled gray, yellowish-brown, and strong-brown moderately friable clay loam or silty clay loam.
30 inches +, mottled gray and brownish-yellow moderately friable clay loam or silty clay loam.

Mottling occurs at depths ranging from 12 to 20 inches, depending upon the drainage. In most areas either mottling or a grayish tinge is at about 16 or 18 inches. In places the subsoil is slightly to moderately compact, but it is generally friable and does not form a pan layer.

The soil is medium to strongly acid and moderately well supplied with plant nutrients. Air, water, and plant roots permeate the soil readily when the water table is low. For a large part of the year, the water table is within 2 or 3 feet of the surface. Consequently, the root zone is limited and the soil poorly aerated during part of the growing season. The moisture-supplying capacity is high.

Use suitability (6).—Most of this soil has been cleared and is used for crops or pasture. The crops commonly grown are corn and oats, and crimson clover, soybeans, and other hay crops.

Imperfect drainage limits the use suitability of many areas. The soil is well suited to corn, permanent pastures, and many kinds of hay but not to alfalfa. Some areas are well suited to wheat, but many are too wet. Farmers prefer to use this soil for rotation pasture and crops rather than for permanent pasture. The soil can be used intensively if the management is good and organic matter and fertility are maintained. It needs phosphorus and potassium for continuous high yields of most crops.

Interpretative Soil Groupings

Interpretative groupings help in evaluating the suitability of individual soils for agriculture, forestry, or other uses. Three such groupings have been made of

the soils of Franklin County, one based on use and management, one on capability, and one on geographic associations of soils. These groupings are discussed in the following sections.

Use and Management of Soils

Good soil management makes it possible to obtain consistently good yields and at the same time keep the soil in good condition. Crop selection, crop rotation, fertilization, suitable methods of cultivation, and control of weeds, diseases, and insects are basic management practices applicable to all soils. Individual soils, however, differ widely in use suitability and specific management needs. To simplify the discussion of management, the soils mapped in Franklin County have been combined into 18 groups, each group consisting of soils that have similar management needs.

In the following pages, two levels of management are discussed for each group: (A) prevailing management, and (B) improved management, similar to that used by the farmers of the county who get better yields. For each management group, there is a table showing the yields that can be expected under each of the two levels of management. These are average yields, each based on at least a 5-year period. Higher yields are possible in favorable seasons, especially with more liberal use of fertilizer. To raise yields from those in the "A" columns to those in the "B" columns will generally require at least two complete rotation cycles under the high level of management. New crop varieties, improved tillage methods, or better methods of controlling plant diseases and insects will likely make still higher yields possible in the future.

Information on testing soils for available plant nutrients and specific recommendations on kinds and quantities of fertilizer to be used can be obtained from the county agricultural agent.

Management group 1

The soils of management group 1 are fair to excellent for crops and pasture. They are nearly level and subject to flooding. The Huntington and Ennis soils are well drained and the Bruno excessively drained. The Huntington and Ennis soils are good to excellent for crops and pasture. All soils, except the Bruno soil, are fertile and produce high yields of the adapted crops without the use of amendments. They are well supplied with lime, organic matter, and plant nutrients, which are replenished periodically by flood sediments. Moisture is favorable for plant growth most of the time. The soils have favorable properties that allow tilth to be easily maintained. The Bruno soil is only fairly well suited to crops and pasture because of low productivity and low moisture-supplying capacity. It can be tilled over a wide range of moisture content. Ennis cherty silt loam is not so easily worked as the others because it is cherty.

Table 7 shows yields of adapted crops to be expected on these soils under two levels of management.

TABLE 7.—*Soils of management group 1 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Bruno loamy fine sand	15	30	(2)	(2)					0.4	0.8					40	65
Ennis cherty silt loam	30	45	(2)	250	(2)	14	(2)	35	.9	1.4					80	110
Huntington silt loam	45	70							1.4	1.6			(2)	160	120	150
Huntington fine sandy loam	40	65	350	450	(2)	(2)	(2)	(2)	1.2	1.5			(2)	150	110	140

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.
[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—These soils are used intensively for corn, cotton, wheat, and hay. Soybeans are grown on a large acreage for hay and seed. Very little alfalfa is grown. However, lespedeza is grown on a considerable acreage for hay or pasture. Vetch and crimson clover are grown principally for soil improvement. Cotton and potatoes are the chief cash crops. Watermelons for market are grown on the Bruno soil.

Systematic rotations of crops are not practiced on the soils of this group. Many farmers break the sequence of row crops every few years by planting hay. A few farmers alternate corn or cotton crops with a green-manure crop. Row crops are grown continuously on some areas.

Very little lime and fertilizers are used. Since the plant nutrients of all soils are occasionally replenished by flood sediments, many farmers feel that fertilizers

are not necessary. Corn is seldom fertilized, but cotton gets moderate amounts of a complete fertilizer. Potatoes generally get heavy applications of a complete fertilizer. The control of insects and plant diseases is generally inadequate.

Use suitability and management requirements.—The soils of this management group are well suited to intensive use for crops, but periodic flooding limits their use suitability. They are very well suited to corn and the summer annual hay crops. They are poorly suited to alfalfa but better suited to red clover. Small grains mature later and are more susceptible to lodging and to diseases than on soils of the uplands. The soils are well suited to vegetables but are little used for them because of distance to market.

The selection of adapted crops is very important in the management of these soils. Adapted crops can be successfully grown almost continuously, but short rotations are desirable on most farms. A corn-hay rotation should be well suited to the soils, but a corn-vetch or crimson clover-corn rotation is successfully used on many farms. Vetch and crimson clover, planted in fall and plowed under as green manure in spring, are beneficial to soil that is used for corn every year. Cotton and potatoes can be grown in short rotations with lespedeza or red clover and corn. Small grains can be successfully grown along streams that flood only for short periods.

Good crop yields are obtained without amendments, but fertilizers are needed for continuous high yields. Most of the soils respond well to fertilizers. Lime and phosphorus are required to establish and maintain red clover. Nearly all crops respond well to liberal applications of phosphorus. The need for potassium depends on the crop to be grown and the previous cropping system used on the soil. Nitrogen is needed if the soil is continuously cropped. A legume in the rotation will supply enough of this element for good yields of the first crop that follows the legume. The use of crop residues, green manure, or barnyard manure will maintain organic matter on land not subject to beneficial silting.

Special practices to control runoff are not necessary. The soils are not ordinarily susceptible to erosion, but hedges, levees, or diversion ditches may be necessary to protect them against floods and runoff from higher land.

Most of the soils of this group are also very well suited to pasture because they stay moist and productive in hot, dry seasons. The Bruno soil is only fairly well suited to pasture. Pasture management consists of applying lime and phosphorus, growing suitable pasture plants, and controlling grazing. Orchardgrass or tall fescue mixed with Ladino clover or white clover is well suited to these soils. Weed control on fertilized pastures is not a problem if grazing is controlled. Excess herbage and undesirable plants are removed by mowing. Weed control is difficult on the Ennis soil because chert interferes with mowing. Droppings should be spread on productive, heavily grazed pastures.

Management group 2

Management group 2 consists of moderately well drained to imperfectly drained, nearly level soils on first bottoms subject to overflow. They are good for summer crops and good to excellent for pasture. Supplies of lime, organic matter, and plant nutrients vary but are relatively good. They are more abundant than in the associated soils of the uplands. Fresh sediment deposited by floodwaters help maintain the supply of plant nutrients and organic matter. These soils are fairly easily worked and easily conserved. Some of the soils in this group are moderately fine textured and can be worked satisfactorily only within a narrow range of moisture content. Chert in the Lobelville soil interferes with tillage.

Table 8 shows yields of adapted crops to be expected under two levels of management.

TABLE 8.—*Soils of management group 2 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not physically suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Dunning silty clay loam, better drained phase	32	50							1.2	1.5					90	110
Egam silty clay loam	30	45	(2)	400	(2)	15	(2)	35	1.0	1.5	(2)	2.8			80	110
Lindside silt loam	35	60							1.2	1.5					100	140
Lindside silty clay loam	30	50							1.1	1.4					90	130
Lindside fine sandy loam	30	55				(2)		(2)	1.1	1.4					95	135
Lobelville cherty silt loam	20	40							.8	1.3					65	100
Ooltewah silt loam	40	60							1.2	1.5					100	140

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—The soils are used for pasture or crops. They are used intensively for corn, soybeans, lespedeza, and other annual hay crops. Systematic rotations of crops are not commonly practiced. The soils are generally used rather intensively for corn, but an occasional hay crop is grown. Some farmers apply lime to these soils but few use fertilizers. Seedbed preparation and tillage are frequently inadequate. Cornfields are usually very weedy in wet seasons. Tile drainage is seldom used, although open ditches partially drain some areas.

Use suitability and management requirements.—Although good for crops and good to excellent for pasture, the soils of this group are limited in use suitability by moderately good to imperfect drainage and by susceptibility to flooding. Corn, lespedeza, soybeans, sorghum, grasses, and the legumes such as white, Ladino, alsike, and red clovers produce good yields if management is good. Alfalfa, cotton, and fruit trees are not well suited. Small grains tend to lodge and winterkill on these soils.

The soils of this group can be used intensively, but crop yields can be increased by the use of fertilizers and short rotations that include legumes. Rotations consisting of meadow, corn, and soybeans or of meadow and corn can be used successfully. Lespedeza, alsike clover, red clover, orchardgrass, redtop, white clover, and tall meadow fescue can be grown for hay or pasture.

These soils produce fair to moderate yields of crops without fertilizers. However, yields can be increased by the use of lime and commercial fertilizers. Row crops should have moderately large applications of complete fertilizers. All crops need phosphorus. Lime, phosphorus, and potassium are needed to develop good stands of legumes. The nitrogen required for moderate yields can be supplied by legumes in the rotation, particularly if they are plowed under. Commercial nitrogen is needed for continuous high yields of crops. Barnyard manure supplies nitrogen and potassium and increases the humus content of the soil, but it should be supplemented with phosphorus.

If artificially drained, these soils would produce a wider variety of crops and become more productive. The advisability of drainage, however, and the kind of drains to use will depend on cost, engineering feasibility, and the extent of other soils on the farm. Surface water may be controlled and internal drainage improved by diversion ditches and open drains, and by bedding the soil. The soils are not ordinarily susceptible to erosion, except along streambanks. Excessive overwash from adjacent slopes can be prevented by diversion ditches.

These soils are good for pasture because of their good moisture relations and productivity. Pastures can be improved by the use of fertilizers and selected pasture plants. Lime and phosphorus help to produce good stands. Orchardgrass or tall fescue mixed with whiteclover is adapted to these soils if fertility is good. Lespedeza and redtop are suitable if fertility is low. Pastures should be properly grazed, adequately fertilized, and occasionally mowed. Droppings should be spread on heavily grazed pastures.

Management group 3

The soils of management group 3 are well-drained soils of the colluvial lands and low terraces. They are good to excellent for crops and pasture. They are not ordinarily flooded, and for this reason are adapted to a wider range of crops than the soils of management group 1. All the soils are deep and permeable and have a moisture content favorable for plant growth. Included with the Emory silt loam are soils in depressions that are subject to ponding for short periods.

TABLE 9.—*Soils of management group 3 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not physically suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Barbourville fine sandy loam	25	50	(2)	(2)	10	20	25	40	0.8	1.5	------	(2)	(2)	170	70	120
Emory silt loam	40	70	380	500	14	22	40	60	1.2	1.8	2.5	3.5	160	180	120	150
Emory cherty silt loam	30	60	350	450	12	20	30	50	1.0	1.5	2.3	3.2	155	175	110	135
Greendale silt loam	30	50	(2)	450	12	20	28	45	1.0	1.6	2.0	3.2	(2)	170	90	130
Greendale cherty silt loam	25	45	(2)	400	10	18	20	40	.9	1.4	1.7	3.0	(2)	165	80	120
Humphreys cherty silt loam	25	45	(2)	400	10	18	20	40	.9	1.4	1.7	3.0	(2)	130	80	120
Sequatchie fine sandy loam, undulating phase	35	55	360	500	16	25	28	45	1.0	1.5	2.2	3.0	140	160	70	115

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

The content of organic matter and plant nutrients is moderately high to high in the soils of this management group, and the moisture-supplying capacity is high to very high. These soils occasionally receive sediments from floods that tend to replenish plant nntrients and organic matter. Good tilth is easily maintained. The soils can be tilled without injury over a fairly wide range of moisture conditions.

Yields of adapted crops on these soils under two levels of management are shown in table 9.

Present use and management.—The soils of this group are used somewhat intensively for corn, wheat, oats, cotton, lespedeza, crimson clover, and soybeans. A small acreage is used for potatoes and for pasture. These soils generally occur in small areas in the uplands or on high terraces, and their use is influenced greatly by that of adjacent soils.

Systematic crop rotations are not ordinarily used unless these soils occur in fields with other soils on which crops are grown in rotations. A green-manure crop is grown every few years on soils that are used intensively for row crops.

These soils get manure, lime, and fertilizers according to the requirements of other soils that are associated with them on the high terraces or on the uplands. The response to these amendments is good. Corn and wheat usually get light applications of a complete fertilizer. Potatoes receive large amounts of a complete fertilizer. Potatoes get 1,000 to 1,500 pounds per acre of a complete fertilizer. Tillage is generally promptly and carefully performed. Most plowing is done in spring. Control of insects and diseases is generally inadequate.

Use suitability and management requirements.—These soils are suited to intensive use for crops. They are well suited to corn, hay, small grain, and vegetables. There is some lodging of small grain on the Emory soils. Alfalfa can be grown successfully, but it is probably better suited to Decatur and Dewey soils of the uplands. Areas of Emory silt loam that occur in sinks or depressions are not well suited to alfalfa.

Good yields are obtained from row crops grown almost continuously, but the use of short rotations is desirable on most soils. Rotations consisting of corn, wheat, and crimson clover or of corn, wheat, and red clover are well suited. Cotton or potatoes can be substituted for the corn and oats or barley for the wheat. Alfalfa can be substituted for the red clover on some areas, but if this is done a longer rotation is required. On some farms, it may be necessary to use this soil almost continuously for row crops. On these farms, a rotation consisting of corn and crimson clover is advisable. Cotton, potatoes, or any vegetable crop may be substituted for the corn.

The fertility of the soils of this group is generally high compared to that of other soils of the county. However, their response to proper fertilization is excellent. Nitrogen is needed even where it is supplied by legumes. Phosphorus is also generally needed for high yields of most crops. Potassium is less likely to be deficient, but some crops such as alfalfa may require it. The soils are not especially low in lime, but applications are generally beneficial, especially if red clover and alfalfa are grown. Where soils are used intensively for row crops, barnyard manure and crop residues should be added to maintain the proper content of organic matter.

The control of runoff is not a problem except in a few places where some of the soils receive excess runoff from the slopes above. In such places there is danger of injury from erosion and also from heavy deposits. Diversion of the runoff from such slopes will be needed. Contour cultivation may be needed. Natural waterways should remain in sod.

These soils are especially good for pasture because they stay moist and productive during hot dry weather. They are well suited to a mixture of orchardgrass or tall fescue and white or Ladino clovers. Phosphorus is the chief requirement for such pastures, but lime and potassium will also be needed.

Other management practices needed are control of grazing and scattering of droppings on heavily grazed pastures. Excess herbage and undesirable plants should be mowed occasionally.

Management group 4

The well-drained soils of management group 4 are good to excellent for crops and pasture. Most of the soils have been cleared, and only a small acreage is still in forest. All are moderately fertile and productive of the crops most commonly grown. They have mild slopes and are not seriously eroded or very susceptible to erosion. Compared with other well-developed soils in Franklin County, the content of organic matter and plant nutrients is moderate to high, and moisture is favorable for plant growth. These soils are easy to work and conserve. They are not stony, and good to excellent tilth can be maintained.

Yields of adapted crops to be expected under two levels of management are shown in table 10.

Present use and management.—Most of these soils are used for crops and pasture, but a small acreage is in timber. Corn, alfalfa, lespedeza, crimson clover, cotton, potatoes, and wheat and other small grains are the main crops. A considerable acreage is in pasture, mainly of the rotation type. Alfalfa is the chief hay crop. Crimson clover is grown for seed, but most of the crop is plowed under as green manure. Lespedeza is used both for hay and pasture. Potatoes are grown mainly on the loamy-textured Cumberland soils. Several nurseries that produce fruit trees and ornamental trees and shrubs are located on the Cumberland soils. Cotton is grown on all of these soils. A higher proportion of Waynesboro soils than of the other soils in this group is in cotton. The soils of this group are well suited to vegetables, but they are used more extensively for potatoes than for other vegetables.

Systematic rotations are used more on these soils than on those of any other management group. A commonly used rotation consists of corn or cotton and lespedeza for 2 years. Another common rotation is crimson clover, corn, wheat, and lespedeza. Crimson clover and small grains are sown in the fall as a part of the regular rotation or are planted especially for winter cover.

TABLE 10.—*Soils of management group 4 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Permanent Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Cumberland and Etowah silt loams, undulating phases	35	63	350	520	20	26	33	55	1.1	1.7	3.0	3.8	165	190	85	140
Cumberland and Etowah silty clay loams, eroded undulating phases	32	58	320	480	18	25	30	50	1.0	1.6	2.8	3.5	150	180	80	130
Cumberland and Etowah loams:																
Undulating phases	33	60	330	500	17	25	32	55	1.1	1.6	2.8	3.7	160	190	80	135
Eroded undulating phases	30	55	300	450	16	24	30	50	1.0	1.5	2.7	3.5	150	180	75	125
Decatur silt loam, undulating phase	33	60	330	500	19	26	32	55	1.1	1.7	3.0	3.8	150	180	85	140
Decatur silty clay loam, eroded undulating phase	30	55	300	450	18	25	30	50	1.0	1.6	2.8	3.5	140	170	80	130
Dewey silt loam, undulating phase	33	60	330	500	19	26	32	55	1.1	1.7	2.9	3.8	150	180	85	140
Dewey silty clay loam, eroded undulating phase	30	55	300	450	18	25	30	50	1.0	1.6	2.8	3.5	140	170	80	130
Hermitage silt loam, eroded undulating phase	30	55	300	450	16	24	30	50	1.0	1.5	2.7	3.5	140	170	75	125
Nolichucky loam, eroded undulating phase	20	40	260	380	10	18	20	35	.6	1.1	2.0	3.0	100	150	50	110
Waynesboro loam:																
Undulating phase	28	50	310	450	14	22	28	45	.9	1.5	2.5	3.5	135	175	70	125
Eroded undulating phase	25	48	280	400	12	20	25	42	.8	1.3	2.4	3.3	130	160	65	115

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

Alfalfa generally follows potatoes in the cropping sequence. Potatoes and alfalfa get heavy applications of complete fertilizers. Lime and borax are usually applied just before alfalfa is seeded. Corn usually gets a light application of a complete fertilizer. A moderate amount of complete fertilizer or superphosphate is applied to wheat. A few farmers topdress their wheat, oats, and barley in the spring with moderate amounts of ammonium nitrate.

