Series 1959, No. 9

Issued June 1962

SOIL SURVEY

Cullman County Alabama

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES
AND
ALABAMA AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Cullman County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodlands; and add to the fund of knowledge in soil science.

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

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

Locating the Soils

Use the index to map sheets to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map has been found, it will be seen that boundaries of the soils are 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. The symbol is inside the area if there is enough room; otherwise, it is outside the area and a pointer shows where the symbol belongs.

Finding Information

Special sections in this report will interest different groups of readers, and some sections will be of interest to all. The section "General Nature of the Area" is written mainly for those not familiar with the county.

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

Foresters and others interested in woodland can refer to the section "Use and Management of Woodland." In that section, the soils in the county are grouped according to their suitability for trees, and the factors affecting the management of woodland are explained.

Engineers will want to refer to the section "Engineering Applications." Tables in that section show characteristics of the soils that affect engineering.

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

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

Newcomers in Cullman County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the Area," which gives additional information about the county.

* * * * *

This soil survey was made cooperatively by the United States Department of Agriculture, the Alabama Agricultural Experiment Station, and the Alabama Department of Agriculture and Industries. It is part of the technical assistance furnished to the Cullman County Soil Conservation District. The fieldwork on this survey was completed in 1959. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time.

U.S. GOVERNMENT PRINTING OFFICE: 1962

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

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SOIL SURVEY OF CULLMAN COUNTY, ALABAMA

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE ALABAMA AGRICULTURAL EXPERIMENT STATION AND THE ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

CULLMAN COUNTY, in an area where the climate is generally mild and humid, has been primarily agricultural since early settlement. Corn, cotton, potatoes, sweet peppers, and strawberries are the main crops. Poultry is raised on many farms, and many broilers and eggs are produced. Beef cattle and hogs are the principal livestock, but some dairy cattle are raised in small commercial herds.

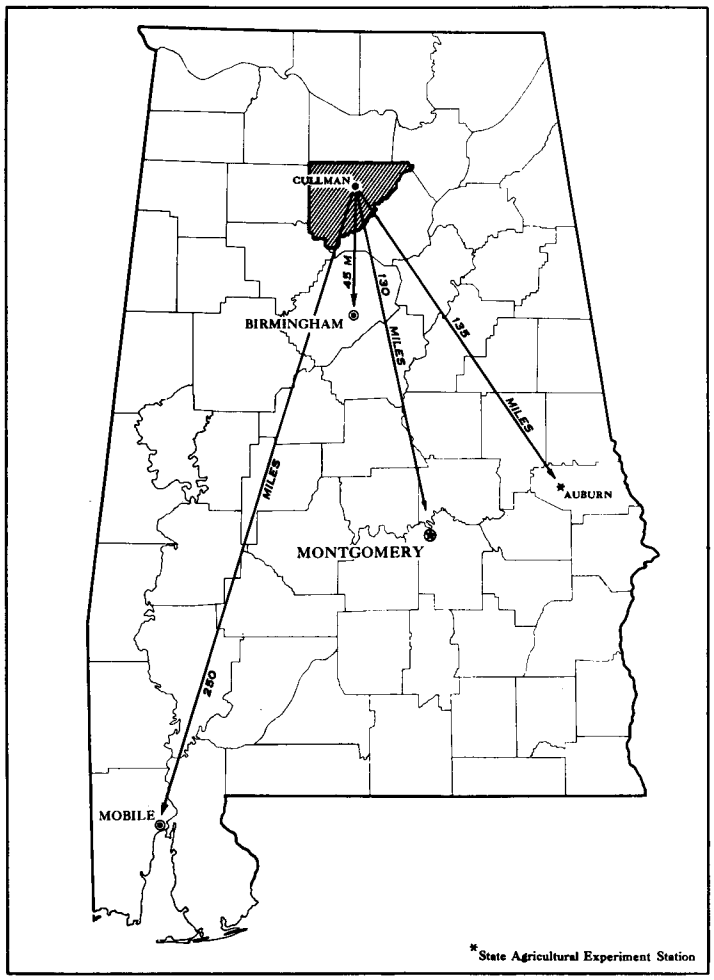

Figure 1.—**Location of Cullman County in Alabama.**

General Nature of the Area

Cullman County, in the north-central part of Alabama (fig. 1), has a total area of 743 square miles, or 475,520 acres. Smith Lake makes up about 8,040 acres of this area. Cullman, the county seat, is near the center of the county. The Mulberry Fork of the Black Warrior River is the southern and eastern boundary and separates the county from Blount County. The Sipsey Fork of the Black Warrior River is the southwestern boundary and separates the county from Walker County. The county is bounded on the west by Winston County, on the north by Morgan County, and on the northeastern corner by Marshall County.

Physiography

This county lies almost entirely in the Appalachian Plateau province (*5*),[1] in an area called the sandstone plateau. This area was once a part of a nearly level, continuous plain that extended from New York State into central Alabama. Sand Mountain is a remnant of this plain.

A very small area in the north-central part of the county is in the Ridge and Valley province of the Appalachian Highlands. It is more dissected than the rest of the county and consists of small ridges and valleys that are called the limestone valley, or Wilhite Cove.

Elevation in the county ranges from about 300 feet to approximately 1,150 feet. The lowest elevation is in the southwestern part, and the highest is near Battleground in the northwestern part. In other parts of the county, elevations are: Cullman, 789 feet; Hanceville, 522; Garden City, 502; Arkadelphia, 370; Baileyton, 931; Joppa, 938; and Jones Chapel, 816.

Geology

Nearly all of Cullman County is underlain by rocks of the Pottsville formation of Pennsylvanian age (*3*). A small part is underlain by Bangor limestone of Mississippian age. The Pottsville formation in this county is a succession of similar beds of shale and sandstone. Ma-

[1] Italic numbers in parentheses refer to Literature Cited, page 72.

terials weathered from this shale and sandstone make up the parent material of most of the soils in the county. The beds of shale and sandstone are in two areas. The smaller area is the Warrior field in the extreme southwestern part of the county. The Plateau field covers nearly all the rest of the county. Strip mining for coal is important in the Warrior field.

Bangor limestone is in a small area in the north-central part of the county, adjacent to Morgan County. Outcrops of this limestone are exposed in the cuts of U.S. Highway No. 31, along the lower part of the steep slopes that break off at the edge of the valley. Bangor limestone is the parent rock of Rockland, limestone.

Drainage and Water Supply

Almost all of Cullman County drains southward through many streams into the drainage basin of the Black Warrior River. A narrow area along the northern edge of the county drains northward into the Tennessee River, mostly through Flint Creek.

The water supply is adequate for domestic use in most parts of the county. Late in summer and in fall, however, most of the small intermittent streams and creeks dry up.

The Mulberry Fork of the Black Warrior River furnishes water for the city of Cullman and for agricultural uses. North of Cullman, two lakes totaling about 225 acres in area supplement the water used for domestic and industrial purposes.

Dug or drilled wells provide water for homes in the rural sections. These wells are generally 15 to 50 feet deep. Many of them have automatic equipment that supplies water to homes. Ponds have been built on many farms to furnish water for livestock and poultry. A few ponds supply water for irrigation.

The recently completed Smith Dam creates about 8,040 acres of lake area in the county. This dam, built on the Sipsey Fork of the Black Warrior River, is between Cullman County and Walker County. The water is used for industrial purposes and for generating hydroelectric power.

Climate

Cullman County has a humid-temperate climate; the weather is mild during much of the year. Winters are cold but are not severe. Summers are rather long and hot, but nights are comfortable. The average annual precipitation at the United States Weather Bureau Station at Saint Bernard College is 55.76 inches, and the annual temperature is 60.9° F. (table 1). In winter, freezing temperatures are common at night but are unusual during the day. Snow is fairly common, but it is normally light and remains on the ground for only a short time.

Some extremes in weather based on a 45-year record through 1955 at the Saint Bernard weather station are: highest precipitation in any single month, 15.66 inches in November 1929; lowest precipitation in any single month, none in October 1924; highest temperature ever recorded, 110° in July 1952; and lowest temperature recorded, 17° in January 1918. Freezing temperatures have occurred in this county in spring as late as May 2 and in fall as early as October 1. The average frost-free period of 201 days extends from April 8 to October 26. The shortest growing season ever recorded was 164 days in 1909, and the longest, 266 days in 1946.

TABLE 1.—*Temperature and precipitation at Saint Bernard College, Cullman County, Alabama*

[Elevation, 802 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1943)	Wettest year (1929)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	44.0	80	−4	5.53	3.13	4.39	0.5
January	43.1	79	−17	5.51	2.60	8.39	1.1
February	45.7	80	−7	4.92	2.69	4.70	.4
Winter	44.3	80	−17	15.96	8.42	17.48	2.0
March	52.3	89	10	5.97	8.27	12.91	.2
April	60.5	91	22	4.84	3.89	6.55	[3]
May	67.9	96	30	4.49	2.54	7.87	0
Spring	60.2	96	10	15.30	14.70	27.33	.2
June	75.7	104	41	4.27	1.92	1.70	0
July	78.2	110	48	5.32	2.79	3.15	0
August	77.4	105	48	4.66	1.37	.76	0
Summer	77.1	110	41	14.25	6.08	5.61	0
September	73.4	107	34	2.79	3.18	6.56	0
October	61.7	98	19	3.74	.76	6.66	[3]
November	50.6	86	2	3.72	1.88	15.66	.2
Fall	61.9	107	2	10.25	5.82	28.88	.2
Year	60.9	110	−17	55.76	35.02	79.30	2.4

[1] Average temperature based on a 49-year record, through 1955; highest temperature on a 45-year record and lowest temperature on a 44-year record, through 1952.

[2] Average precipitation based on a 49-year record, through 1955; wettest and driest years based on a 47-year record, in the period 1907–1955; snowfall based on a 45-year record, through 1952.

[3] Trace.

Dangerous winds and tornadoes are rare. From April through November, electrical storms frequently accompany thundershowers in the afternoon, but these storms seldom cause serious damage.

The climate is suited to a wide variety of crops, including winter legumes and grasses. Crop yields and the kinds of crops grown, however, could be increased by irrigation. For best growth, crops need about 1 inch of rainfall each week in the growing season, which extends from April through August. During these months, less than 1 inch of rain falls in 2 to 4 weeks in some years. Also, a scarcity of rainfall in September and October prevents the cultivation of many crops. If dry fields were irrigated during the growing season, and in September and October, crop yields would be increased and a wider variety of crops could be grown.

Wildlife

Squirrel, rabbit, quail, and mourning dove are the most common game in Cullman County. A few deer and wild turkey are in the southwestern part. Raccoon, opossum,

fox, bobcat, skunk, and weasel are the most common fur-bearing and predatory animals. The game in the county could be increased by protecting the birds and animals and by providing well-managed wildlife areas.

Fishing is fairly good in the large streams, and bream and bass have been stocked in private ponds. Smith Lake provides additional fishing.

Organization and Population

Cullman County was created by the Alabama State legislature on January 24, 1877. It was formed mainly from Winston and Blount Counties, but a small area was once part of Morgan County. The county was named for Col. John G. Cullmann, a Bavarian who emigrated from Europe to America in 1865 and came to Alabama in 1871.

Colonel Cullmann obtained from the South and North Alabama Railroad about 349,000 acres of land to establish a settlement. This railroad completed a line from Decatur to Montgomery in 1872. The land obtained extended 15 miles on each side of the railroad. The first families arrived in the area early in 1873 from Cincinnati, Ohio, and by January of the next year, Cullman, which became the county seat, was incorporated. In 1876, the population of the area was 9,500. The town of Cullman had about 1,000 people in 1885.

The population of Cullman County decreased from 49,046 in 1950 to 45,572 in 1960. In 1960, the population of the three largest towns was Cullman, 10,883; Hanceville, 1,174; and Garden City, 536.

Transportation

The main line of the Louisville and Nashville Railroad, the only railroad in the county, runs north and south through the middle of the county. It carries passengers and freight and connects Cullman, Hanceville, and Garden City. Several bus and motortruck lines also carry passengers and freight. An airport is about 6 miles north of Cullman. It has two runways and is automatically lighted at night.

Roads in Cullman County total 1,496 miles. Of this total, 141 miles are paved State and Federal roads, 212 miles are paved farm-to-market and county roads, and 1,143 miles are unpaved county roads. Interstate Highway 65 roughly bisects the county from north to south. In rural areas, 10 wooden covered bridges are still in use.

Industry

In the past 20 years, the number and kinds of manufacturing and processing plants in Cullman County have increased greatly. The only plants in Cullman County in 1940 were two lumber mills and a dairy products plant. Since 1940, the processing of dairy products and lumbering have expanded and many new plants have been established.

The county now has two garment factories, a vegetable canning plant, dairy and ice cream distributing plants, several feed mills, a poultry disease laboratory, a poultry processing plant, a cigar plant, and a company that manufactures metal products. Coal strip mining is important in the southwestern part of the county.

Community Facilities

The total enrollment of all schools in the county is about 10,900 students. There are 6 senior high schools, 11 junior high schools, and 19 elementary schools. In one school all 12 grades are taught. Two colleges are in Cullman, Sacred Heart Junior College for women and St. Bernard College for men. Churches of many denominations are distributed throughout the county.

Two radio stations broadcast from the city of Cullman, and a biweekly and a weekly newspaper are published there. A modern 100-bed hospital in Cullman serves the entire county. Daily mail service is available to all communities. All towns and communities and many rural areas have dial telephones, and electricity is available in all parts of the county.

Agriculture

Since farming on a large scale began in Cullman County, corn and cotton have been the main crops. Much of the corn is fed to livestock, and cotton is an important cash crop. Truck crops are also important commercially, and in recent years the acreage in these crops has increased (fig. 2).

Listed in table 2 are the number of acres planted to principal crops in 1949 and 1954 as reported in the 1954 Census of Agriculture. The Alabama Department of Agriculture and Industries reports that in 1958 about 64,700 acres of corn was harvested. Much of this corn was fed to livestock. In 1958, only about 13,880 acres of cotton was harvested because many farmers leased land that had formerly been planted in cotton to the Soil Bank.

Livestock and livestock products are the main sources of farm income in the county, and poultry is the most important product. Table 3 lists the number of livestock on farms in 1949 and 1954 as reported in the agricultural census. Cullman County is one of the top 15 counties in the United States in the production of broilers. In 1954, 5,420,676 broilers were processed. Figure 3 shows a

***Figure 2.*—Sweetpotatoes on Tilsit fine sandy loam, 2 to 6 percent slopes, eroded. Yields of 350 to 375 bushels per acre can be expected.**

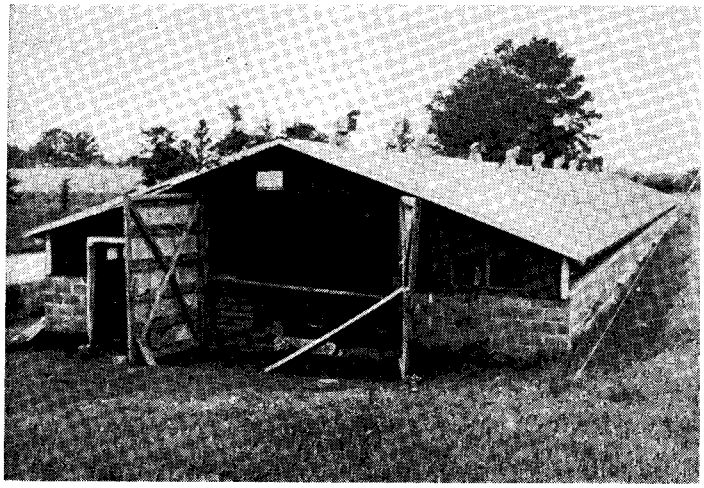

Figure 3.—**Broiler house with capacity for 7,000 chickens.**

broiler house that can handle approximately 35,000 broilers each year. Houses of this kind supply much litter that is put on fields to increase their fertility.

TABLE 2.—*Acres of principal crops in 1949 and 1954*

Crops	1949	1954
Corn for all purposes	62, 708	70, 607
Cotton harvested	79, 421	38, 366
Sorghum, all purposes except sirup	580	687
Oats, for grain, threshed or combined	725	2, 361
Soybeans, all purposes	2, 930	1, 265
Cow peas, all purposes except processing	711	585
Hay crops:		
Alfalfa	442	438
Lespedeza	8, 267	8, 351
Small grains	1, 747	3, 044
Other hay cut	2, 048	1, 632
Irish potatoes for home use or for sale	[1] 1, 787	[2] 663
Sweetpotatoes for home use or for sale	[1] 3, 595	[2] 3, 232
Sugarcane or sorghum for sirup	108	473
Vegetables harvested for sale:		
Snap beans, pole and bush types	129	229
Green lima beans	211	614
Blackeyes and other green cowpeas	490	1, 023
Tomatoes	468	652
Sweet peppers and pimentos	79	2, 586
Strawberries harvested for sale	417	189
Watermelons	92	361

[1] Does not include acres for farms with less than 15 bushels harvested.

[2] Does not include acres for farms with less than 20 bushels harvested.

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

Livestock	1950	1954
Cattle and calves	18, 653	24, 110
Milk cows	9, 255	8, 962
Hogs and pigs	18, 028	19, 578
Chickens over 4 months old	289, 287	343, 173
Broilers sold	[1]	5, 420, 676
Horses and mules	10, 539	5, 063

[1] Not reported.

Other products important in the diversified agriculture of this county are pork, beef, and milk. Large amounts of forest products are produced and are marketed through local dealers in lumber and pulpwood. About 240,704 acres in the county is woodland.

In 1954, there were 6,291 farms in the county with a total farm acreage of 374,812. Of this acreage, 169,679 acres was cropland. The average-sized farm was 59.6 acres, and tenants operated 26.4 percent of the farms. The 1954 Census of Agriculture lists the number of farms by type in this county as follows:

Type of farm	*Number of farms*
Field-crop farms (other than vegetable and fruit-and-nut)	3, 575
Cash grain	10
Cotton	3, 445
Other field crops	120
Vegetable farms	5
Fruit-and-nut farms	10
Dairy farms	36
Poultry farms	350
Livestock farms (other than dairy and poultry)	115
General farms	320
Primarily crops	210
Crops and livestock	110
Miscellaneous and unclassified	1, 880
Total	6, 291

In 1954, the 6,291 farms in the county ranged in size from less than 10 acres to more than 1,000 acres. About 29 percent of the farms had 29 acres or less; 30 percent had 30 to 49 acres; 33 percent had 50 to 99 acres; 6 percent had 100 to 219 acres, and only 2 percent of the farms had more than 220 acres.

In 1949, a horticultural substation of the Alabama Agricultural Experiment Station began operation 2.5 miles east of the city of Cullman. This 160-acre substation carries on experiments to improve the selection of varieties of fruits and truck crops, and to improve cultural methods, storage methods, and the control of insects and disease.