Use suitability and management requirements.—The soils in this group are well suited to practically all crops commonly grown in the area. They can be intensively cropped. When properly fertilized and limed, they are some of the best soils in the county for alfalfa and red clover. The soils are better suited to corn than most soils of the uplands. Cumberland, Etowah, and Waynesboro soils are well suited to the growing of nursery stock.

If other management is good, these soils can be conserved and maintained or improved by using a rotation that includes a row crop every second or third year and a deep-rooted legume. These soils are very well suited to deep-rooted legumes such as alfalfa and red clover. A rotation of corn, a small grain, red clover, and grass is well suited. Any of the truck crops or tobacco can be substituted for the corn in this rotation. Another cropping system that is well suited consists of an intertilled crop followed by lespedeza and a small grain. A good practice is to sow barley or rye on the lespedeza sod for winter cover and pasture, and plow it under in the spring when the land is prepared for corn.

The soils of this group need lime, phosphorus, nitrogen, and possibly potassium for high yields of most crops. The response to fertilization is excellent. Moderate amounts of lime and phosphorus are necessary for the successful growth of the deep-rooted legumes such as alfalfa and red clover. These elements also greatly increase the yields of other legumes, especially those of lespedeza. Nitrogen is required for high yields of practically all crops except legumes and the crops that immediately follow legumes. Practically all crops respond well to phosphorus. The Nolichucky and Waynesboro soils are likely to be deficient in potassium for many crops. Large amounts of complete high-grade fertilizers are desirable for vegetables, tobacco, and potatoes. Properly conserved manure is an excellent source of nitrogen and potassium but should be supplemented with phosphorus.

Good tilth is easily maintained. The soils can be tilled over a fairly wide range of moisture content. Soil and moisture conservation is not a serious problem if suitable crops are grown and adequate amendments are used. Cultivation should be on the contour, and

natural waterways should remain in sod. Where long slopes are cultivated, stripcropping or terracing will be needed to control runoff.

These soils are also well suited to pasture. High-yielding pastures of good quality can be developed by applying lime and phosphorus. Weed control on fertilized pastures is not a problem if grazing is controlled and mowing is practiced. If properly fertilized, the soils are productive of orchardgrass, tall fescue, alfalfa, lespedeza, and white, Ladino, and red clovers. White clover or Ladino clover, mixed with orchardgrass or fescue, is well suited if fertility is high; redtop and lespedeza are better suited if the fertility is low.

Management group 5

Management group 5 is made up of rolling well-drained soils. They are deep and have friable to firm subsoils. Slopes seldom exceed 12 percent. The soils of this group are good for crops and good to very good for pasture. They are susceptible to erosion, and most areas have lost part of the surface soil. Compared with other cropped soils of the uplands or high terraces, these soils are high in organic matter, plant nutrients, and moisture-supplying capacity. The content of organic matter and plant nutrients, especially nitrogen, depends largely on the previous cropping system and the amount of soil lost through erosion. These soils are medium to strongly acid.

Yields of adapted crops under two levels of management are shown in table 11.

Present use and management.—Practically all areas of these soils have been cleared and are used mostly for crops and pasture. A very small part is in forest. Corn, wheat, alfalfa, lespedeza, crimson clover, cotton, potatoes, and soybeans are the chief crops. Cotton and potatoes are the principal cash crops. Alfalfa is the main hay crop, but a large acreage is used for annual hay. A considerable acreage is in rotation pasture, but very little is in permanent pasture.

Many kinds of crops are grown, but systematic rotations are not used. A few farmers use a 5-year rotation consisting of corn, a small grain, and alfalfa for 3 years. Potato growers use a rotation consisting of crimson clover, potatoes, alfalfa, and corn. Crimson clover is grown to improve the soil before planting potatoes. A mixture of oats and vetch or rye and vetch is grown for a winter cover. It is generally pastured and plowed under in spring for green manure.

Potatoes usually get heavy applications of a complete fertilizer. Lime and superphosphate are usually applied before alfalfa is seeded. Moderate amounts of complete fertilizers are used on corn, small grains, and cotton.

Plowing is done mostly in spring. Tillage is generally both timely and adequate. Runoff and erosion are not controlled on most farms.

Use suitability and management requirements.—These soils are well suited to practically all of the crops

TABLE 11.—*Soils of management group 5 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Allen fine sandy loam, eroded rolling phase	18	40	240	350	10	18	18	35	0.6	1.2	1.8	2.8	(2)	140	55	100
Cumberland silt loam, rolling phase	28	58	300	480	15	25	28	50	.9	1.6	2.6	3.5	148	180	75	130
Cumberland and Etowah silty clay loams, eroded rolling phases	26	52	280	420	13	20	25	45	.8	1.5	2.5	3.4	135	165	70	120
Cumberland and Etowah loams, eroded rolling phases	25	50	275	400	13	20	25	45	.8	1.4	2.5	3.4	135	165	65	120
Decatur silty clay loam, eroded rolling phase	25	50	275	400	13	20	25	45	.8	1.5	2.5	3.4	135	165	70	120
Dewey silt loam, rolling phase	28	55	300	450	14	25	28	50	.9	1.6	2.6	3.5	140	175	75	130
Dewey silty clay loam, eroded rolling phase	25	50	275	400	13	20	25	45	.8	1.5	2.5	3.4	135	165	70	120
Hermitage silt loam, eroded rolling phase	25	50	275	400	13	20	25	45	.8	1.4	2.5	3.4	135	165	65	120
Nolichucky loam, eroded rolling phase	18	35	240	350	8	16	16	30	.5	1.0	1.8	2.8	70	120	40	95
Waynesboro loam:																
Rolling phase	(2)	45	(2)	400	(2)	20	(2)	42	(2)	1.3	(2)	3.2	(2)	150	(2)	115
Eroded rolling phase	20	43	250	370	10	18	20	38	.6	1.2	2.2	3.0	110	140	60	110

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

commonly grown. They are very well suited to most hay crops, especially to alfalfa, but not so well suited to corn, tobacco, and truck crops as the soils in management group 4.

Because of their stronger slopes and greater susceptibility to erosion, the soils of this group cannot be used as intensively as those in management group 4. Crop rotations should be longer and include more close-growing crops. The selected crops must be grown in proper sequence if the soil is to remain productive or become more so. Row crops should be alternated with close-growing crops; the inclusion of deep-rooted crops at intervals is beneficial. A row crop may be grown safely every 4 to 6 years if fertilization and other management is good. A rotation consisting of corn, a small grain, and alfalfa for 4 years is very well suited to these soils. Winter cover crops should be planted following the harvest of clean-cultivated crops. Supplies of organic matter can be maintained if grass is grown periodically in the rotation. However, if grass is omitted from the rotation, green-manure crops should be grown.

These soils need lime, phosphorus, and nitrogen for continuous high yields of most crops. Lime and phosphorus are needed particularly for legumes and grasses. Nitrogen is needed for all crops except where it is supplied by legumes. Potassium is generally required for the deep-rooted legumes, but less of it is needed for other crops. The need for potassium depends mainly on the crop to be grown and the past management of the soil.

On uneroded areas good tilth is easily maintained, but on eroded areas tillage is possible only within a limited range of moisture content. Tilth can be improved if grasses, deep-rooted legumes, and green-manure crops are grown. Fall plowing may also improve the tilth, but could cause excessive runoff and soil erosion on fall-plowed fields.

Contour tillage should be used wherever feasible because it conserves soil and moisture. Terracing is advisable on the more friable soils that are to be cultivated. Stripcropping is desirable on the longer tillable slopes where terraces are impractical. Natural waterways should remain in sod.

The soils of this management group are very well suited to pasture. They are not as productive as those in group 3 or group 4 because the moisture supply is less favorable for plant growth. Good pastures can be established without amendments, but an excellent response is obtained from the use of lime and phosphorus. Nitrogen fertilizers or barnyard manure help establish pasture plants. Once the pasture is established, legumes in the plant mixture should supply most of the nitrogen needed for high yields. Mixtures of orchardgrass and Ladino clover or white clover, or tall fescue and Ladino clover are well suited. Where fertility is low, redtop and lespedeza are easier to establish and maintain. Other management includes the control of undesirable plants and of grazing.

Management group 6

The soils of management group 6 are poor to good for crops and fair to very good for pasture. All the soils are well drained to moderately well drained except the Whitwell soils, which range to imperfectly drained. All are friable, and easy to work and conserve. In addition, they are permeable to air, roots, and water. Rainfall is readily absorbed. The water-holding ca-

TABLE 12.—*Soils of management group 6 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Capshaw silt loam	25	45	280	400	12	20	25	40	0.8	1.3	2.2	3.0	(2)	120	70	110
Dickson silt loam:																
Undulating phase	21	40	210	375	9	16	21	40	.6	1.3	-----	-----	(2)	90	45	110
Eroded undulating phase	20	35	200	350	8	16	20	38	.5	1.2	-----	-----	(2)	80	40	100
Holston loam:																
Undulating phase	21	45	240	425	9	18	19	40	.7	1.4	(2)	2.8	(2)	110	45	110
Eroded undulating phase	20	42	225	400	8	16	18	38	.6	1.2	-----	2.5	(2)	100	40	105
Mountview silt loam:																
Undulating phase	28	45	275	425	10	20	22	42	.7	1.4	(2)	2.8	(2)	110	55	120
Eroded undulating phase	25	42	250	400	9	18	20	40	.6	1.3	-----	2.6	(2)	100	50	115
Pace cherty silt loam, eroded undulating phase	20	35	180	350	8	16	20	35	.7	1.2	-----	-----	70	130	60	100
Whitwell loam	30	50	250	350	10	16	20	35	1.0	1.5	-----	-----	(2)	(2)	65	110

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

pacity is moderate, and the content of plant nutrients is low to medium. Good tilth is easily maintained, and the soils can be tilled over a fairly wide range of moisture conditions. Dickson soils contain siltpans, are less permeable than other soils in this group, and have a lower water-holding capacity. Only the Pace soils contain enough stones or chert to interfere with tillage. The Holston soils have a few cobblestones and some gravel. Tillage of the Dickson, Capshaw, and Whitwell soils is delayed by saturation that follows very wet weather.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 12.

Present use and management.—Most of this management group has been cleared and is used intensively for crops. A small acreage is in forest. Corn, cotton, small grains, and annual hay are the principal crops. Cotton is the main cash crop, but watermelons are grown on a considerable acreage of the Holston soils. Corn occupies 30 to 40 percent of the acreage of this management group and cotton about 15 percent. Wheat is the chief small grain, but oats and rye are grown on quite a large acreage. Rye and vetch, mixed, are commonly grown for winter cover and as a green-manure crop. Sorghum and buckwheat are grown mainly on the less well-drained Capshaw, Dickson, and Whitwell soils.

Systematic rotations of crops are not generally used. A 3-year rotation that consists of lespedeza for 2 years and corn or cotton for 1 year is used by a few farmers. A 4-year rotation that consists of corn, a small grain and lespedeza for 2 years, and lespedeza is used by some of the farmers getting better yields.

The amount of fertilizer used varies from farm to farm. Lime is necessary in establishing red clover and alfalfa and is generally applied at the rate of 2 tons an acre. Some farmers apply lime every 3 or 4 years. Cotton, corn, and small grain get moderate amounts of a complete fertilizer. Most plowing is done in spring.

Use suitability and management requirements.—These soils are suited to corn, wheat, oats, barley, cotton, and vegetables. Red clover can also be grown if properly fertilized. The Capshaw, Dickson, and Pace soils range to moderately well drained and the Whitwell to imperfectly drained. Consequently, their use suitability is more limited than that of the well-drained members of the group. None of the soils of this management group are well suited to alfalfa; they are better suited to annual legumes. Most of the soils are somewhat droughty and better suited to drought-resistant crops. Alfalfa and red clover can be established by applying large quantities of fertilizers and lime, but stands are hard to maintain even though management is good. The Pace soil is fairly well suited to potatoes because it warms up early in spring.

The soils of this group require more exacting management than those of group 4. They need longer rotations and larger quantities of fertilizers. If other management is good, the soils can be maintained by use of 3-year or 4-year rotations. A well-suited rotation consists of corn, a small grain, and 2 years of lespedeza. Cotton, potatoes, or any other row crop can be substituted for the corn in this rotation. Cover crops should be planted following the harvest of all intertilled crops. Alfalfa can be grown on the Mountview and Holston soils if they are properly limed and fertilized.

The soils of this management group need lime, phosphorus, nitrogen, and possibly potassium for high yields of most crops. The needs of the different soils vary considerably, however. Inoculated legumes, if plowed under, will generally supply adequate amounts of nitrogen for the next crop in the rotation. A complete fertilizer is needed for truck crops and tobacco. Properly conserved manure supplies nitrogen and potassium but should be supplemented with phosphorus. Nitrogen fertilizer can be used profitably as a topdressing for small grains and corn.

These soils are slightly susceptible to erosion, but the control of runoff and erosion is not a serious problem. Cultivation should be on the contour, and waterways should remain in sod. Long slopes that are cultivated should be stripcropped or terraced to control the runoff.

These soils are suited to pasture. Productive pastures can be developed and maintained if lime, phosphorus, and potassium are applied and suitable pasture plants are grown. Proper control of grazing is also required. Weed control on properly grazed and fertilized pasture is not a problem, but an occasional mowing is necessary. Mowing will be difficult on some areas of Pace soil because of the chert. If fertility is poor, a mixture of lespedeza and grass such as redtop should be grown. If the soil is adequately fertilized, orchardgrass or tall fescue mixed with white clover and Ladino clover can be established and maintained.

Management group 7

The soils of management group 7 are poor to fair for crops and fair to very good for permanent pasture. All the soils except the Dickson have adequate surface and internal drainage for most crops. The Dickson soils have siltpans that interfere with water movement and root penetration in the lower subsoil.

The soils in this management group are acid and low in fertility. In addition, they are friable, well drained to moderately well drained, and moderately low in moisture-supplying capacity. Tilth is generally good, and tillage can be performed over a wide range of moisture conditions. Except for Jefferson stony fine sandy loam, eroded rolling phase, and Pace cherty silt loam, eroded rolling phase, the soils are relatively free of stones and chert. The gravel in Holston soils does not interfere with tillage. Erosion on cultivated areas of the soils of this group has exposed the finer textured subsurface layers in places.

Yields of adapted crops under two levels of management are given in table 13.

Present use and management.—Most of the acreage of the soils in this group is used for pasture and crops. Cotton is the chief cash crop. Hartsells fine sandy loam, eroded rolling and undulating phases, is used almost entirely for corn, but wheat, lespedeza, and hay

TABLE 13.—*Soils of management group 7 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Dickson silt loam:																
Rolling phase	16	35	180	300	(2)	14	15	34	0.5	1.1	-----	-----	(2)	80	40	100
Eroded rolling phase	15	30	175	280	(2)	14	15	34	.4	1.0	-----	-----	(2)	75	35	90
Hartsells fine sandy loam:																
Rolling and undulating phases	21	45	210	400	10	16	16	35	.8	1.4	(2)	2.8	100	160	55	130
Eroded rolling and undulating phases	20	40	200	350	9	15	15	30	.7	1.3	(2)	2.6	95	150	50	120
Holston loam, eroded rolling phase	18	35	200	350	6	14	16	32	.5	1.1	-----	2.3	(2)	90	40	95
Jefferson fine sandy loam, eroded rolling phase	18	35	200	350	(2)	14	(2)	32	.5	1.1	-----	2.3	(2)	90	(2)	90
Jefferson stony fine sandy loam, eroded rolling phase	15	30	170	300	(2)	12	(2)	28	.3	1.0	-----	2.2	(2)	80	(2)	80
Mountview silt loam, eroded rolling phase	20	37	225	350	8	16	18	35	.5	1.1	-----	2.4	(2)	90	(2)	100
Pace cherty silt loam, eroded rolling phase	15	30	150	300	7	14	15	30	.5	1.0	1.4	2.5	60	120	55	90

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

are also grown. Yields are very low, as lime and fertilizer are not generally used. The other soils in the group are used mainly for corn, wheat and other small grains, cotton, and annual hay. Lespedeza and soybeans are the main legumes; little alfalfa is grown. A considerable acreage is used for rye and a small acreage for oats. Rye and vetch are grown together for winter cover and as a green-manure crop. A small acreage of potatoes is grown on the Pace soil, and a very small acreage of Holston loam, eroded rolling phase, is used for melons. Crops are not generally grown in systematic rotations on the soils of this management group.

Hartsells fine sandy loam, rolling and undulating phases, covers an extensive area on the Cumberland Plateau that is still in oak and hickory forest. The trees are of poor quality because the forest has been burned, cut over, and grazed. The uneroded phases of other soils in this management group are also in forest, but the acreage is not large.

Cotton, corn, and wheat usually get a moderate application of complete fertilizer. A few farmers topdress wheat and corn with a moderate amount of nitrogen.

Most plowing is performed in spring. Tillage is generally timely and adequate. However, it is delayed on the Dickson soils by wet conditions. Some farmers plow the Hartsells soils shallowly in the belief they will dry out less rapidly than when plowed deeply.

Use suitability and management requirements.—Low fertility limits the use suitability of this management group. Soils of this group are suited to corn, wheat, oats, barley, cotton, and many kinds of vegetables. If properly fertilized, red clover can be successfully grown. Most soils are probably better suited to small grains or cotton than to corn.

The soils in this group require more careful management than those in group 6 because slopes are stronger and runoff and erosion are greater. Rotations should be longer and include more close-growing crops. If other management is good, the soils can be maintained by use of 3-year to 6-year rotations. A suitable 3-year rotation consists of corn, a small grain and crimson clover, and a small grain and lespedeza. A good 4-year rotation is corn, a small grain and lespedeza, followed by 2 years of lespedeza. Cotton, soybeans, or sorghum, can be substituted for the corn in these rotations. Vetch and crimson clover planted between rows of cotton can be used for winter cover and as a green-manure crop. A rotation consisting of corn, a small grain, and alfalfa for 4 years is well suited if soil fertility is very good. Alfalfa, however, may not succeed on the Dickson soils. The soils should be protected by a cover crop after the harvest of all intertilled crops.

The soils of this management group have fertilizer requirements similar to those of management group 6 but require somewhat larger quantities for comparable yields. All soils need lime, phosphorus, potassium, and nitrogen for high yields of most crops. If inoculated, the legume crop will generally supply enough nitrogen for the next crop in the rotation. Large quantities of complete fertilizer are needed for potatoes and other vegetables.