General Soil Map

In mapping a county or other large tract, it is fairly easy to see definite changes as one travels from place to place. There are many obvious differences, among them changes in shape, steepness, and length of slopes; in the course, depth, and speed of streams; in the width of the bordering valleys; in the kinds of native plants; and even in the kinds of agriculture. With these more obvious differences there are less easily noticed differences in the pattern of soils. The soils change along with the other parts of the environment.

By drawing lines around the different patterns of soils on a small map, one can obtain a map of general soil areas or, as they are called in this report, soil associations. Such a map is useful to those who want a general idea of the soils, who want to compare different parts of a county, or who want to locate large areas suitable for some particular kind of agriculture or other broad land use. Because its scale is small, a general soil map cannot be used in planning management for a particular farm.

A soil association may contain a few soils or many soils, and these soils may be similar or different. In an association, two or more soils are generally dominant in the pattern, and the soil associations are named for these dominant soils.

The four soil associations, or general soil areas, in Cullman County are shown on the colored map at the back of this report. These associations are described in the following paragraphs.

Tilsit-Hartsells-Albertville Association

Well drained to moderately well drained soils, underlain by sandstone and shale, on level to rolling parts of the plateau

This soil association, or general soil area, is on the broad, nearly level to rolling Appalachian plateau. It makes up about 32 percent of the county. The area is dissected by a dendritic pattern of drainageways. Dominant in the association are the Tilsit, Hartsells, and Albertville soils (fig. 4). These soils formed in residuum of weathered sandstone and shale. Their depth to bedrock in most places ranges from 20 to 48 inches. Most of the area is east of U.S. Highway No. 31.

The Tilsit soils are on the broad, nearly level to gently sloping ridgetops. They are moderately well drained and have a fine sandy loam or loam surface soil and a yellowish-brown to dark yellowish-brown loam subsoil. A well-developed fragipan is at a depth of 20 to 26 inches. The Hartsells and Albertville soils are well drained and are generally more rolling than the Tilsit soils. They do not have a fragipan. The Albertville soils have a yellowish-brown to strong-brown, firm silty clay loam to silty clay subsoil, and the Hartsells soils have a friable loam to fine sandy clay loam subsoil.

Also in this association are the Muskingum, Philo, Stendal, and Atkins soils. The Muskingum soils are on the steep slopes along drainageways. They are shallow to bedrock, stony, and excessively drained. The Philo, Stendal, and Atkins soils are in recent local alluvium that is around the heads of and along the upper parts of the narrow drainageways. The Philo soils are moderately well drained; the Stendal soils, somewhat poorly drained; and the Atkins soils, poorly drained.

The Tilsit soils make up about 27 percent of the association; the Hartsells soils, 26 percent; the Albertville soils, 22 percent; and the Muskingum soils, 20 percent. The remaining 5 percent is Philo, Stendal, and Atkins soils.

About 80 percent of the association has been cleared. Of this acreage, at least 65 percent is made up of soils in capability classes II and III and most of this is cultivated. The remaining cleared area is in about equal acreages of class IV, VI, and VII soils.

This is the most intensively farmed area in the county. Most of the farms are operated by their owners and are small, well managed, and productive. Farming is a full-time operation. Most of the farms are of the general type, though there are a few small dairy and beef farms. Cotton, corn, truck crops, and nursery stock are the main crops. Broiler production is extensive.

Hartsells-Albertville-Linker-Muskingum Association

Well-drained to excessively drained soils, underlain by sandstone and shale, on gently sloping to hilly parts of the plateau

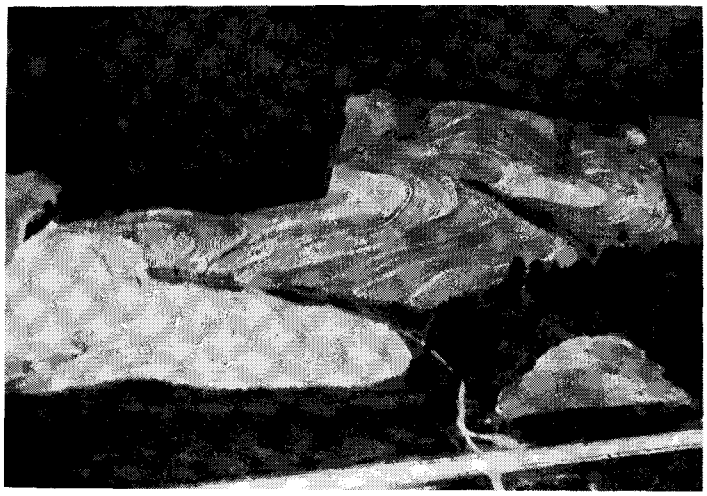

***Figure 4.*—Typical landscape in the Tilsit-Hartsells-Albertville soil association. Areas tilled on contour consist of Hartsells fine sandy loam, 6 to 10 percent slopes, eroded, and Tilsit fine sandy loam, 2 to 6 percent slopes, eroded. Waterways (dark strips) are on Philo and Stendal soils, local alluvium, and are planted to sericea lespedeza. Muskingum stony fine sandy loam, 15 to 45 percent slopes, is the dominant soil in the wooded areas.**

This soil association, which makes up about 32 percent of the county, is on the broad, gently sloping to hilly Appalachian plateau. The area is dissected by many streams. Dominant in the association are the Hartsells, Linker, Muskingum, and Albertville soils. These soils formed in residuum of weathered sandstone and shale. Their depth to bedrock in most places ranges from 20 to 40 inches. Most of this association is in the northwestern quarter of the county, but a small area extends southward along U.S. Highway No. 31 to the Mulberry Fork of the Black Warrior River at Garden City.

The Hartsells and Linker soils are on gently sloping to sloping ridgetops. These soils are well drained and formed in material weathered mostly from sandstone but partly from shale. They have a fine sandy loam surface soil. The subsoil of the Hartsells soils is yellowish-brown loam to fine sandy clay loam, whereas that of the Linker soils is yellowish-red to dark-red clay loam to fine sandy clay loam.

The Albertville soils are well drained and formed in residuum weathered mostly from acid shale but partly from sandy shale and sandstone. They are on rolling to hilly ridges. They have a loam or fine sandy loam surface soil and a firm, yellowish-brown to strong-brown silty clay loam to silty clay subsoil. The Muskingum soils are on steep slopes along the drainageways. In most places they are stony, shallow to bedrock, and excessively drained.

Also in this association are Tilsit, Johnsburg, Hanceville, Philo, Stendal, and Atkins soils. The Tilsit soils are on gently sloping ridgetops. They are moderately well drained and have a fine sandy loam or loam surface soil and a yellowish-brown to dark yellowish-brown loam subsoil. A well-developed fragipan is at a depth ranging from 20 to 26 inches. The Johnsburg soils are on low saddles and divides and around the heads of draws. They are somewhat poorly drained and have a loam sur-

face soil and a mottled silty clay loam subsoil. A fragipan is at a depth of 18 to 24 inches.

The Hanceville soils make up only a small acreage but are very productive. They are deep to very deep and well drained. Hanceville soils formed in residuum weathered mostly from sandstone but partly from shale. These soils are gently sloping to sloping. They occur mainly between Hanceville and Phelan, but a small area is near Goodhope School. These are the reddest soils in the county. Their surface soil is dark reddish-brown to dark-brown loam, and their subsoil is dark-red to red clay loam or fine sandy clay loam.

The Philo, Stendal, and Atkins soils are in recent local alluvium around the heads of and along the many narrow drainageways in this association. The Philo soils are moderately well drained; the Stendal soils, somewhat poorly drained; and the Atkins soils, poorly drained.

About 37 percent of this association consists of Hartsells soils; 15 percent, Linker soils; 17 percent, Albertville soils; 18 percent, Muskingum soils; 3 percent, Tilsit soils; 5 percent, Johnsburg soils; 2 percent, Hanceville soils; and 3 percent, Philo, Stendal, and Atkins soils.

About 65 percent of this association has been cleared. Soils in capability classes II and III make up about 60 percent of the cleared area, most of which is cultivated. Of the remaining cleared acreage, soils in capability class IV make up 25 percent; soils in class VI, 8 percent; and soils in class VII, 7 percent.

This acreage is farmed intensively. Most of the farms are operated by owners and are small, generally well managed, and fairly productive. Farm owners are full-time operators on about two-thirds of the farms and are part-time operators on the remaining one-third. Farming is mainly general, but small beef and dairy farms are common. The main crops are cotton, corn, and truck crops. Broiler production is extensive.

Philo-Tyler-Monongahela-Pope Association

Well drained to somewhat poorly drained soils on narrow alluvial flood plains and low stream terraces on the plateau

This soil association is the least extensive in the county and makes up only 2 percent of the total acreage. It consists of narrow, nearly level strips of general alluvium and the adjoining nearly level to gently sloping low stream terraces; and of a nearly level to gently sloping basin of old local and general alluvium. The strips of alluvium and adjacent stream terraces are in the southern part of the county, along the creeks and streams that flow into the Mulberry Fork of the Black Warrior River. The basin of old alluvium is near Hanceville and is surrounded by highly dissected shale hills. The Philo, Tyler, Monongahela, and Pope soils are the dominant soils in this association. These soils are on materials weathered from sandstone and shale.

The Philo soils are deep and moderately well drained. They are in general alluvium on narrow flood plains and are flooded periodically. These soils have a brown to dark-brown or dark grayish-brown loam surface soil and brown to dark-brown loam subsurface layers that are mottled at a depth of 18 to 24 inches.

The Tyler and Monongahela soils are on low stream terraces. They have a fine sandy loam to loam surface layer and a well-developed fragipan at a depth of 18 to 24 inches. The Monongahela soils are moderately well drained, and the Tyler, somewhat poorly drained. The Pope soils are deep and well drained. They are in general alluvium on narrow flood plains and are subject to periodic flooding. Their surface layer is dark-brown to dark grayish-brown fine sandy loam, and their subsurface layers are dark-brown fine sandy loam.

Also in this association are the Sequatchie and the Purdy soils. These soils are on low stream terraces. The Sequatchie soils are well drained, and the Purdy soils are poorly drained. The Sequatchie soils have a dark-brown to dark yellowish-brown silt loam surface soil and a yellowish-brown to strong-brown silt loam to silty clay loam subsoil. The Purdy soils have a gray to grayish-brown, mottled silt loam surface soil and a distinctly mottled silty clay loam to silty clay subsoil.

The Philo soils make up about 40 percent of this association; the Tyler soils, 25 percent; the Monongahela soils, 10 percent; the Pope soils, 10 percent; the Sequatchie soils, 8 percent; and the Purdy soils, 7 percent.

About 85 percent of this association has been cleared. About 86 percent of this cleared acreage consists of soils in capability classes II and III, 6 percent is in capability class I, and the remaining 8 percent is in class IV.

Most farmers are full-time operators. The farms are small, generally well managed, and productive. The Philo and Pope soils are planted mainly to corn, and a small acreage is in pasture. About two-thirds of the acreage of the Monongahela and Tyler soils is in pasture; the rest is in row crops.

Pottsville-Muskingum-Linker-Hartsells Association

Well drained to excessively drained soils, underlain by sandstone and shale, on the part of the plateau that has narrow ridgetops, steep slopes, and narrow valleys

This soil association, which makes up about 34 percent of the county, is on the highly dissected Appalachian plateau. The acreage consists of a series of narrow, gently sloping to sloping, winding ridgetops with steep side slopes that terminate in narrow, winding valleys. Dominant in the association are the Pottsville, Muskingum, Linker, and Hartsells soils. These soils have developed in residuum of weathered sandstone and shale. Their depth to bedrock is about 8 to 15 inches in the steep, rough, and broken areas, and is as much as 48 inches on the smoother, narrow ridgetops. This area is mainly in the southern part of the county.

The Pottsville soils are on the lower parts of most of the steep, rough, and broken side slopes in the area. Also, they make up a network of broken ridges and knobs, which are underlain by shale. Locally these areas are called shale hills. These soils are excessively drained and have a thin, shaly silt loam surface soil and thin, yellowish-brown, shaly silty clay loam or silty clay subsurface layers. The subsurface layers grade to shale beds at a depth of 8 to 20 inches.

The Muskingum soils are on the upper parts of the steep, rough, broken hills and along many of the steep-walled drains that dissect the area in a dendritic pattern.

These soils are excessively drained. They have a thin, stony, grayish-brown to very dark grayish-brown surface soil of fine sandy loam, which is underlain by a thin layer of stony, yellowish-brown fine sandy loam. Sandstone is at a depth of 10 to 20 inches, and outcrops and boulders of sandstone are common in places.

The Linker and the Hartsells soils are well drained and are on narrow, winding ridgetops. These soils formed in material weathered mainly from sandstone. Their surface soil is fine sandy loam. The subsoil of the Linker soils is yellowish-red to red clay loam, whereas that of the Hartsells soils is yellowish-brown loam to fine sandy clay loam.

The Enders, Albertville, Muse, Leadvale, Philo, Stendal, and Atkins soils also occur in this association. The Enders and the Albertville soils formed in material weathered mainly from shale but partly from interbedded sandy shale and sandstone. These soils are on rolling, narrow ridges. Their depth to bedrock ranges from about 15 to more than 40 inches. The Albertville soils have a strong-brown, firm, silty clay loam to silty clay subsoil, whereas the Enders soils have a firm, yellowish-red to red silty clay subsoil.

The Muse and the Leadvale soils are on foot slopes at the base of the shale hills. Muse soils are well drained and have a shaly silt loam surface soil over a strong-brown to yellowish-red silty clay loam subsoil. Leadvale soils are moderately well drained and have a light olive-brown to strong-brown loam to silty clay loam subsoil. A well-developed fragipan is at a depth of 16 to 30 inches.

The Philo, Stendal, and Atkins soils are in recent local alluvium along the many narrow drainageways and draws. The Philo soils are moderately well drained; the Stendal, somewhat poorly drained; and the Atkins, poorly drained.

About 36 percent of this soil association consists of Pottsville soils; 18 percent, Muskingum soils; 14 percent, Linker soils; 8 percent, Hartsells soils; 10 percent, Albertville and Enders soils; 8 percent, Muse and Leadvale soils; and 4 percent, Philo, Stendal, and Atkins soils. The remaining 2 percent of the acreage consists of the miscellaneous land types, Rockland, sandstone; Sandy alluvial land; Mine pits and dumps; and Gullied land.

About 85 percent of this soil association is wooded and consists mainly of soils in capability classes VI and VII. The rest of this association has been cleared. Soils in capability classes II and III make up at least 40 percent of the cleared acreage, and most of this is cultivated. About 40 percent of the cleared acreage is in soils of capability class IV, and the remaining 20 percent is in about equal acreages of soils in classes VI and VII.

Smith Lake and all the coal mines in the county are in this association. The lake covers approximately 8,040 acres.

This association is less intensively farmed than the others in the county. Large tracts are owned by corporations and by private individuals. Most of the farms are small and are operated by owners; the management is fair. Farming is a part-time enterprise on about half of the farms in this area and is mostly of the general type. There are, however, a few small beef farms. The principal crops are cotton, corn, and truck crops. Broiler production is fairly extensive.

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How a Soil Survey Is Made

When the soils in a county are surveyed, the soil scientists in the survey party dig or bore enough holes to allow them to see what each one of the soils is like. They also observe the soil and the underlying rock in exposed gullies and road cuts. They measure the range of slope and observe other external characteristics of the soil. As they go along, the soil scientists map the boundaries of the soils on aerial photographs.

Most soils are made up of several distinct layers that are called horizons. The layers in a soil make up what is called a soil profile. From their borings the scientists note and record the thickness of the layers and their arrangement in the profile. They also note characteristics of the soil layers that affect plant growth or that are related to the formation of the soil. Some of the important characteristics noted are color, texture, structure, consistence, and acidity or alkalinity.

Color is estimated by comparing the color of the soil with the colors on a color chart. Texture, or the proportions of sand, silt, and clay in a soil, is estimated in the field by rubbing the soil material between the thumb and forefinger. Consistence, or the property that makes the soil material stick together, fall apart, break, or deform, is estimated by handling and perhaps kneeding the soil material. Field tests are generally made to determine acidity or alkalinity. Some of the characteristics estimated in the field may be checked in a soils laboratory.

The soil scientists learn a great deal about the soils in an area by examining the soil horizons. From this knowledge and their knowledge of soils in other areas, they classify similar soils in a soil series. Soils are classified in the same soil series if they have similar horizons, except for the texture of the surface layer, and these horizons are arranged in the soil profile in about the same way. A soil series is given the name of a place near which it was first mapped. The soils in a series are similar, wherever they are found.

Most soil series cover areas that have wide ranges of slope, different degrees of erosion, and other external characteristics that affect use and management. These characteristics are recorded. But before the boundaries of the single soils in a series can be drawn on the aerial photograph, the soil scientists must decide the slope ranges and degrees of erosion to use in mapping the single soils. In Cullman County, the scientists decided that the soils could be best mapped according to the following slope ranges, which may be described by the descriptive names listed:

0 to 2 percent	Level or nearly level
2 to 6 percent	Gently sloping
6 to 10 percent	Sloping
10 to 15 percent	Strongly sloping
15 to 25 percent	Moderately steep
25 to 45 percent	Steep

A 2 percent slope is one that rises or falls 2 feet in every 100 feet of horizontal distance. The slopes of the soils in the areas surveyed are measured with a hand level.

The amount of erosion is also considered in mapping the soils. In this county, soils were placed in three erosion classes. Soils that have had less than 25 percent of the surface soil removed are said to have no erosion or only slight erosion, and the word "eroded" is not in

the soil name. The word "eroded" is a part of the name of soils that have had 25 to 75 percent of the surface soil removed. The term "severely eroded" is part of the name of soils that have had more than 75 percent of the surface soil removed.

In their survey, the soil scientists may find, together in an area, two or more soils that are much alike and that require similar management. These soils may be mapped as a single mapping unit if the needs of the survey do not require that they be mapped separately. In Cullman County, an Enders silty clay loam and an Albertville silty clay loam were mapped together in a single mapping unit called Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded.

The scientists may also come across areas that have little true soil, or areas that are so inaccessible that an orderly examination is not practical. These areas may be rocky, gullied, or have little soil for other reasons. They are called miscellaneous land types and may be given a name descriptive of the land instead of a place name as is given to a soil series. Some of the land types mapped in Cullman County are Gullied land; Made land; Rockland, limestone; and Sandy alluvial land.

After the soil scientist determines the boundaries for the mapping units, he maps these boundaries on aerial photographs. He also designates important natural and manmade features that cannot be seen on the aerial photograph. When the field survey is completed, the photographs are sent to cartographers, who make a finished map like the one at the back of this report.

Descriptions of Soils

This section provides detailed information about the soils of Cullman County. It describes the soil series, or groups of soils, that have essentially the same kind of parent material and the single soils, or mapping units, that are shown on the detailed map at the back of this report.