The soils of this group are susceptible to erosion. The control of runoff or erosion is not a serious problem if crops are rotated and adequately fertilized. All tillage should be on the contour and waterways should remain in sod. Stripcropping or terracing will usually be needed where long slopes are cultivated.

The development of high-yielding pastures requires the use of suitable pasture plants, large quantities of lime and phosphorus, and moderate quantities of nitrogen and potassium. If fertility is good, Ladino or white clover mixed with orchardgrass or tall fescue can be grown. Lespedeza and redtop is the best mixture if fertility is poor. Other management includes proper grazing and occasional mowing to control weeds. The Hartsells and parts of the Jefferson soils are suited best for pastures because of favorable climatic conditions.

Management group 8

The soils of management group 8 are poor to fair for crops and fair to good for pasture. They are imperfectly drained and occur on nearly level to slightly depressed areas. The Lawrence soil is on uplands, and the Taft and Tyler soils are on stream terraces. All of these soils are low in fertility and are medium to very strongly acid. In their natural state, the soils are generally too wet to be cultivated during much of the year. They are either too wet or too dry. Tillage is easily accomplished, but will likely be delayed by excessive moisture in spring.

Table 14 shows yields of adapted crops on soils of this group under two levels of management.

Present use and management.—Most of the Tyler and Taft soils have been cleared and are used for pasture or crops, but a large part of Lawrence silt loam is in trees. About 10 to 15 percent of the acreage of this group is idle. Most of the large cleared areas are used for pasture. The small clearings are used and managed like the better drained soils with which they are associated. Corn and other annual crops are grown, but failures are common because of the natural imperfect drainage of these soils. A considerable acreage is used for soybeans, lespedeza, and sorghum. Attempts to grow alfalfa on these soils have been unsuccessful. Artificial drainage of a number of areas by use of open ditches has not been effective.

Use suitability and management requirements.—Imperfect drainage, low fertility, and extended periods of unfavorable moisture conditions limit the suitability of these soils. They are probably better suited to pasture than to crops, although the productivity of most pasture plants is low. In the present undrained condition of the soils, sorghum, soybeans, tall fescue, and lespedeza can be grown, but the yields are very low unless fertilizers are applied. If adequately drained, these soils would be suited to about the same crops as those in management group 6.

The management of these soils consists of improving use suitability by selecting crops suited to alternate wet and dry conditions, the supplying of needed amendments, and improving the drainage. If other management is good, these soils can be conserved by use of rotations that include a row crop once in 3 years. A suitable rotation consists of corn for 1 year and lespedeza for 2 years. Sorghum or soybeans can be substituted for the corn, and whiteclover for the lespedeza. If drained, sericea lespedeza is a desirable legume on these soils where longer rotations are used. Row crops, if needed, can be grown successfully in alternate years if soil management is good.

In general, these soils are deficient in lime, phosphorus, potassium, and nitrogen. Corn and small grains need complete fertilizers. Legumes and mixtures of legumes and grasses need phosphorus and potassium. Nitrogen is not required if legumes are properly inoculated. Lime is essential for most legumes, and will also benefit other crops in the rotation.

The soils are not susceptible to erosion. Drainage can usually be improved by the use of open ditches, bedding the soil, proper row direction, or diversion ditches, or by all of these practices. Tiling will not be effective because of the impermeable pan layer.

These soils are fairly well suited to pasture, but grazing is poor during dry spells in summer and fall. Lime and complete fertilizers are necessary for establishing good pastures. The best mixture for high production is white clover and tall fescue. A good mixture where soil fertility is low is redtop and lespedeza. Weeds should be controlled by periodic clipping.

TABLE 14.—*Soils of management group 8 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; wheat, oats, alfalfa, and potatoes not commonly grown, and the soils are not suitable for these crops under either level of management]

Soil	Corn		Cotton		Lespedeza		Pasture	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Lawrence silt loam	15	30	150	220	0.4	0.9	35	70
Taft silt loam	20	35	150	240	.5	1.0	45	80
Tyler silt loam	15	30	150	220	.4	.9	35	70

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

Management group 9

The soils of management group 9 are poor to fair for crops but good for pasture. They are highly plastic and occur in the undulating to rolling uplands and on the colluvial lands. They are medium to strongly acid

and moderately high to low in content of organic matter and most plant nutrients. Supplies of these constituents, especially of nitrogen, depend largely on the past cropping system and the extent to which the soil has been damaged by erosion. Runoff is rapid and the moisture-supplying capacity is low. These soils are droughty, highly susceptible to erosion, and for the most part moderately eroded. However, the eroded soils can be tilled only within a narrow range of moisture content. Bedrock is at an average depth of about 4 feet, but it outcrops in many areas and interferes with tillage.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 15.

TABLE 15.—*Soils of management group 9 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Colbert-Talbott silty clay loams, eroded rolling phases	15	32	140	280	(2)	18	15	30	0.5	1.0	(2)	2.8	------	------	65	95
Swaim silty clay loam:																
Eroded rolling phase	18	35	240	360	10	16	18	35	.8	1.3	1.8	3.0	------	------	55	110
Eroded undulating phase	20	40	280	400	12	18	20	40	1.0	1.4	2.0	3.2	------	------	60	120

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—Most of these soils have been cleared, but a small part is in the cedar-hardwoods forest type. A small acreage of cleared land is in permanent pasture, and a considerable part is idle. Corn, wheat, rye, lespedeza, soybeans, and alfalfa are the principal crops.

Systematic rotations of crops are not ordinarily used on these soils. The common practice is to grow corn and follow it with a small grain and red clover or lespedeza. The legumes remain on the ground until bushes and briers start growing. The soil is then plowed, planted to corn, and again to a small grain and red clover. Rye is the chief small grain. Amendments are seldom applied to these soils, but lime and phosphorus are needed to establish alfalfa.

Use suitability and management requirements.—Most of the common crops can be grown on these soils. However, yields are low because of poor tilth, low fertility, and low moisture-supplying capacity. When properly fertilized, the soils are fairly well suited to alfalfa. Small grains do better than corn or other crops that mature in dry periods. The soils are difficult to till, and for this reason are better suited to semipermanent hay or pasture.

The main management problems are maintaining good tilth and improving the moisture-supplying capacity of the soils. A cropping system is needed that will help check runoff and make the best use of available supplies of moisture. On most areas row crops can be grown safely every third or fourth year if other management is good. A rotation of corn, a small grain, and red clover or lespedeza is suited to these soils. Barley or rye can be sown in the lespedeza sod for winter cover and as green manure. Alfalfa can be substituted for red clover if the rotation is lengthened. Deep-rooted legumes open up the soil and help maintain organic matter and nitrogen. Grasses such as orchardgrass should be planted with the legumes to reduce erosion. Crimson clover, vetch, and small grains grown for winter cover and as green manure also reduce erosion.

Lime and phosphorus are required for the hay crop in the suggested rotations. Manure is helpful in establishing legumes on eroded spots. The legumes supply nitrogen for the next crop in the rotation. The supply of potassium in these soils is sufficient for most crops except alfalfa.

On cultivated land, runoff and erosion can be reduced by tilling the soil on the contour. Natural waterways should remain in sod. Stripcropping helps control runoff on long slopes. Terraces will control runoff if they are properly constructed. These structures cannot be built, however, if there are rock outcrops or if bedrock is too near the surface.

On many farms pasture is the best use for these soils. Good pastures can be established and maintained. A good sod-forming pasture mixture should be seeded. Tall fescue or orchardgrass mixed with Ladino or whiteclover is suitable where the soil is properly limed and fertilized. Droppings should be spread, and potassium from commercial fertilizer may be needed at long intervals. Excess herbage and brush can be effectively controlled by mowing several times a year.

Management group 10

The soils in management group 10 are fair to good for crops and pasture. All the soils are deep and well drained and permeable to air, roots, and water. The content of organic matter and plant nutrients is moderate or low; the reaction is medium to strongly acid. Moisture-supplying capacity is fair to good. The high content of chert on the surface and throughout the profile interferes with tillage.

Yields of adapted crops to be expected on these soils under two levels of management are shown in table 16.

TABLE 16.—*Soils of management group 10 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Baxter cherty silt loam:																
Rolling phase	20	38	170	300	10	16	18	35	0.6	1.2	-----	2.4	(2)	120	75	105
Eroded rolling phase	18	35	150	275	8	14	15	32	.5	1.1	-----	2.2	(2)	110	70	100
Undulating phase	22	40	190	325	10	18	20	38	.7	1.3	1.9	2.5	(2)	125	80	110
Eroded undulating phase	20	38	175	300	9	17	18	35	.6	1.2	1.8	2.4	(2)	120	75	105
Dellrose cherty silt loam, eroded rolling phase	30	45	(2)	(2)	12	20	25	40	.7	1.3	(2)	2.5	(2)	130	75	110
Dewey cherty silt loam, rolling phase	22	45	245	370	12	18	22	42	.9	1.3	2.1	3.2	110	150	65	115
Dewey cherty silty clay loam, eroded rolling phase	20	40	225	320	10	16	20	38	.6	1.2	2.0	3.0	100	130	60	110

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—Most of the acreage of these soils has been cleared and is used for pasture or crops, although a considerable acreage is in forest. Corn, rye, wheat, oats, crimson clover, cotton, and lespedeza are the principal crops. Some alfalfa is grown, mainly on the Dewey soils. The Baxter soils are the most droughty and consequently the least suited to corn. Their chief grain crop is rye. All the soils are used for cotton, but most of it is grown on Baxter soils.

Systematic rotations of crops are not generally used on these soils. Most farmers break the sequence of row crops every few years by planting a small grain, as rye or wheat, followed by lespedeza or crimson clover. However, length of time between close-growing crops is very irregular. Oats, rye, or a mixture of rye and vetch are commonly grown for winter cover that is grazed and later plowed under as green manure. The use of soil amendments varies, but lime and phosphorus are used in establishing alfalfa. A few farmers use boron on alfalfa. Tillage is generally timely and adequate.

Use suitability and management requirements.—These soils are suited to most crops grown in the county, but their suitability is limited by stoniness and droughtiness. They are well suited to early vegetables and fairly well suited to crimson clover, red clover, and small grains. They are not so well suited to crops that are sensitive to drought. Of this group, the Dewey soils are the most suitable for such crops. On many farms pasture is the most suitable use for these soils because of tillage difficulties.

Because the soils of this group are hard to till, many farmers favor a long rotation that consists of cotton or corn, wheat, and pasture for 3 to 5 years. If these soils must be used more intensively, a rotation consisting of corn, a small grain, and red clover and grass for 3 years is suitable. Any commonly grown row crop can be substituted for the corn in this rotation.

Practically all the soils need lime, phosphorus, and nitrogen for high yields of most crops. The Dellrose soil is less deficient in phosphorus than other soils of the group, and crops grown on it may not respond to additions of this element. Lime, phosphorus, and potassium are essential for alfalfa and red clover. Nitrogen is needed to produce high yields of all crops except legumes. Potassium may be needed by all crops on these soils but is required by alfalfa and potatoes. Barnyard manure is an excellent source of nitrogen, potassium, and organic matter.

These soils are susceptible to erosion and should be tilled on the contour. Natural waterways should remain in sod. Stripcropping or terracing will usually be required to control runoff on cultivated land. The workability of the soils can be improved by removing loose stones, but this is not generally practical except on very small areas.

High-yielding pastures can be established and maintained on these soils by applying moderate to large

quantities of lime, phosphorus, potassium, and nitrogen. Tall fescue or orchardgrass mixed with Ladino or white clover is well suited to these soils. Other management consists of controlling the grazing and mowing the excess herbage and weeds. Droppings should be spread on productive, heavily grazed pastures.

Management group 11

The soils of management group 11 are poor to fair for crops that require tillage and fair to very good for permanent pasture. They differ from those in management group 5 chiefly in being severely eroded. Most of the original surface layer and part of the subsoil have been removed by erosion. Shallow gullies are common. Although the soils are generally 5 feet or more in thickness, erosion has exposed the bedrock in some places. The soils are fine textured, medium to strongly acid, and of low fertility. The content of organic matter and plant nutrients and the moisture-supplying capacity have been greatly reduced by erosion. These soils are very susceptible to further erosion because of the rolling relief and the slow infiltration of moisture. Good tilth is hard to maintain. The soils can be tilled only over a narrow range of moisture conditions.

Yields of adapted crops to be expected on these soils under two levels of management are shown in table 17.

TABLE 17.—*Soils of management group 11 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Baxter cherty silty clay loam, severely eroded rolling phase	-----	20	-----	175	-----	12	-----	20	0.3	0.6	-----	-----	-----	-----	25	65
Cumberland silty clay loam, severely eroded rolling phase	15	38	160	280	(2)	15	15	30	.4	1.0	-----	2.2	-----	-----	40	85
Cumberland clay loam, severely eroded rolling phase	15	35	150	275	(2)	15	15	30	.4	1.0	-----	2.2	-----	-----	35	80
Decatur silty clay, severely eroded rolling phase	15	35	150	275	(2)	15	15	30	.4	1.0	-----	2.2	-----	-----	40	85
Dewey silty clay, severely eroded rolling phase	15	35	150	275	(2)	15	15	30	.4	1.0	-----	2.2	-----	-----	40	85
Dewey cherty silty clay, severely eroded rolling phase	-----	28	-----	230	-----	12	-----	26	-----	.8	-----	2.0	-----	-----	30	75
Nolichucky clay loam, severely eroded rolling phase	-----	-----	-----	200	(2)	12	(2)	20	.3	.7	-----	1.6	-----	-----	30	70
Sequatchie fine sandy loam, severely eroded rolling phase	15	30	150	300	(2)	14	14	28	.4	1.0	-----	2.0	-----	-----	30	75
Waynesboro clay loam, severely eroded rolling phase	-----	28	100	225	(2)	12	(2)	25	.3	.8	-----	1.8	-----	-----	35	75

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—All of the soils of this group have been used for pasture and crops. A small portion is now idle or in unimproved pasture. These soils generally occupy small areas in fields that consist predominantly of less eroded soils, and they are used in the same way as the associated soils. Corn, small grains, cotton, and semipermanent hay are the principal crops. Also grown are lespedeza for pasture, crimson clover for green manure, and alfalfa for hay.

Systematic rotations of crops are not generally practiced. A few farmers rotate entire fields without special attention to the severely eroded areas occupied by these soils. Amendments are also generally applied to the field as a whole, although the more severely eroded areas are usually manured somewhat more heavily. Lime and phosphorus are generally used in establishing alfalfa, but use of boron is increasing. Tillage is often delayed because these soils cannot be worked over a wide range of moisture conditions.

Use suitability and management requirements.—The soils of this group are poorly suited to row crops but fairly well suited to grains, pasture, and hay crops, especially the deep-rooted legumes.

The main management problems are the improvement of the physical condition of the soils to get better moisture-supplying capacity, improvement of tilth, and control of runoff and erosion. Deep-rooted legumes grown in mixture with grasses improve the physical

condition of the soils and help maintain supplies of organic matter and nitrogen. Alfalfa mixed with orchardgrass or sericea lespedeza is suited to this purpose. Crimson clover, vetch, and sweet clover are useful as green-manure crops.

One of the best rotations consists of corn, a small grain, and either a legume alone or a legume-grass mixture for 4 or 5 years. If it is necessary to grow a row crop on these soils, it should always be followed by a cover crop.

The soils need nitrogen and phosphorus for practically all crops and potassium for legumes. Manure is beneficial in supplying plant nutrients and improving tilth and moisture-absorbing properties of the soil. In a 6-year rotation of corn, small grain, and alfalfa (4 years), the soil should be limed and a complete fertilizer applied following the small grain. An application of phosphorus and potassium fertilizer after the second year in alfalfa will help maintain the crop. From 15 to 20 pounds of borax should be used as a topdressing on alfalfa each year.

Runoff and erosion can be reduced by tilling the soil on the contour and planting close-growing crops. Natural waterways should remain in sod. Winter cover crops should be grown for protection of fall-plowed soil and for use as green manure in spring. Stripcropping or terracing will usually be required on cultivated land to control the runoff.

Established pastures need periodic applications of lime and phosphorus, control of grazing, and mowing to control weeds. Under such management, seeding should be unnecessary and pastures should improve with age. The establishment of pastures is difficult because these soils are extremely deficient in organic matter, are slow to absorb moisture, and have poor tilth. Lime, phosphorus, potassium, and nitrogen should be applied to help establish satisfactory pastures. Barnyard manure helps pasture plants get started on severely eroded spots. Tall fescue or orchardgrass mixed with Ladino clover is well suited to these soils.

Management group 12

The soils of management group 12 are poor to fair for crops and fair for pasture. They differ from the soils in management group 7 principally in being severely eroded. Slopes range from 5 to 12 percent. The soils are strongly to very strongly acid, low in organic matter, and low to very low in plant nutrients. The moisture-supplying capacity is also low or very low. Most of the original surface layers, and, in many places, part of the subsoil have been lost through erosion. Shallow gullies are common. Gravel and cobblestones on the surface and in the profile do not interfere with tillage. These soils are friable, but they are moderately difficult to work because of severe erosion. They cannot be worked over as wide a range of moisture conditions as the soils of management group 7.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 18.

TABLE 18.—*Soils of management group 12 and average expected acre yields of adapted crops [1] under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Cotton		Wheat		Oats		Lespedeza		Pasture	
	A	B	A	B	A	B	A	B	A	B
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Dickson silty clay loam, severely eroded rolling phase	------	150	------	10	------	20	([3])	0.5	([3])	45
Holston clay loam, severely eroded rolling phase	------	200	------	10	------	20	0.3	.6	20	60
Jefferson clay loam, severely eroded rolling phase	------	200	------	10	------	20	.3	.6	20	60
Mountview silty clay loam, severely eroded rolling phase	------	250	------	12	------	22	.4	.7	25	65

[1] Corn, alfalfa, and potatoes not suitable for the soils of this group under either of the two levels of management.

[2] Number of days 1 acre will graze a mature cow without injury to the pasture.

[3] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—All of these soils have been cleared and are used for pasture or crops. A large acreage is idle each year, and some areas have been abandoned. Many kinds of crops are grown, but yields are low. Cotton is the main row crop. Corn is grown to some extent, but the soils are too droughty for it. Wheat, rye, and oats are also grown. Rye is usually grown with vetch for winter cover and a green-manure crop. Lespedeza, soybeans, and crimson clover are the main legumes. Pastures are generally unimproved and have the appearance of idle land.