The soil series are arranged in alphabetic order, and first described for each series are characteristics that are common to all the soils in the series. Then the single soils, or mapping units, in that series are described. Normally a mapping unit is a member of a soil series, but it may be a group of undifferentiated soils that have been mapped as one unit, or it may be a miscellaneous land type.

The first soil described in each series is one that is considered typical of the series, and the soils that follow are described by pointing out how they differ from the first.

In this section, you can gain a working knowledge of each mapping unit by reading the larger print. If you want detailed information, read the smaller print, which is a detailed description of the soil profile, or is what the soil scientist learned when he dug into the soil. Some of the terms that the soil scientist uses in recording the properties of a soil profile may not be familiar and, therefore, are explained.

Soil Terms

Soil scientists call the upper part of a soil the *A horizon.* This term refers to the layer or layers that have lost some of the clay and other soluble minerals. Water has leached these out and carried them to the horizon below. That part of the A horizon, not more than 8 inches thick, is sometimes called the surface soil. The A horizon may be divided into A_1, A_2, and A_3 horizons.

The B horizon is the layer or layers in which some of the clays and minerals leached from the A horizon have accumulated. This horizon is sometimes divided into B_1, B_2, and B_3 horizons. The B horizon is frequently referred to as *subsoil.*

Below the B horizon in many soils, there is a C horizon, or parent material. A C_{ca} horizon has formed in the upper part of the C horizon in many soils that have developed from material containing free lime.

The D horizon underlies the C horizon, or the B if no C horizon is present. The designation D_r is for consolidated parent rock like that from which the parent material formed. In this county, the Atkins, Albertville, Hanceville, and many other soils have a D_r horizon.

The *color* of a soil horizon is denoted by words, such as "grayish brown," and by Munsell notations, such as "10YR 5/2." Munsell notations indicate colors more precisely than words and are used mainly by soil scientists and others who must make detailed comparisons of soils (*8*). In this report, the color given in words is the color of the soil when moist.

The color of the surface soil is generally related to the amount of organic matter in the soil material. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots or mottles of gray, yellow, red, or brown in the subsoil layers indicate poor drainage and restricted aeration. Uniform color of brown, yellow, and red normally indicates good drainage and good aeration.

The *texture* of the soil estimated in the field may be checked later in a soils laboratory. A fine sand is at least 85 percent sand; it is loose and friable when wet or dry. A clay is never more than 45 percent sand and is always more than 35 percent clay; it is sticky and plastic when wet and is hard when dry. Between sand and clay are other textures, for example, *clay loam, fine sandy loam,* and *sandy clay loam.*

The *structure* of a soil is the arrangement of the soil grains into aggregates and the distinctness, size, and shape of these aggregates. Terms for distinctness are *weak, moderate,* and *strong;* for size, *very fine, fine, medium, coarse,* and *very coarse;* and for shape, *prismatic, blocky, subangular blocky,* and *granular.* Soils without structure are described as single grain if they are sands, or *massive* if they are clays.

The *consistence* of a soil is the tendency of the particles to stick together, or cohere, when wet, moist, and dry. Some common terms of consistence are *sticky when wet, friable when moist,* and *hard when dry.*

Other Information

On reading about each mapping unit, you will find statements about its use and management and a reference showing in which capability unit and woodland suitability group it has been placed. Capability units are discussed in the section "Use and Management of Soils," and woodland suitability groups, in the section "Use and Management of Woodland." The approximate acreage of each soil is given in table 4.

TABLE 4.—*Approximate acreage and proportionate extent of soils*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Albertville loam, 2 to 6 percent slopes	590	0. 1	Linker fine sandy loam, 2 to 6 percent slopes	1, 379	0. 3
Albertville loam, 2 to 6 percent slopes, eroded	19, 353	4. 1	Linker fine sandy loam, 2 to 6 percent slopes, eroded	13, 941	2. 9
Albertville loam, 6 to 10 percent slopes	2, 441	. 5	Linker fine sandy loam, 6 to 10 percent slopes	3, 556	. 7
Albertville loam, 6 to 10 percent slopes, eroded	26, 756	5. 6	Linker fine sandy loam, 6 to 10 percent slopes, eroded	17, 924	3. 8
Albertville loam, 10 to 15 percent slopes, eroded	2, 194	. 5	Linker fine sandy loam, 6 to 10 percent slopes, severely eroded	1, 338	. 3
Albertville silty clay loam, 2 to 6 percent slopes, severely eroded	996	. 2	Linker fine sandy loam, 10 to 15 percent slopes	1, 389	. 3
Albertville silty clay loam, 6 to 10 percent slopes, severely eroded	4, 340	. 9	Linker fine sandy loam, 10 to 15 percent slopes, eroded	2, 882	. 6
Albertville silty clay loam, 10 to 15 percent, severely eroded	959	. 2	Linker fine sandy loam, 10 to 15 percent slopes, severely eroded	855	. 2
Atkins silt loam, local alluvium	9, 901	2. 1	Made land	109	(1)
Enders silt loam, 2 to 6 percent slopes, eroded	2, 016	. 4	Mine pits and dumps	635	. 1
Enders silt loam, 6 to 10 percent slopes, eroded	1, 310	. 3	Monongahela fine sandy loam, 0 to 2 percent slopes	775	. 2
Enders and Muse soils, 6 to 15 percent slopes, severely eroded	597	. 1	Monongahela fine sandy loam, 2 to 6 percent slopes	824	. 2
Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded	988	. 2	Muse shaly silt loam, 2 to 6 percent slopes, eroded	946	. 2
Enders and Albertville soils, shallow, 6 to 10 percent slopes, eroded	4, 354	. 9	Muse shaly silt loam, 6 to 10 percent slopes, eroded	2, 782	. 6
Enders and Albertville soils, shallow, 10 to 15 percent slopes	704	. 1	Muse shaly silt loam, 10 to 15 percent slopes, eroded	1, 589	. 3
Enders and Albertville soils, shallow, 10 to 15 percent slopes, eroded	7, 637	1. 6	Muskingum stony fine sandy loam, 10 to 15 percent slopes	1, 039	. 2
Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded	1, 303	. 3	Muskingum stony fine sandy loam, 15 to 45 percent slopes	77, 874	16. 4
Enders and Albertville silty clay loams, shallow, 10 to 15 percent slopes, severely eroded	2, 377	. 5	Philo loam	4, 529	. 9
Gullied land	55	(1)	Philo and Stendal soils, local alluvium	6, 112	1. 3
Hanceville loam, 2 to 6 percent slopes, eroded	2, 015	. 4	Pope fine sandy loam	1, 377	. 3
Hanceville loam, 6 to 10 percent slopes, eroded	337	. 1	Pottsville shaly silt loam, 2 to 10 percent slopes, eroded	1, 281	. 3
Hartsells fine sandy loam, 2 to 6 percent slopes	1, 195	. 2	Pottsville shaly silt loam, 10 to 15 percent slopes	2, 019	. 4
Hartsells fine sandy loam, 2 to 6 percent slopes, eroded	28, 945	6. 1	Pottsville shaly silt loam, 15 to 45 percent slopes	52, 615	11. 1
Hartsells fine sandy loam, 6 to 10 percent slopes	2, 705	. 6	Pottsville shaly silty clay loam, 10 to 25 percent slopes, eroded	1, 893	. 4
Hartsells fine sandy loam, 6 to 10 percent slopes, eroded	41, 499	8. 7	Purdy silt loam	877	. 2
Hartsells fine sandy loam, 6 to 10 percent slopes, severely eroded	1, 926	. 4	Rockland, limestone	365	. 1
Hartsells fine sandy loam, shallow, 2 to 6 percent slopes, eroded	374	. 1	Rockland, sandstone	594	. 1
Hartsells fine sandy loam, shallow, 6 to 10 percent slopes, eroded	3, 136	. 7	Sandy alluvial land	743	. 2
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes	5, 142	1. 1	Sequatchie silt loam, 0 to 2 percent slopes	614	. 1
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded	22, 035	4. 6	Sequatchie silt loam, 2 to 6 percent slopes	502	. 1
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, severely eroded	2, 060	. 4	Tilsit loam, 0 to 2 percent slopes	853	. 2
Jefferson fine sandy loam, 2 to 6 percent slopes, eroded	440	. 1	Tilsit fine sandy loam, 2 to 6 percent slopes	14, 344	3. 0
Jefferson fine sandy loam, 6 to 10 percent slopes, eroded	997	. 2	Tilsit fine sandy loam, 2 to 6 percent slopes, eroded	29, 834	6. 3
Jefferson fine sandy loam, 10 to 15 percent slopes, eroded	450	. 1	Tyler silt loam	4, 425	. 9
Johnsburg loam	3, 980	. 8		466, 668	98. 1
Leadvale loam, 2 to 6 percent slopes	2, 188	. 5	Water and Smith Lake	8, 834	1. 9
Leadvale loam, 2 to 6 percent slopes, eroded	5, 559	1. 2	Gravel pits	18	(1)
			Total	475, 520	100. 0

[1] Less than 0.1 percent.

Albertville Series

The Albertville series consists of well-drained, shallow to moderately deep, gently sloping to strongly sloping soils that are dominantly on slopes of 6 to 10 percent. These soils developed in residuum weathered mainly from thinly bedded acid shale but partly from sandy shale and sandstone.

In most places, Albertville soils have a grayish-brown to yellowish-brown loam or fine sandy loam surface layer and a yellowish-brown to strong-brown silty clay loam to silty clay subsoil. Various amounts of angular fragments of shale and sandstone, ⅛ to ¼ inch in diameter, are on the surface and through the profile.