The management of these soils varies widely. Small areas are managed in the same way as associated soils. Systematic rotations of crops are not generally followed. Very little lime is used. A moderate amount of complete fertilizer is generally applied to the cotton

crop. Some farmers grow crops as long as the soil will produce them with few, if any, good management practices. They then abandon the land or use it for pasture.

Use suitability and management requirements.—The soils of this management group have more exacting management requirements than those of group 11. They are limited in suitability for intertilled crops by low fertility, very low moisture-supplying capacity, and susceptibility to further erosion. They are probably best suited to semipermanent hay and pasture, although yields are low. Drought-resistant crops, such as cotton, and crops that mature when moisture is adequate, such as small grains, yield better than corn.

A good rotation on these soils consists of a small grain followed by a leguminous hay crop or pasture of legumes mixed with grasses for 4 or 5 years. After productivity and organic matter have been increased, a row crop may be grown every 5 or 6 years if other management is good. It should always be followed by a cover crop. Red clover or lespedeza will help improve the physical condition of these soils and maintain the organic-matter and nitrogen content. Greenmanure crops, including crimson clover and vetch, are also useful.

Lime, nitrogen, phosphorus, potassium, and organic matter are needed for good yields of the crops adapted to these soils.

Runoff and erosion are reduced and tilth is improved by selecting and rotating crops and by adding organic matter. Contour tillage should be practiced where feasible, and stripcropping is advisable on long slopes. Natural waterways should remain in sod. Terraces can be used on uniform slopes with suitable outlets.

Established pastures require mainly periodic applications of amendments, mowing of weeds, and control of grazing. New pastures are hard to establish because the soils of this group are droughty, deficient in organic matter, and of poor tilth. In addition they tend to clod and bake. Lime, phosphorus, potassium, and initial applications of nitrogen are necessary to start pastures. Barnyard manure helps establish pastures on severely eroded areas.

Management group 13

The soils of management group 13 are poor to fair for crops and fair to good for pasture. All except the Cumberland soil contain enough stones or chert on the surface and throughout the profile to interfere with tillage. They are all deep and well drained and permeable to air, roots, and water. The moisture-supplying capacity and the content of plant nutrients and organic matter are moderate to low. The soils are medium to strongly acid. Slopes range from 12 to 25 percent. Most of the acreage is moderately eroded, but a few areas are not eroded.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 19.

TABLE 19.—*Soils of management group 13 and average expected acre yields of adapted crops under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Cotton		Wheat		Oats		Lespedeza		Alfalfa		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Allen stony fine sandy loam, hilly phase	-----	28	-----	300	-----	14	-----	25	0.5	1.0	-----	2.0	-----	-----	40	75
Baxter cherty silt loam:																
Hilly phase	(2)	25	(2)	240	(2)	14	(2)	26	(2)	1.1	(2)	2.2	-----	-----	(2)	90
Eroded hilly phase	-----	22	-----	225	-----	12	(2)	24	.4	1.0	(2)	2.0	-----	-----	60	85
Cumberland silty clay loam, eroded hilly phase	20	40	150	300	8	16	15	35	.6	1.3	1.8	2.8	-----	(2)	60	110
Dellrose cherty silt loam, eroded hilly phase	25	40	(2)	(2)	10	16	20	35	.6	1.1	(2)	2.3	(2)	(2)	70	100
Dewey cherty silty clay loam, eroded hilly phase	-----	30	120	250	7	14	12	28	.5	1.1	1.6	2.5	-----	(2)	50	100

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—Most of the uneroded types in this management group are still in forests, which are poorly managed and consequently of low quality. The other soils have been used for crops and pasture. A large acreage is in unimproved permanent pasture. Cropped areas are used principally for corn, cotton, small grains, and annual hay. Lespedeza, crimson clover, and red clover are the chief legumes, but alfalfa is also grown.

Systematic rotations of crops are not followed.

Crops are grown until yields are no longer profitable, and then the land is used for permanent pasture. A few farmers plant winter cover crops. Lime and fertilizers are seldom applied. Lime, however, is used when alfalfa and red clover are grown.

Use suitability and management requirements.—These soils are fairly well suited to most crops grown in the county. Their suitability is restricted, however, because they are droughty, steep, and stony. They are fairly well suited to crimson clover, red clover, and small grains, but poorly suited to row crops and to crops that are sensitive to drought.

These soils require careful management if used for crops. Long rotations chiefly of close-growing crops, adequate fertilization, and proper tillage are needed. A rotation consisting of cotton, wheat, and pasture (4 to 5 years) is suitable. Any of the commonly grown row crops may be substituted for cotton in this rotation. Row crops should be limited to 1 year in 6 or 8.

These soils need lime, phosphorus, and nitrogen for high yields of most crops. Lime, phosphorus, and potassium are essential for the vigorous growth of alfalfa and red clover. Practically all crops respond well to phosphorus fertilizers. Nitrogen is also essential for high yields of all crops except legumes and the crops that immediately follow them. Potassium deficiency restricts the growth of legumes and other crops, particularly on the Allen soil.

When these soils are cultivated, contour tillage and stripcropping will help control runoff. Natural waterways should remain in sod.

The soils of this group should be used mainly for pasture on most farms because tillage and the control of runoff are difficult. Moderate to large quantities of lime, phosphorus, and potassium are needed to establish and maintain good pastures. Orchardgrass or tall fescue mixed with Ladino clover or white clover is well suited to these soils. Good pasture management requires proper control of grazing and mowing of weeds. Mowing will be difficult because of the slopes, stones, and chert.

Management group 14

Management group 14 consists chiefly of well-drained soils of the uplands and the stony rolling and hilly miscellaneous land types. The soils differ from those in group 13 chiefly in being severely eroded. Most of the original surface layer and, in places, parts of the subsoil have been lost. Shallow gullies are common. Although the soils are generally 3 to 5 feet or more in depth, erosion has exposed bedrock in many places. These soils have been severely damaged by erosion. The content of organic matter is very low, and that of plant nutrients is low. The moisture-supplying capacity is low because of the slow penetration and rapid runoff of rainwater. The soils are strongly acid. Good tilth is hard to maintain. The soils can be tilled over a very narrow range of moisture conditions. The cherty phases of Baxter and Dewey soils contain enough chert to interfere with tillage. Occasional rock outcrops occur on all the soils of this group. The stony land types have enough stones and rock outcrops to prevent tillage.

Yields of adapted crops to be expected on these soils under two levels of management are shown in table 20.

TABLE 20.—*Soils of management group 14 and average expected acre yields of adapted crops [1] under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Wheat		Oats		Lespedeza		Alfalfa		Pasture	
	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Baxter cherty silty clay loam, severely eroded hilly phase	-----	(3)	-----	(3)	-----	0.5	-----	-----	20	60
Cumberland silty clay loam, severely eroded hilly phase	-----	12	-----	20	0.4	.9	-----	1.9	40	90
Dewey silty clay, severely eroded hilly phase	(3)	12	(3)	20	.3	.8	-----	1.8	35	80
Dewey cherty silty clay, severely eroded hilly phase	-----	10	-----	15	.4	.8	-----	1.6	30	80
Mimosa silty clay, severely eroded hilly phase	-----	-----	-----	-----	-----	-----	-----	-----	40	90
Stony hilly land, Mimosa soil material	-----	-----	-----	-----	-----	-----	-----	-----	50	70
Stony rolling land, Talbott and Colbert soil materials	-----	-----	-----	-----	-----	-----	-----	-----	45	65
Stony hilly land, Talbott and Colbert soil materials	-----	-----	-----	-----	-----	-----	-----	-----	40	60
Waynesboro clay loam, severely eroded hilly phase	-----	-----	-----	-----	(3)	.5	-----	1.5	30	60

[1] Corn, cotton, and potatoes are not suitable for the soils of this group under either of the two levels of management.

[2] Number of days 1 acre will graze a mature cow without injury to the pasture.

[3] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Present use and management.—All of these soils have been cleared and used for crops and pasture; most of the acreage is now in unimproved pasture or is idle. A large acreage is abandoned. Small grains and lespedeza are the chief crops, but attempts are made to grow corn and cotton.

The management of these soils varies widely. A few farmers use lime and fertilizers and follow systematic rotations. The general practice is to crop the land as long as it will produce, then abandon it or use it for pasture. Tillage practices vary from farm to farm. Stripcropping or contour cultivation is not practiced.

Use suitability and management requirements.—These soils are poorly suited to crops that require tillage because they have poor tilth and strong slopes and are extremely susceptible to further erosion. Their best use is for pasture.

If these soils are used for tilled crops they must be managed extremely well. A cover of vegetation must protect them during all seasons. Row crops should not be grown. Biennial and perennial close-growing crops are preferable to those that require annual preparation of a seedbed. Grasses and legumes should be the chief components in crop rotations. Additions of lime, fertilizers, and organic matter are needed to maintain productivity of the soils.

If cultivated, row crops should be grown in alternate contour strips. Terracing is not practical because slopes are strong and subsoils are slowly permeable. Diversion ditches may be helpful in preventing erosion in a few places. Established pastures require periodic applications of lime and phosphorus and an occasional mowing to control weeds. They should improve with age if management is good. New pastures are hard to establish because these soils have unfavorable tilth and a tendency to clod and bake. In addition, they absorb moisture slowly and are extremely deficient in organic matter. Lime, phosphorus, potassium, and nitrogen are needed to help start the pasture plants. Barnyard manure helps establish plants on the severely eroded areas. Many farmers establish pastures on properly limed and fertilized soil by seeding small grain and orchardgrass or tall fescue. The following spring white clover or lespedeza is sown.

Management group 15

The soils of management group 15 are poor for crops and fair for pasture. They range in relief from rolling to hilly. They are moderately well drained to excessively drained and permeable to air, roots, and water. The content of organic matter and of plant nutrients and the moisture-supplying capacity are low. Water is readily absorbed. Loose chert, gravel, or cobblestones on the surface and throughout the profiles interfere with tillage.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 21.

Present use and management.—Some areas are still in timber, but most of the acreage of these soils has been cleared and used for pasture or crops. The cleared land is now used mainly for unimproved pasture. A considerable acreage is idle. Some areas are used for small grains, corn, lespedeza, and hay.

Systematic rotations are seldom followed. The soils are generally used for crops until yields are very low. They are then allowed to lie idle or are pastured. Lime and fertilizers are used in various amounts, but amendments are seldom applied on the Jefferson soils. Tillage is often untimely and inadequate, particularly on the Jefferson soils.

Use suitability and management requirements.—Very careful management is required for successfully growing crops on these soils. On most farms their best use is for semipermanent hay or pasture.

Soil productivity can be maintained or improved by use of long rotations and adequate fertilizer. Rotations should consist mainly of close-growing crops. If other management is good, a row crop can probably be grown in alternating contour strips once in 5 or 6 years. It is especially important that a leguminous cover crop follow the intertilled crop. Sod crops help

TABLE 21.—*Soils of management group 15 and average expected acre yields of lespedeza and pasture under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Lespedeza		Pasture	
	A	B	A	B
	Tons	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Jefferson stony fine sandy loam:				
Hilly phase [2]	([3])	0.8	------	75
Eroded hilly phase [2]	([3])	.7	------	70
Jefferson stony clay loam, severely eroded hilly phase [2]	------	------	------	40
Muskingum stony fine sandy loam:				
Hilly phase [2]	------	------	([3])	75
Eroded hilly phase [2]	------	------	([3])	70
Eroded rolling phase [2]	------	------	([3])	75
Rolling phase [2]	------	------	([3])	80
Pace cherty silt loam, eroded hilly phase [4]	0.3	.9	45	80

[1] Number of days 1 acre will graze a mature cow without injury to the pasture.

[2] Corn, cotton, wheat, oats, alfalfa, and potatoes are not suitable for these soils under either of the two levels of management.

[3] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

[4] Expected yields on this soil under improved management are corn, 22 bushels; cotton, 200 pounds; wheat, 12 bushels; oats, 22 bushels; and alfalfa, 2 tons. These crops (except oats) are not suitable for this soil under prevailing management. Potatoes are not suitable under either of the two levels of management.

prevent erosion, conserve moisture, and improve the supply of nitrogen and organic matter.

These soils are low in nitrogen, phosphorus, potassium, and lime. Small grains require complete fertilizers for high yields. Legumes or mixtures of legumes and grasses require phosphorus and potassium. Nitrogen is not needed if the legumes are properly inoculated. Lime is needed to develop good stands of legumes and to improve the yields and quality or other crops in the rotation. Barnyard manure is an excellent source of nitrogen, potassium, and organic matter. Amendments should be applied to meet the needs of particular crops rather than in large quantities at long intervals.

Lime and complete fertilizers are essential in establishing and maintaining permanent pasture. Orchardgrass or tall fescue mixed with Ladino clover or white clover can be established and maintained if the soil is properly fertilized. Control of grazing and weeds is needed. Weed control is difficult because mowing machines are hard to operate on stony and cherty soils.

Management group 16

The soils of management group 16 are poorly suited to crops but fair to good for pasture. They are all imperfectly to poorly drained except the Cotaco soil, which is moderately well drained to poorly drained. They occur on nearly level to slightly depressed areas. The water table is at or near the surface most of the time. Practically all the soils are subject to flooding or ponding. The Robertsville, Guthrie, Cotaco, and Purdy soils are low in fertility and strongly to very strongly acid. The Melvin and Dunning soils vary considerably both in fertility and reaction.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 22.

TABLE 22.—*Soils of management group 16 and average expected acre yields of adapted crops [1] under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Corn		Lespedeza		Pasture	
	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Cotaco fine sandy loam	20	40	0.6	1.3	60	100
Dunning silty clay loam	----	40	.5	1.3	65	100
Guthrie silt loam	----	25	.3	.8	30	65
Melvin silt loam	----	40	.5	1.4	50	120
Melvin loam	----	35	.4	1.3	40	110
Purdy silt loam	----	25	.3	.8	30	65
Robertsville silt loam	----	30	.3	1.0	35	75

[1] Cotton, wheat, oats, alfalfa, and potatoes are not suitable for the soils of this group under either of the two levels of management.

[2] Number of days 1 acre will graze a mature cow without injury to the pasture.

Present use and management.—The soils of this group are used mainly for forests and unimproved permanent pasture. The Guthrie soil has been left almost entirely in forests, chiefly because of its low productivity. The Cotaco soil is in forests because the areas are isolated and associated with the steep forested Muskingum soils. Some of the acreage of the soils of this group is used for sorghum, soybeans, corn, and lespedeza. Wheat is very seldom grown because the soils are flooded or ponded in winter. Yields of corn are very low, and complete crop failures are common.

Soil amendments and crop rotations are seldom used. Drainage of some areas by use of open ditches has been partly successful.

Use suitability and management requirements.—Unless adequately drained, these soils are poorly suited to crops that require tillage. However, they may be fairly well suited to sorghum and soybeans and to other crops that are planted late in spring or early in summer and harvested in fall. They are suitable for pasture, although yields on the Robertsville, Guthrie, Cotaco, and Purdy soils are very low. These soils would be improved by artificial drainage, but draining the Robertsville, Purdy, and Guthrie soils is difficult and of doubtful practicability. If the Melvin and Dunning soils are effectively drained, their use and management would be similar to those of the imperfectly drained soils of management group 2. Pastures on the soils of management group 16 furnish a fair quantity of forage in spring, summer, and fall, but the quality is only poor to fair. Drainage can be improved considerably by use of open-drain and diversion ditches and by bedding the soil. Tiling would be effective on the Melvin, Cotaco, and Dunning soils but not on Robertsville, Purdy, and Guthrie because of the hardpan. After the drainage has been improved, mixtures of fescue and

whiteclover or redtop and lespedeza will grow fairly well if adequate quantities of lime and phosphorus are used. Redtop and lespedeza can be grown without amendments, but the pastures are of low quality. Weeds should be controlled by proper grazing and by mowing.

Management group 17

The soils of management group 17 are steep and cherty. All are low in content of lime, organic matter, and plant nutrients. Most of them are droughty because they are porous and have strong slopes that allow rapid runoff.

Yields of adapted crops to be expected on these soils under two levels of management are given in table 23.

Present use and management.—The uneroded soils of the group are in oak and hickory forests. The trees are of poor quality largely because of grazing, burning over, and other poor management practices. The eroded soils are chiefly in unimproved pasture. A small acreage is used for crops. Yields of crops and pasture are low because the soils are droughty and seldom fertilized. Control of grazing and weeds is seldom practiced.

Use suitability and management requirements.—The soils of this group have strong slopes, low fertility, poor tilth, a high content of chert, and a susceptibility to erosion. They are consequently poorly suited to crops that require tillage. Although the soils are not naturally productive of pasture plants, good pastures can be established and maintained by good management. Lime, phosphorus, potassium, and nitrogen are needed. Properly fertilized soils are suited to tall meadow, fescue, orchardgrass, lespedeza, and white, Ladino, and red clovers. Bermudagrass can be grown in many places. Productive pastures require periodic additions of lime and phosphorus. Grazing should be controlled and weeds eradicated to maintain a good sod. Clipping the pastures to control weeds will be difficult because of the chert.

On some farms the soils of this group can be best used for forest, particularly the Bodine soils. Soils used for forestry should be protected and managed according to good forestry methods. See the section Forests for a discussion of forest management.

TABLE 23.—*Soils of management group 17 and average expected acre yields of adapted crops [1] under two levels of management*

[Yields in columns A are those to be expected under prevailing management, as defined in text under the subheading Present Use and Management; yields in columns B are those to be expected under improved management, as defined under the subheading Use Suitability and Management Requirements; absence of yield indicates crop is not commonly grown and the soil is not suitable for it under the management specified]

Soil	Lespedeza		Pasture	
	A	B	A	B
	Tons	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Baxter cherty silt loam:				
Steep phase	(3)	0.9	(3)	80
Eroded steep phase	0.3	.8	45	75
Bodine cherty silt loam:				
Steep phase	-----	-----	(3)	50
Eroded steep phase	-----	-----	(3)	45
Dellrose cherty silt loam:				
Steep phase	-----	.8	60	90
Eroded steep phase	-----	.7	55	85

[1] Corn, cotton, wheat, oats, alfalfa, and potatoes are not suitable for the soils of this group under either of the two levels of management.

[2] Number of days 1 acre will graze a mature cow without injury to the pasture.

[3] Crop suitable for soil, but seldom grown and not so suitable as crops for which yields are given.

Management group 18

The soils and miscellaneous land types of management group 18 are for the most part not suited either to crops or to pasture because of extreme stoniness, steep slopes, severe erosion, and low fertility. Their productivity for forest varies, as the soils have many different characteristics.

Present use and management.—About 96 percent of the acreage in this group is in forests of mixed hardwood trees. The eroded phases are cleared but have a very small total acreage. Cleared areas either are idle or are used for pasture along with associated soils. Pastures consist mainly of broomsedge mixed with weeds, brush, and briers. Woodlands are poorly managed. Selective harvesting of trees is not generally practiced.