The Albertville soils are widely distributed in this county. They adjoin the Hartsells, Tilsit, Enders, and Pottsville soils. They have a finer textured subsoil than the Hartsells and Tilsit soils and, unlike the Tilsit soils, do not contain a fragipan. The Albertville soils are

lighter colored in the subsoil than the Enders soils and are deeper to bedrock than the Pottsville soils. Albertville soils less than 18 inches deep to rock are mapped in undifferentiated units of shallow Enders and Albertville soils.

The Albertville soils are low in natural fertility and in organic matter. They are strongly acid to very strongly acid. Infiltration of water is medium, and the permeability of the subsoil is moderate to slow. The moisture-supplying capacity is moderate to low. Because of the fine-textured subsoil, erosion is moderate to severe. Most areas, except severely eroded ones, are in good tilth.

The native vegetation consists of oak, hickory, dogwood, persimmon, and pine trees, but in many places these trees have been cleared. These soils are well suited to corn, cotton, truck crops, hay, and pasture and are used mainly for those crops. The soils respond well to management.

Albertville loam, 2 to 6 percent slopes, eroded (AbB2).—This is a well-drained, moderately deep soil. It developed in residuum weathered mainly from acid shale but partly from sandy shale and sandstone.

Profile in a moist, cultivated field 1.5 miles south of Cullman on U.S. Highway No. 31 (NE¼SE¼ sec. 22, T. 10 S., R. 3 W.):

A_p	0 to 7 inches, brown (10YR 5/3) to light olive-brown (2.5Y 5/4) loam; weak, fine, granular structure; very friable; few fragments of shale and sandstone, ⅛ to ¼ inch in diameter; many fine roots; strongly acid; clear, smooth boundary. 4 to 8 inches thick.
B_1	7 to 11 inches, light yellowish-brown (10YR 6/4) to brownish-yellow (10YR 6/6) silt loam; weak, fine, subangular blocky and weak, medium to coarse, granular structure; friable; many fragments of sandstone, ⅛ to ½ inch in diameter; many fine roots; very strongly acid; clear, wavy boundary. 1 to 10 inches thick.
B_{21}	11 to 17 inches, brownish-yellow (10YR 6/6) to yellowish-brown (10YR 5/6) silty clay loam; weak, fine to medium, subangular blocky structure; friable to firm; many fragments of sandstone, ⅛ to ½ inch in diameter; many fine roots; very strongly acid; clear, wavy boundary. 2 to 6 inches thick.
B_{22}	17 to 29 inches, brownish-yellow (10YR 6/6) to yellowish-brown (10YR 5/6) silty clay; moderate, fine and medium, subangular blocky structure; firm; many fragments of shale and sandstone, ¼ to ½ inch in diameter; few fine roots; few small pores; very strongly acid; gradual, wavy boundary. 8 to 14 inches thick.
B_3 or C_1	29 to 41 inches, mottled yellowish-brown (10YR 5/6), brownish-yellow (10YR 6/6), light yellowish-brown (2.5Y 6/4), and yellowish-red (5YR 5/6) silty clay; strong, medium, subangular blocky structure; firm; many fragments of sandstone and shale, ¼ to 1 inch in diameter; extremely acid; 5 to 12 inches thick.
D_r	41 inches +, interbedded sandstone and shale.

In many places, a B_1 horizon has not formed. In some areas, the surface layer is grayish brown to yellowish brown instead of brown to light olive brown. The surface layer, in uncleared areas, is very dark grayish brown and is 2 to 3 inches thicker than in the profile described. The texture of the subsoil ranges from clay loam to silty clay or clay. The fragments of shale and sandstone vary in size and amount. Included with this soil are some areas that have a fine sandy loam surface soil.

This soil is low in natural fertility and in organic matter and is strongly acid to very strongly acid. Surface runoff and infiltration of water are medium. The permeability in the subsoil is moderate to slow. The moisture-supplying capacity and hazard of erosion are moderate.

Almost all of this soil is cultivated. Because it is on gentle slopes, is in good tilth, and responds well to management, this is one of the best soils in the county for intensive use. *Capability unit IIe–7; woodland suitability group 3A.*

Albertville loam, 2 to 6 percent slopes (AbB).—This soil is 1 to 3 inches thicker in the surface layer than Albertville loam, 2 to 6 percent slopes, eroded. To a depth of 2 inches, it is very dark grayish brown and contains more organic matter than that soil.

Because of its gentle slopes, good tilth, and a fairly thick root zone, this soil is suited to cultivated crops. The moisture-supplying capacity and hazard of erosion are moderate. Surface runoff is medium to slow. Almost all of the soil is in woods. *Capability unit IIe–7; woodland suitability group 3A.*

Albertville loam, 6 to 10 percent slopes (AbC).—This soil is 1 to 3 inches thicker in the surface layer than Albertville loam, 2 to 6 percent slopes, eroded. Also, the upper part of the surface soil is very dark grayish brown instead of brown to light olive brown. The moisture-supplying capacity is moderate, and surface runoff is medium.

Most of this soil is in woods. It is suited to cultivation, but the hazard of erosion is moderate to severe. *Capability unit IIIe–7; woodland suitability group 3A.*

Albertville loam, 6 to 10 percent slopes, eroded (AbC2).—This soil is 2 to 4 inches thinner in the surface layer than Albertville loam, 2 to 6 percent slopes, eroded, and is slightly less deep to the parent material. Surface runoff is medium, and the hazard of erosion is moderate to severe.

Most of this soil has been cleared and is cultivated. *Capability unit IIIe–7; woodland suitability group 3A.*

Albertville loam, 10 to 15 percent slopes, eroded (AbD2).—This soil is 2 to 4 inches thinner in the surface layer than Albertville loam, 2 to 6 percent slopes, eroded, and is somewhat thiner in the subsoil. In most places, the depth to bedrock is between 20 and 26 inches. This soil has low moisture-supplying capacity and medium to rapid surface runoff. Its hazard of erosion is severe.

About four-fifths of this soil has been cleared and is used for crops, but much of the acreage is reverting to forest consisting mainly of loblolly pine. Included are small, uncleared, uneroded areas in mixed hardwoods and pine. Most of these included areas have a surface layer that is 7 to 9 inches thick and very dark grayish brown in the upper 2 to 3 inches. *Capability unit IVe–7; woodland suitability group 3A.*

Albertville silty clay loam, 2 to 6 percent slopes, severely eroded (AcB3).—This soil has a yellowish-brown to brownish-yellow silty clay loam plow layer, 4 to 6 inches thick. Most of the original surface layer has washed away. The present plow layer consists mostly of remnants of the original loam surface layer that have been mixed with the brownish-yellow silty clay loam subsoil. Shallow gullies are common, and in places, a few deep ones have formed. Included with this soil are a few patches that still contain 1 to 3 inches of the original loam surface layer.

This soil is in fair to poor tilth and is moderate to low in moisture-supplying capacity. Surface runoff is medium to rapid, and the hazard of erosion is severe. Because of these unfavorable characteristics, this soil is not so well suited to cultivation as Albertville loam, 2 to 6 percent slopes, eroded.

All of this soil has been cleared, but small areas are reverting to forest, consisting mainly of loblolly pine. *Capability unit IIIe-7; woodland suitability group 5B.*

Albertville silty clay loam, 6 to 10 percent slopes, severely eroded (AcC3).—The plow layer of this soil is yellowish-brown silty clay loam, 4 to 6 inches thick. The combined depth of the plow layer and subsoil is slightly less than that of Albertville loam, 2 to 6 percent slopes, eroded. Shallow gullies are common, and in places, a few deep ones have formed. This soil is fair to poor in tilth and is low in moisture-supplying capacity. Surface runoff is rapid, and the hazard of erosion is severe.

All this soil has been cleared and cultivated, but some areas are reverting to forest, mainly to loblolly pine. *Capability unit IVe-7; woodland suitability group 5B.*

Albertville silty clay loam, 10 to 15 percent slopes, severely eroded (AcD3).—This soil has a surface layer of yellowish-brown silty clay loam, 3 to 5 inches thick. The total depth to the parent material is 10 to 15 inches less than that of Albertville loam, 2 to 6 percent slopes, eroded. Shallow gullies are common, and a few deep ones have formed.

This soil is fair to poor in tilth and is low in moisture-supplying capacity. Surface runoff is rapid, and the hazard of erosion is severe.

Most of this soil has been cleared, but it is reverting to forest, mainly to loblolly pine. Generally, this soil is not suited to cultivation, but sod crops or trees can be grown. *Capability unit VIe-2; woodland suitability group 5B.*

Atkins Series

The Atkins series consists of poorly drained, deep, friable soils that are level or nearly level. These soils are developing in young or recent local alluvium. This alluvium washed from the Albertville, Hartsells, Tilsit, Linker, Muskingum, and Pottsville soils, all of which formed in materials weathered from sandstone and shale.

In most places, the surface layer of the Atkins soils is grayish-brown or dark grayish-brown to gray silt loam, which is faintly to distinctly mottled. The subsurface layers are gray silt loam or loam and are distinctly to prominently mottled.

These soils are widely distributed in this county, but few areas cover more than 5 acres. The areas are small because they are along narrow drainageways or at the heads of drainageways. In places, water stands on these soils for long periods. These poorly drained soils adjoin the moderately well drained to somewhat poorly drained Philo and Stendal soils.

The Atkins soils are medium to low in natural fertility and are low to medium in content of organic matter. They are strongly acid to very strongly acid. Surface runoff is slow, infiltration of moisture is medium to slow, and permeability is slow.

The native vegetation consists mainly of gum, poplar, maple, water oak, willow, and pine. Most of the acreage is in trees or pasture, and these are suitable uses for these soils. Small acreages are idle or are in cultivated crops.

Only one soil in the Atkins series is mapped in Cullman County.

Atkins silt loam, local alluvium (0 to 2 percent slopes) (At).—This is a poorly drained, deep, friable soil that is forming in recent local alluvium at the heads of and along narrow drainageways.

Profile in a moist pasture 2.5 miles south of Holly Pond (NE¼SW¼ sec. 26, T. 10 S., R. 1 W.):

A_{1p} 0 to 14 inches, grayish-brown (10YR 5/2) to dark grayish-brown (10YR 4/2) silt loam with common, fine, distinct mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6); weak, fine, granular structure; friable; many fine roots; few small, black concretions, ⅛ to ½ inch in diameter; discontinuous lenses of light yellowish-brown (10YR 6/4) to yellowish-brown (10YR 5/4) loamy fine sand, ½ inch to 2 inches thick; strongly acid; clear, wavy boundary. 10 to 18 inches thick.

A_{1gb} 14 to 15½ inches, grayish-brown (2.5Y 5/2) silt loam with few, fine, faint mottles of yellowish brown (10YR 5/6); weak, fine, granular structure; friable; few fine roots; strongly acid; clear, wavy boundary. 1 to 3 inches thick.

A_{2gb} 15½ to 21 inches, gray (2.5Y 6/0) silt loam with common, fine, distinct mottles of yellowish brown (10YR 5/6); weak, fine, granular structure; friable; few small, black concretions; very strongly acid; gradual, wavy boundary. 5 to 8 inches thick.

C_{1g} 21 to 29 inches, gray (10YR 6/1) fine sandy loam with common, medium, distinct mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6); weak, fine, granular structure; friable; few small concretions; very strongly acid; gradual, wavy boundary. 6 to 10 inches thick.

C_{2g} 29 to 75 inches, gray (10YR 6/1) fine sandy clay loam with many, coarse, distinct mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6); massive; friable; few small, black concretions; very strongly acid; 30 to 50 inches thick.

D_r 75 inches, bedrock of sandstone and shale.

The surface soil ranges from very dark gray where the organic matter is plentiful to nearly white where it is scarce. The subsurface layers range from sandy loam to silty clay and ordinarily contain a few concretions, ⅛ to ¼ inch in diameter, that consist of iron or manganese. Strata of loamy fine sand or loamy sand occur at varying depths in some places. Included with this soil are some areas that have a loam or fine sandy loam surface soil.

This soil is medium to low in natural fertility and low to medium in organic matter. It is strongly acid to very strongly acid. Surface runoff is slow, infiltration of water is medium to slow, and permeability is slow. Prolonged wetness interferes with tillage. This soil is mostly in woods or pasture and is well suited to those uses. *Capability unit IVw-2; woodland suitability group 1.*

Enders Series

The Enders series consists of well-drained, shallow to moderately deep, gently sloping to strongly sloping soils. These soils developed in residuum weathered mainly from acid shale but partly from sandstone. The soils are 1 to 4 feet deep to bedrock.

In most places, these soils have a dark grayish-brown to brown silt loam or loam surface layer and a red to yellowish-red silty clay loam to silty clay subsoil. Angular fragments of shale and sandstone, ⅛ to ½ inch in diameter,

are on the surface and through the profile in various amounts.

Most of the Enders soils in this county are in the southwestern part. They occur with the Albertville, Pottsville, and Linker soils, and to a lesser extent, with the Hanceville soils. They have a redder subsoil than the Albertville soils, and unlike the Pottsville soils, they contain a well-developed B horizon. The Enders soils are finer textured in the profile than the Linker soils and are grayer in the surface layer than the Hanceville soils. Enders soils less than 18 inches deep to bedrock are mapped and described in undifferentiated units of shallow Enders and Albertville soils.

The Enders soils contain little organic matter and are low in natural fertility. They are medium acid to strongly acid. Because the subsoil is firm and fine textured, the hazard of erosion is moderate to severe in the strongly sloping areas of these soils.

The native vegetation consists of oak, hickory, pine, dogwood, and persimmon. Much of the acreage of these soils is wooded, but most of the gently sloping areas have been cleared and are used for corn, cotton, hay, and pasture.

Enders silt loam, 2 to 6 percent slopes, eroded (EnB2).—This is a moderately deep, well-drained, fine-textured soil. It developed in residuum weathered mainly from acid shale but partly from sandstone.

Profile in a moist pasture (SW¼SE¼ sec. 27, T. 12 S., R. 3 W.):

- A_p 0 to 3 inches, brown (10YR 5/3) silt loam; weak, fine and medium, granular structure; very friable; some fragments of shale and sandstone, ⅛ to ¼ inch in diameter; many fine roots; medium acid; clear, smooth boundary. 3 to 8 inches thick.
- A_3 3 to 6½ inches, brown or dark-brown (7.5YR 4/4) silt loam; weak, fine, granular and subangular blocky structure; very friable; some fragments of shale and sandstone, ⅛ to ¼ inch in diameter; a few concretions; many fine roots; medium acid; clear, smooth boundary. 3 to 6 inches thick.
- B_1 6½ to 8½ inches, yellowish-red (5YR 4/6) silt loam; weak, fine and medium, granular and subangular blocky structure; friable; some fragments of shale and sandstone, ⅛ to ¼ inch in diameter; many fine roots; strongly acid; gradual, smooth boundary. 2 to 8 inches thick.
- B_2 8½ to 21 inches, red (2.5YR 4/6) silty clay; moderate, fine and medium, subangular blocky structure; friable; some fragments of shale and sandstone, ⅛ to ¼ inch in diameter; few fine roots; strongly acid; gradual, wavy boundary. 10 to 20 inches thick.
- B_3 21 to 29 inches, red (2.5YR 4/6) silty clay with mottles of pale brown (10YR 6/3) and light brownish gray (10YR 6/2); moderate, fine and medium, subangular blocky structure; friable to firm; some fragments of shale and sandstone, ⅛ to ½ inch in diameter; strongly acid; gradual, wavy boundary. 6 to 15 inches thick.
- C 29 to 33 inches, mottled red (2.5YR 4/6), pale-brown (10YR 6/3), and light brownish-gray (10YR 6/2) shaly silty clay; many fragments of shale, ⅛ to ½ inch in diameter.

In a few small areas, the surface soil is grayish brown and yellowish brown to dark brown. The subsoil ranges from strong-brown to yellowish-red and red silty clay loam and silty clay. Included with this soil are small areas that have a loam and fine sandy loam surface soil.

This soil is low in natural fertility and in organic matter and is medium acid to strongly acid. Surface runoff and infiltration of water are medium. The permeability of the subsoil is slow. The moisture-supplying capacity is moderate to low. This soil is in good tilth and responds well to management. The hazard of erosion is moderate.

Almost all of this soil is planted to corn, cotton, truck crops, hay, and pasture. *Capability unit IIe–7; woodland suitability group 4B.*

Enders silt loam, 6 to 10 percent slopes, eroded (EnC2).—This soil is less deep to the parent material than Enders silt loam, 2 to 6 percent slopes, eroded.

Surface runoff is medium to rapid, the moisture-supplying capacity is moderate to low, and the hazard of erosion is moderate to severe. In uncleared areas, the surface soil is dark brown or very dark grayish brown. Included with this soil are small areas on slopes of 10 to 15 percent.

Most of the acreage of this soil has been cleared and is used for cultivated crops, but some areas are being reforested to loblolly and shortleaf pine. *Capability unit IIIe–7; woodland suitability group 4B.*

Enders and Muse soils, 6 to 15 percent slopes, severely eroded (EsC3).—This mapping unit consists of Enders soils and Muse soils that are mapped as a group of undifferentiated soils. Profiles of these soils that have a silt loam surface layer are described elsewhere in this section. About three-fourths of this mapping unit is on slopes of 6 to 10 percent.

The Enders soils and the Muse soils are similar in depth, color, texture, and consistence, but their parent materials differ. The Enders soils developed on uplands in residuum weathered from shale and sandstone, whereas the Muse soils developed on footslopes in old local alluvium. Shallow gullies are common, and in places, a few deep ones have formed.

The plow layer of these soils is 3 to 5 inches thick and is strong-brown to yellowish-red heavy loam or silty clay loam. This layer is underlain by yellowish-red to red silty clay loam to silty clay, 15 to 25 inches thick. Shale fragments, ¼ to 1 inch in diameter, are common on and in these soils.

These soils are low in natural fertility and contain little organic matter. They are medium acid to very strongly acid. Surface runoff is rapid, and infiltration of water is medium to slow. The moisture-supplying capacity is low to moderate. Permeability is moderate to slow in the subsoil. Tilth is fair to poor, and the hazard of erosion is severe.

All the acreage in these soils has been cleared and is used for crops. Cultivation, however, is difficult because of the strong slopes, severe erosion, and the low to moderate supply of moisture. Much of the cleared acreage has now reverted to woodland, mainly to loblolly pine. *Capability unit IVe–7; woodland suitability group 5B.*

Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded (EsB2).—This mapping unit consists of shallow Enders and Albertville soils. These soils are much alike except in the color of their subsoil. The thin, clayey subsoil in the Enders soils is yellowish red to red, whereas that in the Albertville soils is yellowish brown to strong brown. The shallow Enders and Albertville soils occur together in most places and are so intermingled that it was impractical to map them separately. The depth to bedrock ranges from 12 to 20 inches but in most places is 16 to 18 inches.