The soils and miscellaneous land types of management group 18 are as follows:

Baxter cherty silty clay loam, severely eroded steep phase.
Bodine cherty silt loam, severely eroded steep phase.
Bouldery colluvium, Jefferson soil material.
Dellrose cherty silt loam, severely eroded steep phase.
Gullied land, limestone material.
Mimosa silty clay, severely eroded steep phase.
Mines, pits, and dumps.
Muskingum stony fine sandy loam, steep phase.
Riverwash.
Rockland, limestone, hilly and rolling.
Rockland, limestone, steep and very steep.
Rockland, sandstone, very steep.
Stony steep land, Talbott and Colbert soil materials.

These soils and miscellaneous land types are not suited to crops under prevailing or under improved management. Most of them are unsuited to pasture under both levels of management. However, the estimated carrying capacity both of Baxter cherty silty clay loam, severely eroded steep phase, and of Bouldery colluvium, Jefferson soil material, is 20 cow-acre-days under prevailing management and 50 under improved management. Dellrose cherty silt loam, severely eroded steep phase, and Muskingum stony fine sandy loam, steep phase, are both unsuited to pasture under prevailing management but under improved management could be expected to have carrying capacities of 60 and 65 cow-acre-days, respectively.

Use suitability and management requirements.—An

estimated 4 percent of the acreage in this group has been cleared. The rest is in forest. On some farms, because of economic needs, some of these soils are used for crops. When they are used for tilled crops, runoff should be controlled and lime and fertilizer applied. Stands of vegetation should be maintained by use of amendments and carefully selected crops grown in rotations. If they are cultivated, stripcropping is advisable on most slopes.

Pasture maintenance requires good management including the use of lime and phosphorus. Legumes should be used in the plant mixture to a considerable extent. Application of amendments and control of weeds are difficult because the soils are stony and steep.

These soils and miscellaneous land types are better suited to forests than to any other use. The quality and quantity of forest yields could be increased by proper management. See the section Forests for a discussion of forest management.

Capability Classification of Soils

The capability grouping is an arrangement of soils to show their relative suitability for crops, grazing, forestry, or wildlife. Soils that are nearly level, well drained, free from overflow, fairly fertile, and not otherwise limited are placed in class I. They are widely adaptable. The farmer can use his class I soils for crops without special practices, and can choose one of several cropping systems; if he wishes he may use the soil for pasture or for some other purpose.

Soils are placed in class II if they are a little less widely adaptable, and thus more limited than those in class I. A gently sloping soil, for example, must be farmed on the contour, kept under vegetation most of the time, or handled in some other manner to control erosion. Other soils may be in class II because they are too droughty, too wet, too sloping, or too shallow to be in class I.

Class III contains the soils that are suitable for regular cropping but that have more narrow adaptations for use or more stringent management requirements than those in class II. The soils that are even more limited and that have narrower crop adaptations than those of class III, but that are still usable for tillage part of the time or with special precautions, are in class IV.

Soils that are not suitable for cultivation or on which cultivation is not advisable are in classes V, VI, VII, or VIII. Class V, which does not occur in this county, consists of soils not subject to erosion but not suitable for cultivation because they are too wet or too stony. Class VI contains soils that are steep or droughty or that have other serious limitations but will produce forage or forest products. As a rule class VI soils should not be cultivated, but most of them can safely be disturbed enough to prepare them for seeding to extremely long-producing pastures or planting to trees. Soils in class VII are more limited than those in class VI. They usually give only fair to poor yields of forage or forest products. In this county they are usually best suited to forest production. Soils in class VIII, which does not occur in Franklin County, are so rocky or have other severe limitations to an extent that they produce little useful vegetation.

Subclasses.—Most of the capability classes include soils that differ greatly from each other. Class III soils in this county, for example, consist of some rolling soils subject to erosion, some shallow and droughty soils, and some poorly drained soils limited by excess water. It is convenient to recognize, within the broad classes, capability subclasses based on the dominant limitation. The subclasses used in the county are established according to dominant limitations or risks, as follows: Erosion, designated by the symbol (e); excess water (w); and stony, rocky, or shallow soil (s). The subclass is denoted by a small letter following the class number, such IIIe, IIIw, or IIIs.

Capability classes and subclasses

Capability classes and subclasses in Franklin County are in the following list. The brief description of each subclass gives the general nature of the major soils included.

Class I.—Soils that are easy to farm and have no more than slight limitations in use. They may be used for intensive cultivation without any special measures to control excess water or erosion. They may be expected to produce high yields with ordinary good soil and crop management. No subclasses in class I.

Class II.—Soils that can be used for tilled crops with only moderate conservation problems or limitations.
- IIe: Gently sloping soils subject to moderate erosion.
- IIs: Deep cherty colluvial and alluvial soils.
- IIw: Imperfectly drained alluvial and colluvial soils.

Class III.—Soils with one or more serious conservation problems when used for tilled crops.
- IIIe: Deep well-drained soils of the rolling uplands and terraces.
- IIIw: Poorly drained bottom soils and somewhat poorly drained terrace soils.

Class IV.—Soils that have very serious conservation problems when cultivated, and therefore require very careful treatment and management.
- IVe: Deep well-drained soils of the hilly uplands and terraces.
- IVs: Very sandy alluvial soils with low moisture-supplying capacities.
- IVw: Poorly drained soils of the uplands and terraces.

Class VI.—Soils requiring permanent vegetation, usually long-producing pasture and forage, and having only moderate conservation problems when in such use.
- VIe: Deep soils of the hilly and steep uplands.
- VIs: Stony soils of the rolling to hilly uplands.

Class VII.—Soils usually best suited to trees; only the more favorable sites suited for limited grazing.
- VIIe: Deep well-drained soils of the steep uplands; and gullied land.
- VIIs: Stony soils and rockland.

The capability class and subclass for each soil is as follows:

	Capability class and subclass
Allen fine sandy loam, eroded rolling phase (Aa)	IIIe.
Allen stony fine sandy loam, hilly phase (Ab)	VIs.
Barbourville fine sandy loam (Ba)	IIe.
Baxter cherty silt loam:	
Undulating phase (Bb)	IIe.
Eroded undulating phase (Bc)	IIe.
Rolling phase (Bd)	IIIe.
Eroded rolling phase (Be)	IIIe.
Hilly phase (Bf)	IVe.
Eroded hilly phase (Bg)	IVe.
Steep phase (Bh)	VIIe.
Eroded steep phase (Bk)	VIIe.
Baxter cherty silty clay loam:	
Severely eroded rolling phase (Bm)	IVe.
Severely eroded hilly phase (Bn)	VIe.
Severely eroded steep phase (Bo)	VIIe.
Bodine cherty silt loam:	
Steep phase (Bp)	VIIe.
Eroded steep phase (Br)	VIIe.
Severely eroded steep phase (Bs)	VIIe.
Bouldery colluvium, Jefferson soil material (Bt)	VIIs.
Bruno loamy fine sand (Bu)	IVs.
Capshaw silt loam (Ca)	IIe.
Colbert-Talbott silty clay loams, eroded rolling phases (Cb)	IIIe.
Cotaco fine sandy loam (Cc)	IIw.
Cumberland clay loam, severely eroded rolling phase (Cd)	IIIe.
Cumberland silt loam, rolling phase (Ce)	IIIe.
Cumberland silty clay loam:	
Severely eroded rolling phase (Cf)	IIIe.
Eroded hilly phase (Cg)	IVe.
Severely eroded hilly phase (Ch)	IVe.
Cumberland and Etowah loams:	
Undulating phases (Ck)	IIe.
Eroded undulating phases (Cm)	IIe.
Eroded rolling phases (Cn)	IIIe.
Cumberland and Etowah silt loams, undulating phases (Co)	IIe.
Cumberland and Etowah silty clay loams:	
Eroded undulating phases (Cp)	IIe.
Eroded rolling phases (Cr)	IIIe.
Decatur silt loam, undulating phase (Da)	IIe.
Decatur silty clay, severely eroded rolling phase (Db)	IIIe.
Decatur silty clay loam:	
Eroded undulating phase (Dc)	IIe.
Eroded rolling phase (Dd)	IIIe.
Dellrose cherty silt loam:	
Eroded rolling phase (De)	IIIe.
Eroded hilly phase (Df)	IVe.
Steep phase (Dg)	VIe.
Eroded steep phase (Dh)	VIe.
Severely eroded steep phase (Dk)	VIe.
Dewey cherty silt loam, rolling phase (Dm)	IIIe.
Dewey cherty silty clay:	
Severely eroded rolling phase (Dn)	IIIe.
Severely eroded hilly phase (Do)	IVe.
Dewey cherty silty clay loam:	
Eroded rolling phase (Dp)	IIIe.
Eroded hilly phase (Dr)	IVe.
Dewey silt loam:	
Undulating phase (Ds)	IIe.
Rolling phase (Dt)	IIe.
Dewey silty clay:	
Severely eroded rolling phase (Du)	IIIe.
Severely eroded hilly phase (Dv)	IVe.
Dewey silty clay loam:	
Eroded undulating phase (Dw)	IIe.
Eroded rolling phase (Dx)	IIIe.
Dickson silt loam:	
Undulating phase (Dy)	IIe.
Eroded undulating phase (Dz)	IIe.
Rolling phase (D2)	IIIe.
Eroded rolling phase (D3)	IIIe.
Dickson silty clay loam, severely eroded rolling phase (D4)	IVe.
Dunning silty clay loam (D5)	IIIw.
Better drained phase (D6)	IIw.
Egam silty clay loam (Ea)	IIw.
Emory cherty silt loam (Eb)	IIs.
Emory silt loam (Ec)	I.
Ennis cherty silt loam (Ed)	IIs.
Greendale cherty silt loam (Ga)	IIs.
Greendale silt loam (Gb)	IIe.
Gullied land, limestone material (Gc)	VIIe.
Guthrie silt loam (Gd)	IVw.
Hartsells fine sandy loam:	
Rolling and undulating phases (Ha)	IIIe.
Eroded rolling and undulating phases (Hb)	IIIe.
Hermitage silt loam:	
Eroded undulating phase (Hc)	IIe.
Eroded rolling phase (Hd)	IIIe.
Holston clay loam, severely eroded rolling phase (He)	IIIe.
Holston loam:	
Undulating phase (Hf)	IIe.
Eroded undulating phase (Hg)	IIe.
Eroded rolling phase (Hh)	IIIe.
Humphreys cherty silt loam (Hk)	IIe.
Huntington fine sandy loam (Hm)	I.
Huntington silt loam (Hn)	I.
Jefferson clay loam, severely eroded rolling phase (Ja)	IVe.
Jefferson fine sandy loam, eroded rolling phase (Jb)	IIIe.
Jefferson stony clay loam, severely eroded hilly phase (Jc)	VIs.
Jefferson stony fine sandy loam:	
Hilly phase (Jd)	VIs.
Eroded hilly phase (Je)	VIs.
Eroded rolling phase (Jf)	IVs.
Lawrence silt loam (La)	IIIw.
Lindside fine sandy loam (Lb)	IIw.
Lindside silt loam (Lc)	IIw.
Lindside silty clay loam (Ld)	IIw.
Lobelville cherty silt loam (Le)	IIw.
Melvin loam (Ma)	IIIw.
Melvin silt loam (Mb)	IIIw.
Mimosa silty clay:	
Severely eroded hilly phase (Mc)	VIe.
Severely eroded steep phase (Md)	VIIe.
Mines, pits, and dumps (Me)	(Unclassified.)
Mountview silt loam:	
Undulating phase (Mf)	IIe.
Eroded undulating phase (Mg)	IIe.
Eroded rolling phase (Mh)	IIIe.
Mountview silty clay loam, severely eroded rolling phase (Mk)	IVe.
Muskingum stony fine sandy loam:	
Rolling phase (Mm)	VIs.
Eroded rolling phase (Mn)	VIs.
Hilly phase (Mo)	VIs.
Eroded hilly phase (Mp)	VIs
Steep phase (Mr)	VIIs.
Nolichucky clay loam, severely eroded rolling phase (Na)	IIIe.
Nolichucky loam:	
Eroded undulating phase (Nb)	IIe.
Eroded rolling phase (Nc)	IIIe.
Ooltewah silt loam (Oa)	IIw.
Pace cherty silt loam:	
Eroded undulating phase (Pa)	IIe.
Eroded rolling phase (Pb)	IIIe.
Eroded hilly phase (Pc)	IVe.

	Capability class and subclass
Purdy silt loam (Pd)	IVw.
Riverwash (Ra)	(Unclassified.)
Robertsville silt loam (Rb)	IVw.
Rockland, limestone, hilly and rolling (Rc)	VIIs.
Rockland, limestone, steep and very steep (Rd)	VIIs.
Rockland sandstone, very steep (Re)	VIIs.
Sequatchie fine sandy loam:	
Undulating phase (Sa)	IIe.
Severely eroded rolling phase (Sb)	IVe.
Stony hilly land, Mimosa soil material (Sc)	VIs.
Stony rolling land, Talbott and Colbert soil materials (Sd)	VIs.
Stony hilly land, Talbott and Colbert soil materials (Se)	VIs.
Stony steep land, Talbott and Colbert soil materials (Sf)	VIIs.
Swaim silty clay loam:	
Eroded rolling phase (Sg)	IIIe.
Eroded undulating phase (Sh)	IIe.
Taft silt loam (Ta)	IIIw.
Tyler silt loam (Tb)	IIIw.
Waynesboro clay loam:	
Severely eroded rolling phase (Wa)	IVe.
Severely eroded hilly phase (Wb)	VIe.
Waynesboro loam:	
Undulating phase (Wc)	IIe.
Eroded undulating phase (Wd)	IIe.
Rolling phase (We)	IIIe.
Eroded rolling phase (Wf)	IIIe.
Whitwell loam (Wg)	IIw.

Soil Associations

Soils that occur in a characteristic pattern make up a soil association. An association may consist of only a few or of many soils. The soils may be similar or may be of many different types. Although closely associated geographically, the soils in an association may differ in their suitability for agricultural use.

Each of the soil associations of Franklin County is composed of 2 or 3 dominant soils and 1 or more soils of lesser extent. The boundaries of the 11 soil associations in the county are shown in the colored soil association map in the back of the report. Each association is described on the following pages.

Hartsells–Muskingum–Cotaco association

This extensive soil association is on the Cumberland Plateau and occupies 10.4 percent of the county. The relief is predominantly rolling to hilly. The Hartsells soils generally occupy the undulating and rolling areas. The Muskingum soils are on the hilly and steep areas near the rim of the escarpment. These moderately deep and shallow soils occupy the more deeply dissected areas, and in most places have many sandstone rock outcrops. The drainage in the association is dendritic. Colluvial and alluvial materials are in the narrow bands along the intermittent drainageways and at the heads of drainageways. These areas are occupied chiefly by the Cotaco soil but include a very small acreage of the Barbourville soil. The whole area is underlain by sandstone, and the soils are predominantly fine sandy loams.

An estimated 65 percent of the soil association consists of soils that are fair to good for intertilled crops and fair to excellent for permanent pasture. These are mainly Hartsells soils, which are somewhat droughty but well adapted to a wide variety of crops and vegetables. Nearly all the cultivation occurs on Hartsells soils. Corn is the main crop.

About 5 percent of the association consists of soils that are fair to very good for permanent pasture but only fair to poor for tilled crops. Poorly drained Cotaco soil and eroded Hartsells soils comprise most of this part of the association.

About 30 percent of the association consists of steep and stony Muskingum soils that are seldom cultivated and only fairly well suited to pasture.

Farms are widely scattered over the soil association area and population is sparse. Farming is of the subsistence type. However, the association contains a large acreage that is suitable for development. The pattern of land ownership, the lack of good roads and markets, the low natural fertility of the soils, and the cost of clearing have prevented agricultural development of this area. In nearby counties, this soil association supports prosperous agricultural communities.

The blackjack oak-hardwoods and upland hardwoods forest types cover most of this association. Tree species included in these types are pignut and white hickory, blackgum, red maple, sourwood, and white, black, scarlet, blackjack, and chestnut oaks. On the exposed summits of the sharper ridges are black, scarlet, and chestnut oaks. On the ridge slopes, scarlet oak is associated with white oak, pignut hickory, blackgum, sassafras, and dogwood. A few yellow-poplar trees are at the base of the slopes. On the broad level tops of some ridges, on wide benches, and on well-drained alluvial soils white oaks are associated with scarlet and black oaks and an occasional post oak. On the imperfectly drained Cotaco soil are red maple, blackgum, and sweetgum.

Rockland, limestone–Rockland, sandstone–Stony land association

This extensive soil association is on the Cumberland Escarpment and occupies 28.7 percent of the county. It consists mainly of stony and rocky land types. The relief is predominantly steep or very steep. Drainage is very rapid and stream dissection is intense. Very steep sandstone rockland with slopes of more than 60 percent forms the upper part or cliffs of the escarpment. Below this is a belt of bouldery colluvium that occupies talus slopes having a gradient of about 25 percent. Farther down the slopes are mainly steep limestone rockland and some hilly rockland, stony rolling land, stony hilly land, and stony steep land. Included in this association are small acreages of Colbert soils on limestone spurs, and small acreages of Jefferson and Allen soils on the colluvial areas. A few small coves are occupied chiefly by Jefferson and Allen soils.

Practically all of the association consists of soils that are very poorly suited to agriculture. Soils that are fair to poor for tilled crops and fair to very good for permanent pasture occur at the foot of the escarpment and in mountain coves. Most of these areas, however, are almost inaccessible.

Farming is of the subsistence type; the population is very small. The sale of forest products provides some income for many farmers. Agricultural development has poor chances of success on this association. Nearly all the land is now in forests, and this appears to be its best use. Less than 5 percent of the land has been cleared for crops or pasture.

Upland hardwoods occupy practically all of this association. Cow oak, swamp white oak, and papaw or hemlock occur along streams, or in the coves. Yellow buckeye, scarlet, black, and white oaks, blackgum, pignut hickory, black walnut, sugar maple, and yellow locust grow on the lower slopes of the escarpment. Redcedar is prominent on limestone outcrops. The northern slopes support dense forests consisting of most of the tree species that grow on the lower slopes. The most prominent species are pignut and scalybark hickories and white oak. In addition, black walnut, black cherry, white elm, white ash, basswood, cucumbertree, umbrella-tree, northern red oak, and yellow-poplar grow almost always on northern slopes. The forests on southern exposures are decidedly inferior to those on northern exposures.

Pace–Baxter–Greendale association

This small soil association is in the southwestern part of the county and occupies 0.4 percent of the area. It is in a mountain cove that is drained by Larkin Fork Creek. The relief is mainly rolling to hilly, and drainage is well established. Numerous sinkholes occurring in the areas of Baxter soils give the association a hummocky or karst relief in places. The soils are predominantly cherty silt loams, but many areas have almost the texture of cherty loam.

Baxter and Pace soils are most extensive in this association. Baxter soils occupy most of the rolling to hilly uplands; Pace soils are on the rolling to hilly colluvial slopes.

Greendale soils are very important agriculturally, but much less extensive than either the Baxter or Pace soils. They occur on the gently sloping young colluvial areas.

Also included in this association are small acreages of Hermitage, Swaim, and Emory soils on colluvial areas and of Huntington soils on first bottoms along streams. In addition, there are stony land types that occur on rolling to steep areas along major drainageways and near the outer edge of the association at the base of steep mountain slopes.

The association consists chiefly of soils that are poor to good for tilled crops and fair to excellent for permanent pasture. Hermitage and Emory soils are excellent for tilled crops and good to excellent for permanent pastures, but the acreage is small. An estimated 15 percent of the association consists of soils that are poor to very poor for tilled crops and poor to very good for permanent pasture.

Nearly all of this association is in small general farms. Cotton is the chief cash crop, although a few small patches of tobacco are grown, mainly on the Greendale soils. Corn and wheat are most extensively grown and the crops are used locally as feed for livestock. Potatoes are grown commercially on the Baxter and Pace soils. The acreage of crop-adapted soil is small in this area. Consequently the land is used more intensively than it should be.

Forests occupy only a small acreage in this soil association. Species of trees are scalybark hickory, redcedar, persimmon, redbud, basswood, mulberry, sugar maple, and white, scarlet, and chinquapin oaks. Many farms that extend into the Rockland, limestone—Rockland, sandstone—Stony land association get part of their incomes from the sale of forest products.

Jefferson–Sequatchie–Huntington association

This inextensive association is in the southeastern corner of the county and occupies 1.5 percent of its area. The relief is mainly undulating to rolling but is hilly in some areas near the foot of the mountains. The association consists of deep coves in the Cumberland Escarpment. Sinking Cove is completely surrounded by steep mountain slopes and drains into deep limestone sinkholes. The valley that extends from northwest of Sherwood to the Alabama line is a long narrow area with steep mountain slopes on three sides. It is drained by Crow Creek, which flows south into Alabama.

The association consists chiefly of colluvial and alluvial soils that washed or rolled from Hartsells and Muskingum soils of the Cumberland Plateau. Many areas along the stream bottoms, however, consist of fine-textured material that washed from limestone soils on the Cumberland Escarpment. The soils are predominantly fine sandy loams, but many of those along the stream bottoms, particularly in the upper part of the valley that extends from northwest of Sherwood to the Alabama line, are silty clay loams. Small areas of Stony hilly land, Talbott and Colbert soil materials, are near the base of mountain slopes.

Jefferson soils are on most of the old, more strongly sloping colluvial areas. Cherty Pace and Swaim soils are much less extensive. Emory and Ooltewah soils are on the young colluvial areas in shallow depressions and along intermittent drainageways. They make up only a small part of the association. Sequatchie soils predominate in the lower part of the valley that extends from northwest of Sherwood to the Alabama line. They occupy low terraces and are extensive throughout the association. Huntington fine sandy loam is on the first bottoms. It is associated with Egam, Dunning, Lindside, and Melvin soils, which have textures ranging from fine sandy loam to silty clay loam. Dust from the large lime plant located at Sherwood drifts down the valley and has heavily limed the soils a mile or two around the plant.

An estimated 70 percent of this soil association consists of soils that are fair to excellent for permanent

pastures but only poor to good for tilled crops. Soils that are excellent for tilled crops or for permanent pasture occupy 10 percent of the association. The rest is occupied by soils that are poorly suited to tilled crops and very poor to very good for permanent pastures. The acreage of crop-adapted soils on each farm in this association is small. On many farms these soils have been used too frequently for row crops.

The forests in this association, restricted largely to stony land or rockland miscellaneous land types, are primarily of the cedar-hardwoods forest type. Trees include redcedar, scalybark hickory, chinquapin, scarlet, and white oaks, hophornbeam, (*Ostrya virginiana*), persimmon, sugar maple, redbud, mulberry, white ash, basswood, pignut hickory, and other species characteristic of limestone rockland.

Farming on this association is of the general type. A wide variety of crops are grown. Many hogs are produced, particularly in Sinking Cove; consequently, a large acreage of corn is grown for feed. A considerable number of beef or dairy cattle are also produced and fed from crops raised on the farm. Corn is grown chiefly on soils of the first bottoms and on Sequatchie soils of the low terraces. Cotton, the principal cash crop, is grown largely on the Jefferson, Pace, and Sequatchie soils. The poorly drained soils are used chiefly for annual hay crops.

Decatur–Dewey–Cumberland association

This extensive soil association occupies about 21.2 percent of the county. It is on the eastern part of the Highland Rim and comprises the best agricultural section of the county. The relief is predominantly undulating to rolling. Nearly level stream bottoms and belts of hilly land border the larger drainageways. The many shallow sinkholes are occupied by Emory and Ooltewah soils. Occasional large depressed areas are generally occupied by Guthrie or Robertsville soils.

Decatur, Dewey, and Cumberland soils predominate. Decatur and Dewey soils are on the uplands; Cumberland soils are on old high terraces. These soils occur in relatively large areas and are closely associated. The terraces are difficult to distinguish from the uplands on the landscape. Emory, Ooltewah, and Baxter soils are somewhat extensive. Other members of the soil association that occupy considerable acreages are the Waynesboro, Nolichucky, Capshaw, Guthrie, Whitwell, Sequatchie, Taft, Robertsville, Huntington, and Lindside soils. Most of the soils of this association have silt loam and silty clay loam textures. Except for the Baxter and the cherty Dewey soils, the soils are generally free of stones or chert.

This association consists mainly of soils that are fair to excellent for tilled crops and fair to excellent for permanent pastures. A high proportion of soils are poor to fair for tilled crops and fair to very good for permanent pasture. Soils that are poorly suited to crops and poor to very good for permanent pasture occupy an important acreage. They occur in depressed areas and are mainly Guthrie and Robertsville soils.

This association contains the most intensively used soils in the county. Farming is of the general type. Management is at a higher level than in other areas and crop yields are comparatively high. Many kinds of crops are grown. Farmers are prosperous, and the standard of living is relatively high. Farmers on most of the moderate-sized farms can choose the crops and type of farming best suited to their land. Management is not exacting if the soil is used according to its capabilities.

These soils are well suited to practically all the crop and pasture plants commonly grown in the county. Wheat, corn, alfalfa, crimson clover, and potatoes are among the most important crops. Potatoes are grown chiefly on the loamy Cumberland soils. Alfalfa can be grown successfully on all of the important soils, if they are adequately limed and fertilized. Soils of the first bottoms and on the imperfectly and poorly drained terraces are used chiefly for corn, soybeans, and annual hay crops. Many areas of these soils, however, are used for permanent pasture.

Forests occur mainly on the poorly drained, steep cherty, and stony soils. The upland hardwoods forest type dominates the well-drained sites. Trees consist of southern red, post, white, and black oaks, yellow-poplar, and white and pignut hickories. The trees are capable of producing large-sized, high-quality saw logs. Poorly drained sites are occupied by the bottom-land hardwoods forest type, which consists of willow oak, sweetgum, red maple, blackgum, and water oak.

Mountview–Baxter association

This soil association is on the Highland Rim and occupies about 4.3 percent of the county. Relief is predominantly undulating to rolling but is hilly near the larger drainageways. Mountview and Baxter soils occupy most of the association, but Decatur soils are also extensive. The Decatur soils occur in association with soils of the uplands. Other soils in the association are Cumberland, Dickson, Guthrie, Emory, Ooltewah, Capshaw, and Taft. Mountview and Dickson soils occupy the undulating areas and Baxter soils the rolling to hilly areas near large drainageways. Cumberland soils occur on the high terraces closely associated with soils of the uplands. A considerable acreage of Emory soils occurs on young alluvial-colluvial deposits at the base of slopes, along small intermittent drainageways, and in depressed areas. Ooltewah and Guthrie soils occupy the large, imperfectly drained and poorly drained areas. Capshaw and Taft soils are on the medium low terraces.

The most extensive soils in this association are fair to good for tilled crops and fair to excellent for permanent pasture. Soils that are good to excellent for tilled crops and for permanent pasture are on the old high terraces and on alluvial and colluvial positions. An estimated 15 percent of the soils are poor to fair for tilled crops and poor to very good for permanent pasture.

This soil association area supports a relatively large population. Farming is of the general type, and many kinds of crops are grown. However, the soils of this association are less productive than those of the Decatur-Dewey-Cumberland association. Farms are

not so well managed and the choice of crops and types of farming are more restricted. Organic matter and fertility are moderately low. Management, however, is not exacting if the soil is used according to its capabilities.

Soils of this association are also somewhat droughty; consequently a higher proportion of drought-resistant crops are grown. Cotton, corn, wheat, lespedeza, and sorghum are the principal crops. Buckwheat and melons are also grown. Cotton is the chief cash crop and is planted on a larger acreage than corn. Alfalfa can be successfully grown if the soil is adequately limed and fertilized. It cannot be grown very well on the Dickson soils. The proportion of corn and alfalfa grown in this association is less than in the Decatur-Dewey-Cumberland association because fertility levels and moisture-holding capacities of the soils are lower.

The upland hardwoods forest type occurs on well-drained soils, and the bottom-land hardwoods forest type on imperfectly drained and poorly drained areas. The southern red, black, white, and post oaks, and yellow-poplar trees that grow on this association are inferior to those growing on the Decatur-Dewey-Cumberland association. Other trees that grow on well-drained or excessively drained areas are white hickory, black walnut, chestnut and scarlet oaks, and sugar maple. Willow and water oaks and sweetgum grow on the poorly drained areas. Blackgum and red maple grow either on excessively drained or on poorly drained areas. Sycamore, white elm, and silver maple occur along streams and northern red oak, black cherry, buckeye, basswood, and beech on moist slopes.

Whitwell–Holston–Cumberland association

This association occupies about 3.3 percent of the county and is located on the Highland Rim. It consists almost entirely of alluvial soils. The relief is nearly level to undulating. Whitwell, Holston, Cumberland, and Tyler are the principal soils. Waynesboro, Nolichucky, Lindside, Capshaw, and Dunning soils occupy a considerable acreage, and there is a small acreage of other alluvial soils. Holston, Cumberland, Waynesboro, and Nolichucky soils occupy undulating to rolling positions on high terraces. They are the best drained soils of this group. Whitwell and Capshaw soils are on the moderately well drained low or medium low terraces and the Tyler and Purdy soils on poorly drained low terraces. Soils of the first bottoms are the well drained or moderately well drained Huntington and Egam soils, the imperfectly drained Lindside soils, and the poorly drained Dunning and Melvin soils.

The predominant soils are fair to good for tilled crops and fair to excellent for permanent pasture. There is a significant acreage of soils that are poor to fair for tilled crops and fair to very good for permanent pasture. An estimated 15 percent of the association consists of soils that are poor for crops that require tillage and poor to very good for permanent pasture.

Farms of this association are small and of the general type. Corn, wheat, and cotton are the principal crops. Cotton is grown principally on the Holston, Waynesboro, and Nolichucky soils. Alfalfa is grown mainly on the Cumberland and Waynesboro soils, which are well suited to this crop. The other soils in the association are not suited to alfalfa because they are poorly drained, droughty, and infertile. Consequently, lespedeza, soybeans, and crimson clover are the legumes grown on these soils.

The woodland acreage is limited, because nearly all this association has been cleared. Tree species on poorly drained soils are willow oak, blackgum, and maple. Those on well-drained soils are yellow-poplar, white, black, and southern red oaks, and black walnut.

Cumberland–Waynesboro–Sequatchie association

This very small association occupies only 0.9 percent of the county. It is in Williams Cove, southeast of Winchester. Almost all of the association consists of alluvial soils, but there is a small acreage of colluvial soils. Relief is predominantly undulating but ranges from nearly level to rolling.

Cumberland, Waynesboro, and Sequatchie are the principal soils. The Cumberland and Waynesboro soils occupy old, high terraces, and the Sequatchie soils are on low terraces. A large acreage of Lindside, Emory, and Dunning soils and a small acreage of Egam, Ooltewah, Swaim, Pace, and Whitwell soils are included in the association. The Swaim and Pace soils occur on old alluvial-colluvial positions near the base of the Cumberland Escarpment. Emory and Ooltewah soils are on young alluvial-colluvial deposits at the base of slopes, along small drainageways, and in shallow depressions. The Whitwell soil is on low terraces, and the Egam, Lindside, and Dunning soils are on first bottoms. The terrace soils are mainly well drained, whereas soils of the first bottoms are largely imperfectly or poorly drained.

The predominant soils are fair to excellent for tilled crops and fair to excellent for permanent pasture. There is also a considerable acreage of soils that are poor to fair for tilled crops and fair to very good for permanent pasture. Soils that are poor for tilled crops and poor to very good for permanent pasture occupy only a very small acreage.

This soil association area has a relatively large population. Farms are small and of the general type. The principal soils are well suited to all of the crops commonly grown. Corn, wheat, cotton, and legumes are the main crops. The poorly drained Dunning soils are used chiefly for permanent pasture or for hay. The other soils of first bottoms and the Sequatchie soils of the terrace lands are well suited to row crops.

Waynesboro–Holston–Whitwell association

This association occupies 4.7 percent of the county and consists mainly of soils on old high terraces along the Elk River. The materials from which most of the soils were formed are chiefly of sandstone origin, and loam textures predominate. The relief is predominantly undulating but ranges from nearly level to roll-

ing. The area is characterized by undulating terraces that are associated with nearly level, poorly drained depressed areas.

Waynesboro, Holston, Whitwell, Sequatchie, and Tyler are the principal soils in this association. Nolichucky, Cumberland, Huntington, and Lindside soils occupy an important acreage, and Bruno and Mountview soils, a small acreage. Waynesboro, Holston, Nolichucky, and Cumberland soils are on undulating to rolling slopes and have the best drainage. The well drained Sequatchie and the moderately well drained Whitwell soils are on nearly level to undulating low terraces. The Tyler soil, on nearly level to slightly depressed areas, is poorly drained. Huntington soils occupy well-drained first bottoms, and Lindside soils, the imperfectly drained bottoms. A small acreage of Emory and Ooltewah soils occurs on the colluvial areas.

The predominant soils are fair to good for tilled crops and fair to excellent for permanent pasture. There is also a significant acreage of soils that are fair to poor for tilled crops and poor to very good for permanent pasture.

Farms of this association are small and mainly of the subsistence or general type. Generally farmhouses are smaller and modern facilities less common than in the Decatur-Dewey-Cumberland association. Many kinds of crops can be grown. Corn, cotton, sorghum, crimson clover, and rye and vetch mixed are the principal crops. Melons are grown on the Holston and Sequatchie soils. A considerable acreage of buckwheat is grown on the Whitwell, Lindside, and other moderately well drained and imperfectly drained soils.

The soils, except the poorly drained Tyler soil, are suited to most of the common crops. They are low in organic matter and fertility, and under ordinary management they produce low yields of most crops. They respond well to applications of complete fertilizers, but the response is neither as great nor as lasting as on the soils of the Decatur-Dewey-Cumberland association. Alfalfa does not grow well on the Holston and Nolichucky soils because they are droughty and low in fertility.

Dickson–Baxter–Greendale association

This extensive soil association is on the Highland Rim and occupies 13.3 percent of the county. It occurs chiefly in the northwestern part of the county, but some areas are along the western edge. The relief is mainly undulating to rolling. Large nearly level or undulating areas that have stronger slopes near the drainageways are typical of this association. The area has a dendritic drainage pattern, but streams are neither numerous nor well entrenched.

Imperfectly and moderately well drained soils predominate, but there is also a large acreage of poorly drained soils. Dickson, Baxter, and Greendale soils occupy most of the association. Included is a large acreage of Lawrence, Guthrie, Ennis, and Lobelville soils and a small acreage of Mountview soils. Dickson soils are chiefly on the undulating uplands and Lawrence and Guthrie soils on nearly level to depressed areas. The upper layers of these soils are generally free of chert, stones, or gravel, and the subsoils are compact and slowly pervious. The chert-free Mountview soils are chiefly on undulating uplands. The cherty Baxter soils are principally on the steeper areas of the association along the larger drainageways. The dominantly cherty Greendale soils are on young alluvial-colluvial deposits at the base of slopes occupied by Baxter soils and along intermittent streams. Ennis and Lobelville soils occur in long narrow areas on first bottoms.

The most extensive soils are poor to good for tilled crops and fair to excellent for permanent pastures. Small areas, mainly Guthrie soil and a few short steep slopes of Baxter soils, are poor for tilled crops and poor to very good for permanent pasture.

This soil-association area has a relatively small farm population. Most of it is in forests of low quality and in pasture. Much of the idle land has grown up in broomsedge and blackberry briers. Farms are thinly scattered, small, and mainly of the subsistence type. The principal crops are cotton, corn, lespedeza, wheat, sorghum, and a mixture of rye and vetch. Management is generally poor, and yields of crops that are not tolerant to drought are low.

Extensive forests are in this association. They consist of blackjack oak-hardwoods, upland hardwoods, and bottom-land hardwoods forest types. The blackjack oak-hardwoods forest type occurs on dry, cutover, or burned-over sites. It usually consists of southern red, post, scarlet, blackjack, white, and black oaks, white and pignut hickories, blackgum, sourwood, dogwood, and red maple trees. Trees do not grow large and are generally used for crossties, distillation wood, and fuel.

The upland hardwoods forest type consists of mixed oak and hickory, yellow-poplar, blackgum, and shortleaf pine.

The bottom-land hardwoods forest type is on imperfectly drained or poorly drained Lawrence and Guthrie soils. Species of trees consist of water and willow oaks, red maple, sweetgum, and blackgum.

Bodine–Baxter–Ennis association

This extensive association occupies 11.3 percent of the county. It occurs in the western part and includes the Highland Rim Escarpment and Central Basin areas. The relief is hilly to steep and is characterized by narrow, winding ridges and deep, steep-walled V-shaped valleys. A well-developed dendritic drainage pattern has formed. The area is highly dissected, and all parts are well drained.

The Bodine soils are the most extensive in this association, but the Baxter and Ennis soils are more important agriculturally. Dellrose and Lobelville soils occupy a large acreage and are also important to the agriculture of the area. Other important soils that occupy small areas are members of the Mimosa, Bruno, Greendale, Humphreys, Lindside, and Huntington series. Baxter soils occur chiefly on the rolling ridge crests and hilly ridge slopes. Bodine soils are on the steep ridge slopes and Dellrose soils on hilly to steep slopes of the Central Basin. Mimosa soils occupy positions at the foot of high ridges in the Central Basin

that are free of colluvial material from the higher lying Highland Rim Escarpment. Some areas of Mimosa soils occupy benchlike areas away from such slopes. Greendale soils are on the sloping alluvial-colluvial fans. Ennis, Humphreys, Lobelville, Huntington, Lindside, and Bruno soils are on the nearly level narrow stream bottoms.

The predominant soils are poor to very poor for tilled crops and very poor to very good for permanent pasture. A high proportion of the soils are fair to good for tilled crops and fair to excellent for permanent pasture. A very small acreage is occupied by soils that are good to excellent for tilled crops and permanent pasture.

There are relatively few people in this soil association area. Most of them live along the principal roads in the valleys. About 50 percent of the association is in pasture or timber. Most of the farms are small, and farming is of the general type. Some livestock are raised. Corn and hogs are produced on farms in the narrow bottom lands.

Areas suitable for cultivation are the Baxter soils on ridge crests and the Ennis, Lobelville, Huntington, and Lindside soils on first bottoms. Many of these areas are isolated by very poor soils. Huntington and Lindside soils are chert free. The other soils contain enough chert in many places to interfere with tillage. A few crops are grown on the Greendale and rolling to hilly Mimosa soils. Bodine soils are predominant on the ridge slopes. They are unsuited or very poorly suited to crops or pasture because they are steep, cherty, and low in fertility. Their main use is forestry and pasture. A large part of the Dellrose soils, although moderately fertile, is steep and cherty and therefore poorly suited to crops.

Most of the cleared land is in the valleys and consists of Greendale, Humphreys, and Ennis soils. These soils are suited to fairly intensive cropping. Most of the uplands are in forest and very poorly suited to crops and poorly suited to pasture. The Baxter soils are the main cultivated upland soils. The chief crops in the order of importance are rye, wheat, corn, oats, and crimson clover. In the bottom lands, the principal crops in the order of their acreage are corn, wheat, rye, oats, and alfalfa. A small acreage of soybeans is grown on most farms.

Forests are of the upland hardwoods forest type. On Bodine soils the main species are white, black, scarlet, and chestnut oaks, blackgum, sourwood, and hickory. On Dellrose and Mimosa soils the main species are chinquapin and northern red oaks, hackberry, black locust, white oak, black walnut, basswood, yellow-poplar, white elm, mulberry, honeylocust, black cherry, redcedar, Osage-orange, sycamore, sassafras, sumac, boxelder, and sugar maple. Local occurrence of tree species is determined by position on slope, internal drainage, and natural fertility of the soil.

Forests[8]

Practically all of Franklin County was forested at the time of the first white settlement. About 55 percent of the area is still in forest (*7*). Most of the forested area is covered by an upland hardwoods forest type that consists of a mixed stand of oak and hickory trees. The poorest upland soils are covered by the blackjack oak-hardwoods forest type. Poorly drained sites are covered by a bottom-land hardwoods forest type. Cedar-hardwoods and yellow pine-hardwoods forest types cover much less extensive areas than those of the other forest types. Land in trees is 37 percent farm woodland, 62 percent privately owned nonfarm forest, and 1 percent publicly owned forest (*7*).

According to the 1950 Census, 1,595 farms have woodlands. The average area of woodland per farm was 43.4 acres. Farm woodlands occupy 31.2 percent of the land in farms. They contributed 1.6 percent of the value of all products sold from farms in 1949.

Forests are not well managed. Selective cutting is not practiced and the use of cull trees and waste materials is not attempted. Forests have been damaged by fires, overgrazing, and overcutting. Many trees are of low quality and have little market value. Cutover forests contain much cull timber that interferes with the growth of better trees.

Management

The following practices are essential for the improvement of forests in this county: (1) Prevention of fires and control of grazing, (2) elimination of growth that competes with future crop trees, (3) selective harvesting of trees, and (4) maintenance of a full stand of desirable species.

The prevention of fires and control of grazing are needed to maintain soil porosity, prevent erosion, and protect the forest. Fire prevention requires that all people be cautious while in the forest, particularly when conditions are critical in spring and fall. Vigilance and care by local people can almost eliminate fires caused by smokers, incendiaries, hunters, and brushburners.

Grazing in the woodlands does not pay. Experiments in Indiana show that farm animals grazed on 6 acres or less of woodland per animal unit, without supplemental feed, deteriorated seriously in a 6-month season (*2*). Repeated browsing gradually slows tree growth, kills small trees, and prevents forest reproduction. Compaction of the soil and disturbance of the humus decrease soil porosity and water absorption.

Selective cutting would greatly increase timber production on large areas of forest land. Trees that are unsound, crooked, short, or bushy topped, and those that are slow growing or of little commercial value, should be removed. Much of this inferior timber can be used for fuel, chemical wood, or pulpwood. Its removal will allow the sound trees of commercially valuable species to grow more rapidly. (The valuable trees should be harvested according to the degree of maturity or the best size for special products. The removal of trees selected for cutting should not damage reserved trees or interfere with reforestation.)

Forest yields of counties can be increased by improved harvesting. Ordinarily trees are cut when they

[8] The data for this section were supplied by G. B. Shivery, Extension Forester, University of Tennessee, Knoxville, Tenn.

are 12 inches in diameter at breast height or barely large enough to yield 1 crosstie. Such a tree is about 60 years old. If left growing about 20 years more, the same tree will be about 16 inches in diameter at breast height and yield 2 crossties.

Properly managed forests should contain about 200 well-distributed crop trees per acre. Continuous yields at short intervals are possible if the trees are apportioned evenly by 2-inch diameter classes between the 2-inch and the 16-inch diameter limits. According to field studies, trees need about 80 years to grow to a diameter of 16 inches. However, the time needed depends on fertility of soil, on moisture, and on other site factors. Selective cutting of the 16-inch trees would yield about 25 two-tie trees per acre over a 10-year period or an annual harvest of 5 crossties per acre continuously.

Reforestation

Soils that have been cleared and are steep, eroded, or otherwise unsuitable for crops and pasture should be reforested. Some areas may reforest naturally in places. For natural reproduction, seed trees of desirable species must be in the vicinity. Severely eroded hilly and steep soils are more economically reclaimed by reforestation.

Planting is necessary if volunteer seeding by desirable species of trees does not take place. It is particularly important to select species that are suitable to the characteristics of the particular soil. Difficult sites should be prepared for planting by breaking and mulching galled areas, building low check dams of brush in gullies, and plowing contour furrows. Tree seedlings can be obtained without cost from the Tennessee Valley Authority.

Ordinarily, black locust is preferred for reforestation by farmers in need of material for fence posts. It grows rapidly where soil is well drained and well aerated, as behind check dams in gullies. Pine is better adapted to severely eroded soils. Loblolly pine quickly revegetates these soils and makes rapid initial growth if any of the surface soil remains. This pine should be selected for planting in Dellrose, Cumberland, and Waynesboro soils. Shortleaf pine is better suited than loblolly pine on sites that have south and west exposures. Virginia pine should be planted where growing conditions are the most severe. Yellow-poplar and white pine should be planted in deep well-drained colluvial soils on north and east exposures.

A volunteer stand of native yellow locust germinates in many places on the Dellrose and Mimosa soils. The products of this locust may be more desirable than those from black locust trees that were planted as nursery seedlings.

Areas that have been severely burned or those occupied by the blackjack oak-hardwoods forest type may be converted to a pine forest type by planting either shortleaf pine or Virginia pine. Hardwood sprouts or trees that compete with planted pine seedlings must be controlled. Tree-poisoning chemicals are effective for killing unwanted low-grade hardwood trees and for controlling the growth of sprouts.

Other Benefits

Forests supply many indirect benefits in addition to producing wood, especially on areas subject to severe erosion. The layer of leaves, needles, and twigs on the forest floor protects the soil. It absorbs the impact of falling rain and preserves the tiny pores and channels between the soil particles. Bacteria, worms, and fungi consume the litter and each other and form dark-brown humus. The humus is carried downward into the mineral soil and improves fertility and soil structure. The litter of humus has a high capacity to absorb water directly. Soil porosity is also improved by the channels left by decaying plant roots.

Surface roots have a beneficial soil-binding function. The densest network of roots usually is found in the lower parts of well-developed layers of litter. The erosion station near Statesville, N. C., reports that virgin woods lost only 0.002 ton of soil per acre and 0.06 percent of the rainfall in runoff (*12*). A woods plot that was burned over twice a year lost 3.08 tons of soil per acre and 11.5 percent of the rain; an unburned woods plot lost 0.001 ton of soil per acre and 0.06 percent of the rainfall.

Similar experiments were made at Zanesville, Ohio, for a 9-year period on cultivated land, pasture, and woodland. Runoff was 20.6 percent on cultivated land, 13.8 percent on pasture, and 3.2 percent on woodland. Soil losses per acre were 17.18 tons from cultivated land, 0.10 ton from pasture, and 0.01 ton from woodland (*13*). These studies show that a complete forest cover controls erosion and absorbs the most water. The soil under an old-growth forest is more porous and absorbs water more rapidly than that in cultivated fields. If a second-growth forest cover is properly maintained, the soil does not lose its porosity unless it is overgrazed or the litter is destroyed by fire (*1*).

Soil Survey Methods and Definitions

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

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

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

Texture, or the sand, silt, and clay content, is de-

termined by the way the soil feels when rubbed between the fingers, and is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

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

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

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

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified by series, types, and phases.

As an example of soil classification, consider the Nolichucky series of Franklin County. This series is made up of two soil types, subdivided into phases, as follows:

Series	*Type*	*Phase*
Nolichucky	Loam	Eroded undulating phase.
		Eroded rolling phase.
	Clay loam	Severely eroded rolling phase.

Soil series.—Soils similar in kind, thickness, and arrangement of soil layers, are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil. Each series is named for a place near which it was first mapped.

Soil type.—Soils having the same texture in the surface layers and similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

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

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

Miscellaneous land types.—Fresh stream deposits, or rough, stony, and severely gullied land that has little true soil are not classified into types and series but are identified by descriptive names, such as Gullied land, limestone material.

Undifferentiated soils.—Two or more soils that are not regularly associated geographically may be mapped as a single unit—an undifferentiated group—if the differences between them are too slight to justify a separation. An example in Franklin County is Cumberland and Etowah loams, undulating phases.

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Soil	Map symbol	Management group	Slope	Drainage	Color of surface soil	Subsoil		Parent material or parent rock
						Color	Consistence	
			Percent					
Allen fine sandy loam, eroded rolling phase.	Aa	5	5–12	Good	Grayish brown to brownish yellow.	Yellowish red to red	Friable	Colluvium, mainly sandstone, some limestone influence.
Allen stony fine sandy loam, hilly phase.	Ab	13	12–25	Good	Grayish brown	Yellowish red to red	Friable	Colluvium, mainly sandstone, some limestone influence.
Barbourville fine sandy loam	Ba	3	2– 7	Good	Brown, light brown, or yellowish brown.	Brown, brownish yellow, or yellowish brown.	Friable	Colluvium, mainly sandstone, some limestone in places.
Baxter cherty silt loam:								
Hilly phase	Bf	13	12–25	Good	Pale brown to brown	Reddish yellow to red	Firm	Residuum, cherty limestone.
Eroded hilly phase	Bg	13	12–25	Good	Yellowish brown to brown or yellowish red.	Reddish yellow to red	Firm	Residuum, cherty limestone.
Baxter cherty silty clay loam, severely eroded hilly phase.	Bn	14	12–25	Good	Yellowish brown to yellowish red.	Reddish yellow to red	Firm	Residuum, cherty limestone.
Baxter cherty silt loam:								
Rolling phase	Bd	10	5–12	Good	Pale brown to brown	Reddish yellow to red	Firm	Residuum, cherty limestone.
Eroded rolling phase	Be	10	5–12	Good	Yellowish brown to brown	Reddish yellow to red	Firm	Residuum, cherty limestone.
Baxter cherty silty clay loam, severely eroded rolling phase.	Bm	11	5–12	Good	Yellowish brown to yellowish red.	Reddish yellow to red	Firm	Residuum, cherty limestone.
Baxter cherty silt loam:								
Undulating phase	Bb	10	2– 5	Good	Pale brown to brown	Reddish yellow to red	Firm	Residuum, cherty limestone.
Eroded undulating phase	Bc	10	2– 5	Good	Pale brown to yellowish brown.	Reddish yellow to red	Firm	Residuum, cherty limestone.
Steep phase	Bh	17	25–60	Good	Pale brown to brown	Reddish yellow to red	Firm	Residuum, cherty limestone.
Eroded steep phase	Bk	17	25–60	Good	Yellowish brown to brown	Reddish yellow to red	Firm	Residuum, cherty limestone.
Baxter cherty silty clay loam, severely eroded steep phase.	Bo	18	25–60	Good	Yellowish brown to yellowish red.	Reddish yellow to red	Firm	Residuum, cherty limestone.
Bodine cherty silt loam:								
Steep phase	Bp	17	25–60	Excessive	Yellowish brown to light grayish brown.	Brownish yellow to yellowish brown.	Friable	Residuum, cherty limestone or chert.
Eroded steep phase	Br	17	25–60	Excessive	Yellowish brown to light grayish brown.	Brownish yellow to yellowish brown.	Friable	Residuum, cherty limestone or chert.
Severely eroded steep phase.	Bs	18	25–60	Excessive	Yellowish brown to light grayish brown.	Brownish yellow to yellowish brown.	Friable	Residuum, cherty limestone or chert.
Bouldery colluvium, Jefferson soil material.	Bt	18	12–60	Excessive	An extremely stony or bouldery land type.			Colluvium, mainly sandstone material.
Bruno loamy fine sand	Bu	1	0– 3	Excessive	Grayish brown to dark yellowish brown.	Yellowish brown or brownish yellow.	Loose	Alluvium, mainly sandstone material, some limestone influence.
Capshaw silt loam	Ca	6	2– 5	Moderately good	Grayish brown to yellowish brown.	Yellowish brown to brownish yellow, or yellow.	Friable	Old mixed alluvium, chiefly limestone.
Colbert - Talbott silty clay loams, eroded rolling phases.	Cb	9	5–12	Moderately good	Grayish brown to light yellowish brown.	Yellow to yellowish red	Plastic or very plastic.	Residuum, clayey limestone.
Cotaco fine sandy loam	Cc	16	0– 2	Moderately good to poor.	Mottled gray and yellowish brown.	Light brownish gray	Loose	Colluvium, mainly sandstone material.
Cumberland and Etowah silt loams, undulating phases.	Co	4	2– 5	Good	Dark reddish brown (Cumberland); brown (Etowah).	Dark red (Cumberland); reddish brown to yellowish red (Etowah).	Firm	Old mixed alluvium, chiefly limestone materials.
Cumberland and Etowah silty clay loams, eroded undulating phases.	Cp	4	2– 5	Good	Dark reddish brown (Cumberland); brown (Etowah).	Dark red (Cumberland); reddish brown to yellowish red (Etowah).	Firm	Old mixed alluvium, chiefly limestone materials.

			Percent					
Cumberland silt loam, rolling phase.	Ce	5	5–12	Good	Dark reddish brown	Dark red	Firm	Old mixed alluvium, chiefly limestone materials.
Cumberland and Etowah silty clay loams, eroded rolling phases.	Cr	5	5–12	Good	Dark reddish brown (Cumberland); brown (Etowah).	Dark red (Cumberland); reddish brown to yellowish red (Etowah).	Firm	Old mixed alluvium, chiefly limestone materials.
Cumberland silty clay loam:								
Severely eroded rolling phase.	Cf	11	5–12	Good	Brown to reddish brown	Dark red	Firm	Same.
Eroded hilly phase	Cg	13	12–25	Good	Brown to reddish brown	Dark red or reddish brown	Firm	Same.
Severely eroded hilly phase.	Ch	14	12–25	Good	Brown to reddish brown	Dark red, reddish brown, or yellowish red.	Firm	Same.
Cumberland and Etowah loams:								
Undulating phases	Ck	4	2– 5	Good	Dark reddish brown (Cumberland); brown (Etowah).	Dark red (Cumberland); reddish brown to yellowish red (Etowah).	Firm	Old mixed alluvium, chiefly limestone materials.
Eroded undulating phases.	Cm	4	2– 5	Good	Dark reddish brown (Cumberland); brown (Etowah).	Dark red (Cumberland); reddish brown to yellowish red (Etowah).	Firm	Same.
Eroded rolling phases	Cn	5	5–12	Good	Dark reddish brown (Cumberland); brown (Etowah).	Dark red (Cumberland); reddish brown to yellowish red (Etowah).	Firm	Same.
Cumberland clay loam, severely eroded rolling phase.	Cd	11	5–12	Good	Brown to reddish brown or red.	Dark red	Firm	Old mixed alluvium, chiefly limestone material.
Decatur silt loam, undulating phase.	Da	4	2– 5	Good	Brown to dark brown	Dark red	Very firm	Residuum, high-grade limestone.
Decatur silty clay loam:								
Eroded undulating phase	Dc	4	2– 5	Good	Brown, reddish brown, or red.	Dark red	Very firm	Residuum, high-grade limestone.
Eroded rolling phase	Dd	5	5–12	Good	Reddish brown to red	Dark red	Very firm	Residuum, high-grade limestone.
Decatur silty clay, severely eroded rolling phase.	Db	11	5–12	Good	Reddish brown to dark red.	Dark red	Very firm	Residuum, high-grade limestone.
Dellrose cherty silt loam:								
Eroded hilly phase	Df	13	12–25	Excessive	Brown to dark brown	Strong brown to yellowish brown or yellowish red.	Friable	Creep material from cherty limestone, moderately phosphatic limestone influence.
Steep phase	Dg	17	25–60	Excessive	Brown to dark brown	Yellowish brown to yellowish red.	Friable	Same.
Eroded steep phase	Dh	17	25–60	Excessive	Brown to yellowish brown	Yellowish brown to yellowish red.	Friable	Same.
Severely eroded steep phase.	Dk	18	25–60	Excessive	Brown to yellowish brown	Yellowish brown to yellowish red.	Friable	Same.
Eroded rolling phase	De	10	5–12	Excessive	Brown to yellowish brown	Yellowish brown to yellowish red.	Friable	Same.
Dewey silt loam, undulating phase.	Ds	4	2– 5	Good	Grayish brown to brown	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey silty clay loam, eroded undulating phase.	Dw	4	2– 5	Good	Grayish brown to reddish brown or red.	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey silt loam, rolling phase.	Dt	5	5–12	Good	Grayish brown to brown	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey silty clay loam, eroded rolling phase.	Dx	5	5–12	Good	Grayish brown to reddish brown.	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey silty clay:								
Severely eroded rolling phase.	Du	11	5–12	Good	Reddish brown to red	Red to yellowish red	Firm	Residuum from high-grade limestone.
Severely eroded hilly phase.	Dv	14	12–25	Good	Reddish brown to red	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey cherty silt loam, rolling phase.	Dm	10	5–12	Good	Grayish brown to brown	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey cherty silty clay loam, eroded rolling phase.	Dp	10	5–12	Good	Grayish brown to reddish brown.	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey cherty silty clay, severely eroded rolling phase.	Dn	11	5–12	Good	Brown to red	Red to yellowish red	Firm	Residuum from high-grade limestone.

Soils of Franklin County, Tennessee: Summary of important characteristics—Continued

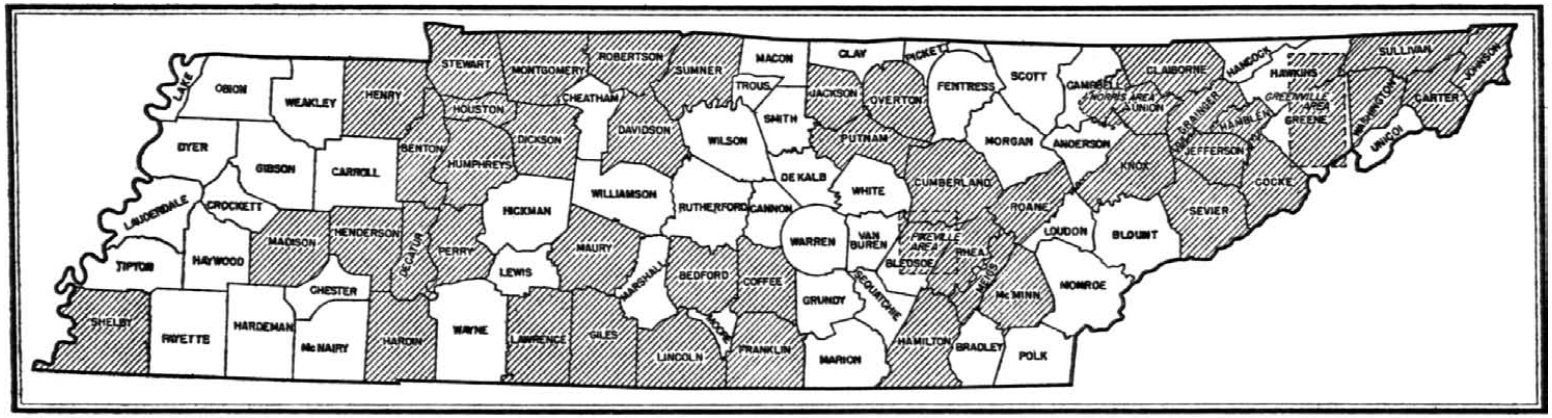
Soil	Map symbol	Management group	Slope	Drainage	Color of surface soil	Subsoil		Parent material or parent rock
						Color	Consistence	
			Percent					
Dewey cherty silty clay loam, eroded hilly phase.	Dr	13	12–25	Good	Grayish brown or brown to reddish brown.	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dewey cherty silty clay, severely eroded hilly phase.	Do	14	12–25	Good	Reddish brown or red	Red to yellowish red	Firm	Residuum from high-grade limestone.
Dickson silt loam:								
Undulating phase	Dy	6	2– 5	Moderately good	Light brownish gray to light yellowish brown.	Yellowish brown to brownish yellow.	Friable	Residuum, loess over cherty limestone.
Eroded undulating phase	Dz	6	2– 5	Moderately good	Yellowish brown to brownish gray.	Yellowish brown to brownish yellow.	Friable	Residuum, loess over cherty limestone.
Rolling phase	D2	7	5–12	Moderately good	Brownish gray to light yellowish brown.	Yellowish brown to brownish yellow.	Friable	Residuum, loess over cherty limestone.
Eroded rolling phase	D3	7	5–12	Moderately good	Yellowish brown to brownish gray.	Yellowish brown to brownish yellow.	Friable	Residuum, loess over cherty limestone.
Dickson silty clay loam, severely eroded rolling phase.	D4	12	5–12	Moderately good	Brownish yellow to yellowish brown.	Yellowish brown to brownish yellow.	Friable	Residuum, loess over cherty limestone.
Dunning silty clay loam	D5	16	0– 3	Poor	Dark gray to very dark gray.	Dark gray	Very plastic	Alluvium, chiefly argillaceous limestone material.
Better drained phase	D6	2	0– 3	Imperfect	Dark gray to very dark gray.	Dark gray	Very plastic	Alluvium, chiefly argillaceous limestone material.
Egam silty clay loam	Ea	2	0– 3	Moderately good	Dark grayish brown	Dark brown to brown	Moderately friable	Alluvium, chiefly argillaceous limestone material.
Emory silt loam	Ec	3	2– 5	Good	Dark brown to brown	Dark reddish brown to yellowish brown.	Moderately friable	Colluvium or local alluvium, chiefly high-grade limestone material.
Emory cherty silt loam	Eb	3	2– 7	Good	Dark brown to brown	Dark reddish brown to yellowish brown.	Moderately friable	Colluvium or local alluvium, moderately cherty limestone material.
Ennis cherty silt loam	Ed	1	0– 3	Good	Grayish brown to brown	Yellowish brown to brown	Friable	Alluvium, chiefly cherty limestone material.
Greendale silt loam	Gb	3	2– 7	Moderately good to good.	Light grayish brown to brown.	Yellowish brown to light yellowish brown.	Friable	Colluvium, chiefly cherty limestone material.
Greendale cherty silt loam	Ga	3	2– 7	Moderately good to good.	Light grayish brown to brown.	Yellowish brown to light yellowish brown.	Friable	Colluvium, chiefly cherty limestone material.
Gullied land, limestone material.	Gc	18	5–60	A land type on which erosion has formed an intricate pattern of gullies				
Guthrie silt loam	Gd	16	0– 3	Poor	Light gray to gray	Light gray, mottled with yellow and yellowish red.	Firm	Residuum, loess over cherty limestone.
Hartsells fine sandy loam:								
Rolling and undulating phases.	Ha	7	2-12	Good	Grayish brown to yellowish brown.	Brownish yellow to yellowish brown.	Friable	Residuum, sandstone.
Eroded rolling and undulating phases.	Hb	7	5–12	Good	Grayish yellow to yellowish brown.	Brownish yellow to yellowish brown.	Friable	Residuum, sandstone.
Hermitage silt loam:								
Eroded undulating phase	Hc	4	2– 5	Good	Brown to reddish brown	Yellowish red to reddish brown.	Firm	Old colluvium, chiefly high-grade limestone material.
Eroded rolling phase	Hd	5	5–12	Good	Brown to reddish brown	Yellowish red to reddish brown.	Firm	Old colluvium, chiefly high-grade limestone material.
Holston loam:								
Undulating phase	Hf	6	2– 5	Good	Pale brown to light yellowish brown.	Brownish yellow to yellowish brown.	Friable	Old mixed alluvium, chiefly sandstone and shale materials.

			Percent					
Eroded undulating phase	Hg	6	2–5	Good	Pale brown to brownish yellow.	Brownish yellow to yellowish brown.	Friable	Old mixed alluvium, chiefly sandstone and shale materials.
Eroded rolling phase	Hh	7	5–12	Good	Pale brown to brownish yellow.	Brownish yellow to yellowish brown.	Friable	Old mixed alluvium, chiefly sandstone and shale materials.
Holston clay loam, severely eroded rolling phase.	He	12	5–12	Good	Pale brown to yellowish brown.	Brownish yellow to yellowish brown.	Friable	Old mixed alluvium, chiefly sandstone and shale materials.
Humphreys cherty silt loam	Hk	3	1–5	Good	Pale brown to brown	Brown to yellowish brown	Friable	Alluvium, cherty limestone material.
Huntington silt loam	Hn	1	0–3	Good	Dark brown to light brown.	Dark yellowish brown to dark brown.	Friable	Mixed alluvium, chiefly limestone material.
Huntington fine sandy loam	Hm	1	0–3	Good	Grayish brown to dark brown.	Yellowish brown to dark brown.	Friable	Mixed alluvium, chiefly limestone and sandstone material.
Jefferson fine sandy loam, eroded rolling phase.	Jb	7	5–12	Good	Grayish brown to brownish yellow.	Yellowish brown to brownish yellow.	Friable	Old colluvium, chiefly sandstone material.
Jefferson clay loam, severely eroded rolling phase	Ja	12	5–12	Good	Brownish yellow to yellowish brown.	Yellowish brown to brownish yellow.	Friable	Old colluvium, chiefly sandstone material.
Jefferson stony fine sandy loam:								
Eroded rolling phase	Jf	7	5–12	Good	Grayish brown to brownish yellow.	Yellowish brown to brownish yellow.	Friable	Old colluvium, chiefly sandstone material.
Hilly phase	Jd	15	12–25	Good	Grayish brown to brownish yellow.	Yellowish brown to brownish yellow.	Friable	Old colluvium, chiefly sandstone material.
Eroded hilly phase	Je	15	12–25	Good	Grayish brown to brownish yellow.	Yellowish brown to brownish yellow.	Friable	Old colluvium, chiefly sandstone material.
Jefferson stony clay loam, severely eroded hilly phase.	Jc	15	12–25	Good	Brownish yellow to yellowish brown.	Yellowish brown to brownish yellow.	Friable	Old colluvium, chiefly sandstone material.
Lawrence silt loam	La	8	0–3	Imperfect	Light gray to gray	Light yellowish brown to pale yellow splotched.	Friable	Residuum, loess over cherty limestone material.
Lindside silt loam	Lc	2	0–3	Imperfect to moderately good	Dark grayish brown to brown.	Dark yellowish brown, splotched.	Friable	Alluvium, chiefly limestone material.
Lindside silty clay loam	Ld	2	0–3	Imperfect to moderately good	Dark grayish brown to brown.	Brownish gray, splotched	Moderately friable	Alluvium, chiefly limestone material.
Lindside fine sandy loam	Lb	2	0–3	Imperfect to moderately good	Grayish brown to yellowish brown.	Brown to yellowish brown, splotched.	Friable	Alluvium, chiefly limestone and sandstones.
Lobelville cherty silt loam	Le	2	0–3	Imperfect to moderately good	Grayish brown to brownish gray.	Grayish brown, light yellowish brown, or brownish gray, splotched.	Friable	Alluvium, cherty limestone material.
Melvin silt loam	Mb	16	0–3	Poor	Gray to light brownish gray.	Mottled gray and brownish yellow.	Friable	Alluvium, chiefly limestone material.
Melvin loam	Ma	16	0–3	Poor	Gray to light grayish brown.	Mottled gray, brownish gray, and yellowish brown.	Friable	Alluvium, chiefly limestone and sandstone material.
Mimosa silty clay:								
Severely eroded hilly phase.	Mc	14	12–25	Good	Brown to yellowish brown	Strong brown with some yellow and gray splotches.	Very plastic	Residuum, phosphatic clayey limestone material.
Severely eroded steep phase.	Md	18	25–60	Good	Yellowish brown to strong brown.	Yellowish brown or strong brown.	Very plastic	Residuum, phosphatic clayey limestone material.
Mines, pits, and dumps	Me	18						
Mountview silt loam:								
Undulating phase	Mf	6	2–5	Good	Grayish brown to light yellowish brown.	Yellowish brown	Friable	Residuum, loess over cherty limestone material.
Eroded undulating phase	Mg	6	2–5	Good	Yellowish brown to light yellowish brown.	Yellowish brown	Friable	Residuum, loess over cherty limestone material.
Eroded rolling phase	Mh	7	5–12	Good	Yellowish brown to light yellowish brown.	Yellowish brown	Friable	Residuum, loess over cherty limestone material.
Mountview silty clay loam, severely eroded rolling phase.	Mk	12	5–12	Good	Yellowish brown to light yellowish brown.	Yellowish brown	Friable	Residuum, loess over cherty limestone material.

Soils of Franklin County, Tennessee: Summary of important characteristics—Continued

Soil	Map symbol	Management group	Slope	Drainage	Color of surface soil	Subsoil		Parent material or parent rock
						Color	Consistence	
			Percent					
Muskingum stony fine sandy loam:								
Steep phase	Mr	18	25–60	Excessive	Pale brown to yellowish brown.	Light yellowish brown to yellowish brown.	Friable	Residuum, sandstone material.
Hilly phase	Mo	15	12–25	Excessive	Pale brown to yellowish brown.	Light yellowish brown to yellowish brown.	Friable	Residuum, sandstone material.
Eroded hilly phase	Mp	15	12–25	Excessive	Pale brown to yellowish brown.	Light yellowish brown to yellowish brown.	Friable	Residuum, sandstone material.
Rolling phase	Mm	15	5–12	Excessive	Pale brown to yellowish brown.	Light yellowish brown to yellowish brown.	Friable	Residuum, sandstone material.
Eroded rolling phase	Mn	15	5–12	Excessive	Pale brown to yellowish brown.	Light yellowish brown to yellowish brown.	Friable	Residuum, sandstone material.
Nolichucky loam:								
Eroded undulating phase	Nb	4	2– 5	Good	Light brownish gray to light yellowish brown.	Reddish yellow or yellowish red.	Firm	Old mixed alluvium, sandstone with some limestone influence.
Eroded rolling phase	Nc	5	5–12	Good	Light brownish gray to yellowish brown.	Reddish yellow or yellowish red.	Firm	Old mixed alluvium, sandstone with some limestone influence.
Nolichucky clay loam, severely eroded rolling phase.	Na	11	5–12	Good	Light yellowish brown to reddish yellow.	Reddish yellow or yellowish red.	Firm	Old mixed alluvium, sandstone with some limestone influence.
Ooltewah silt loam	Oa	2	0– 5	Imperfect	Grayish brown to yellowish brown.	Mottled gray, strong brown, and brownish yellow.	Friable	Colluvium, chiefly limestone material.
Pace cherty silt loam:								
Eroded undulating phase	Pa	6	2– 5	Moderately good to good.	Light yellowish brown to light brownish gray.	Brownish yellow to yellowish brown.	Friable	Old colluvium, chiefly cherty limestone material.
Eroded rolling phase	Pb	7	5–12	Moderately good to good.	Yellowish brown to light brownish gray.	Brownish yellow to yellowish brown.	Friable	Old colluvium, chiefly cherty limestone material.
Eroded hilly phase	Pc	15	12–25	Moderately good to good.	Yellowish brown to light brownish gray.	Brownish yellow to yellowish brown.	Friable	Old colluvium, chiefly cherty limestone material.
Purdy silt loam	Pd	16	0– 3	Poor	Gray to light brownish gray.	Light gray	Compact	Old mixed alluvium, chiefly sandstone and some limestone.
Riverwash	Ra	18	0– 3	A land type consisting of stony, gravelly, and sandy alluvium				
Robertsville silt loam	Rb	16	0– 3	Poor	Light gray to brownish gray.	Light gray mottled with strong brown.	Compact	Old mixed alluvium, chiefly limestone material.
Rockland, limestone:								
Hilly and rolling	Rc	18	3–25	A land type that has numerous ledges and outcroppings of limestone				
Steep and very steep	Rd	18	25–60+	A land type that has numerous ledges and outcroppings of limestone				
Rockland, sandstone, very steep.	Re	18	12–60+	A land type consisting of very steep to nearly vertical sandstone bluffs				
Sequatchie fine sandy loam:								
Undulating phase	Sa	3	2– 5	Good	Yellowish brown or brown	Yellowish brown to brownish yellow.	Friable	Old mixed alluvium, mainly sandstone material but some limestone influence.
Severely eroded rolling phase.	Sb	11	5–12	Good	Yellowish brown	Yellowish brown to brownish yellow.	Friable	Same.
Stony hilly land, Mimosa soil material.	Sc	14	12–25	A land type that cannot be used for crops because limestone outcrops are too numerous				
Stony rolling land, Talbott and Colbert soil materials.	Sd	14	5–12	A land type that cannot be used for crops because limestone outcrops are too numerous				

			Percent					
Stony hilly land, Talbott and Colbert soil materials.	Se	14	12–25	A land type that cannot be used for crops because limestone outcrops are too numerous				
Stony steep land, Talbott and Colbert soil materials.	Sf	18	25–60+	A land type that cannot be used for crops because limestone outcrops are too numerous				
Swaim silty clay loam:								
Eroded rolling phase	Sg	9	5–12	Moderately good	Grayish brown to light brown.	Yellowish brown or brownish yellow.	Very firm	Old colluvium, clayey limestone material.
Eroded undulating phase	Sh	9	2– 5	Moderately good	Grayish brown to light brown.	Yellowish brown or brownish yellow.	Very firm	Old colluvium, clayey limestone material.
Taft silt loam	Ta	8	0– 3	Imperfect	Gray to light brownish gray.	Brownish yellow or pale yellow, splotched with gray.	Friable	Old mixed alluvium, chiefly limestone material.
Tyler silt loam	Tb	8	0– 3	Imperfect	Light brownish gray to gray.	Light yellowish brown to pale yellow, splotched with gray.	Moderately friable	Old mixed alluvium, chiefly sandstone material.
Waynesboro loam:								
Undulating phase	Wc	4	2– 5	Good	Grayish brown to brown	Red to yellowish red	Firm	Old mixed alluvium, chiefly sandstone but some limestone material.
Eroded undulating phase	Wd	4	2– 5	Good	Brown or grayish brown to yellowish red.	Red to yellowish red	Firm	Old mixed alluvium, chiefly sandstone but some limestone material.
Rolling phase	We	5	5–12	Good	Grayish brown to brown	Red to yellowish red	Firm	Old mixed alluvium, chiefly sandstone but some limestone material.
Eroded rolling phase	Wf	5	5–12	Good	Brown or grayish brown to yellowish red.	Red to yellowish red	Firm	Old mixed alluvium, chiefly sandstone but some limestone material.
Waynesboro clay loam:								
Severely eroded rolling phase.	Wa	11	5–12	Good	Brown to yellowish red	Red to yellowish red	Firm	Old mixed alluvium, chiefly sandstone but some limestone material.
Severely eroded hilly phase.	Wb	14	12–25	Good	Brown to yellowish red	Red to yellowish red	Firm	Old mixed alluvium, chiefly sandstone but some limestone material.
Whitwell loam	Wg	6	1– 5	Imperfect to moderately good	Brown to grayish brown	Brownish yellow to yellowish brown, mottled below 18 inches.	Friable	Alluvium, chiefly sandstone material.



Areas surveyed in Tennessee shown by shading.

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