Profile of a shallow Albertville soil 9.0 miles southwest of Cullman (NW¼SE¼ sec. 23, T. 11 S., R. 4 W.):

A_p 0 to 6 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, crumb structure; very friable; many fine roots; very strongly acid; clear, smooth boundary. 3 to 8 inches thick.

B_1 6 to 10 inches, yellowish-brown (10YR 5/4) loam or light fine sandy clay loam; weak, medium, subangular blocky structure; friable; many fine roots; few fragments of shale and sandstone, ⅛ to ½ inch in diameter; very strongly acid; gradual, wavy boundary. 2 to 6 inches thick.

B_2 10 to 15 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; few fine roots; 15 to 20 percent of volume consists of fragments of shale and sandstone, ⅛ to ½ inch in diameter; few clay skins; very strongly acid; gradual, wavy boundary. 4 to 12 inches thick.

C 15 to 20 inches, yellowish-brown, strong-brown, and yellowish-red partly weathered shaly silty clay loam; 40 to 50 percent of volume consists of fragments of shale and sandstone.

D_r 20 inches, interbedded shale and sandstone.

Angular fragments of shale and sandstone, ⅛ to ½ inch in diameter, are common on and in this soil. The surface soil ranges from fine sandy loam to silt loam in texture and from dark grayish brown to dark yellowish brown in color. The subsoil ranges from yellowish brown to strong brown and from loam to silty clay. In some places, the B_1 horizon has not formed.

Profile of a shallow Enders soil 9.0 miles southwest of Cullman (NW¼SE¼ sec. 23, T. 11 S., R. 4 W.):

A_p 0 to 5 inches, yellowish-brown (10YR 5/4–5/6) shaly fine sandy loam; weak, fine, granular structure; friable; many fine roots; many fragments of shale, ¼ inch to 3 inches in diameter; very strongly acid; clear, smooth boundary. 4 to 7 inches thick.

B_2 5 to 12 inches, variegated brownish-yellow (10YR 6/8), yellowish-red (5YR 5/6), and red (2.5YR 4/6) silty clay; moderate, fine and medium, subangular blocky structure; firm; many roots; many fragments of shale and sandstone, ¼ to 1 inch in diameter; very strongly acid; abrupt, wavy boundary. 6 to 9 inches thick.

D_r 12 inches +, interbedded shale and sandstone.

Angular fragments of shale and sandstone, ⅛ to ½ inch in diameter, are common on and in this soil. The surface soil ranges from fine sandy loam to silt loam in texture and from grayish brown and yellowish brown to dark brown in color. The subsoil ranges from clay loam to silty clay and from yellowish red to red.

The shallow Enders and Albertville soils are low in natural fertility, contain little organic matter, and are very strongly acid. Surface runoff and infiltration of water are medium. The permeability of the subsoil is moderate to slow, and the moisture-supplying capacity is low. The hazard of erosion is moderate, and tilth is normally good.

Most of the acreage of this mapping unit is in crops and pasture. *Capability unit IIIe–9; woodland suitability group 4B.*

Enders and Albertville soils, shallow, 6 to 10 percent slopes, eroded (EsC2).—This mapping unit is more strongly sloping than Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded. Surface runoff is medium to rapid, and infiltration of water is medium. The permeability of the subsoil is moderate to slow; the moisture-supplying capacity is low.

Most of this mapping unit has been cleared and used for crops. Cultivation, however, is difficult because of the slope, shallow depth, erosion, and the low moisture-supplying capacity. Many areas are now idle or are reverting to woodland, mainly to loblolly, shortleaf, and Virginia pine. *Capability unit IVe–9; woodland suitability group 4B.*

Enders and Albertville soils, shallow, 10 to 15 percent slopes (EsD).—The surface layer of this mapping unit is 1 to 3 inches thicker than that of Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded. The upper 1 to 2 inches is dark grayish brown to very dark grayish brown instead of dark yellowish brown.

Surface runoff is medium to rapid, infiltration of water is medium, and the moisture-supplying capacity is low. The hazard of erosion is severe.

Most of the acreage of this mapping unit has not been cleared and is in forest, consisting mainly of oak, hickory, and pine. It is not generally suited to cultivation. *Capability unit VIe–4; woodland suitability group 4B.*

Enders and Albertville soils, shallow, 10 to 15 percent slopes, eroded (EsD2).—This mapping unit is 1 to 2 inches thinner in the surface soil than Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded.

Surface runoff is medium to rapid. The infiltration of water is medium to slow, and the permeability of the subsoil is moderate to slow. The moisture-supplying capacity is low. Erosion is a severe hazard.

Much of the acreage in this mapping unit has been cleared and used for crops. But because of the strong slopes, shallowness, erosion, and low moisture-supplying capacity, these soils are not suited to cultivation. Many cleared areas are reverting to forest, mainly to loblolly, shortleaf, and Virginia pine. *Capability unit VIe–4; woodland suitability group 4B.*

Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded (ErC3).—These soils have a strong-brown to yellowish-red silty clay loam surface layer, 3 to 5 inches thick. They are less deep to bedrock and are more severely eroded than Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded. Most of the surface soil has washed away, and many shallow gullies have formed. The original surface layer was fine sandy loam and loam. Patches or remnants of this layer, 1 to 3 inches thick, remain in places.

The infiltration of water in these soils is slow, surface runoff is rapid, and the moisture-supplying capacity is low. The hazard of erosion is severe, and the soils are generally in poor tilth.

All of the acreage in these soils has been cleared and cropped, but the soils are not suited to cultivation. Most of the acreage is now idle or is reverting to woodland, mainly to loblolly, shortleaf, and Virginia pine. *Capability unit VIe–4; woodland suitability group 7.*

Enders and Albertville silty clay loams, shallow, 10 to 15 percent slopes, severely eroded (ErD3).—The thin, clayey surface soil and subsoil of this mapping unit distinguish it from Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded. Most of the surface soil has washed away, exposing a clayey surface layer, and shallow gullies are common. The original surface soil was fine sandy loam and loam, but it remains only in patches or remnants, 1 to 3 inches thick.

The infiltration of water is slow in these soils, surface runoff is rapid, and the moisture-supplying capacity is

low. The hazard of erosion is severe. Tilth is generally poor.

All of the acreage in these strongly sloping soils has been cleared and cropped, but the soils are not suited to cultivation. Most of the acreage is now idle or is reverting to woodland, mainly to loblolly, shortleaf, and Virginia pine. These trees are well suited. *Capability unit VIIe-2; woodland suitability group 7.*

Gullied Land

Areas that have been so badly cut by erosion that the original soil profiles have been largely destroyed are correlated as Gullied land. In Cullman County, this miscellaneous land type formed in material weathered mostly from shale. Areas here consist mostly of parallel, moderately deep to deep gullies and are sloping to moderately steep. The soil material between the gullies is of the Muse, Albertville, Enders, and Pottsville series.

Gullied land (6 to 25 percent slopes) (Gu).—This land consists of sloping to moderately steep areas where the soil profile has been destroyed, and the areas are mostly in parallel, moderately deep to deep gullies. Remnants of the original soil material, which formed mostly from weathered shale, remain between the gullies in places. Before erosion destroyed the soil profiles, areas of Gullied land were in Muse, Albertville, Enders, and Pottsville soils.

Nearly all of the acreage of this mapping unit is in small, scattered areas in the western and southwestern parts of the county. Some areas cover as much as 4 acres.

The soil material that remains is very low in natural fertility and contains little or no organic matter. It is strongly acid to very strongly acid. Surface runoff is very rapid, and infiltration of water and permeability are very slow.

Most areas of Gullied land have been abandoned because it is not practical to reclaim them for use for pasture or crops. Some areas have sparse vegetation of persimmon, honeysuckle, briers, and broomsedge; other areas contain fair stands of Virginia pine. *Capability unit VIIe-1; woodland suitability group 8.*

Hanceville Series

The Hanceville series consists of deep to very deep, well-drained, gently sloping to sloping, red soils that are dominantly on slopes of 2 to 6 percent. These soils developed in residuum weathered mostly from sandstone but partly from shale.

In most places, these soils have a dark reddish-brown to dark-brown loam surface layer and a dark-red to red clay loam or fine sandy clay loam subsoil. They are the reddest and deepest soils in the county.

In this county, most of these soils occur in two areas. A large area is between Hanceville and Phelan, and a smaller area is near Good Hope School. Other small, scattered areas are mostly in the southwestern part of the county. The Hanceville soils commonly adjoin or are near the Hartsells, Linker, and Enders soils.

The Hanceville soils are low to moderate in natural fertility and contain little organic matter. They are medium acid to very strongly acid. The infiltration of water is medium, and the permeability of the subsoil is moderate. The moisture-supplying capacity is moderate to high. Though most areas are in good to very good tilth, the hazard of erosion is moderate to severe.

The native vegetation consists of oak, hickory, and pine, but almost all the acreage in Hanceville soils has been cleared. These soils are cultivated intensively and are well suited to crops. They respond well to management and are among the most productive soils in the county.

Hanceville loam, 2 to 6 percent slopes, eroded (HaB2).—This is a very deep, well-drained, red soil. It developed in residuum weathered mostly from sandstone but partly from shale.

Profile description in a moist, cultivated area one-half mile south of Good Hope Church (SE¼SW¼ sec. 8, T. 11 S., R. 3 W.):

- A_p 0 to 7 inches, dark reddish-brown (5YR 3/3) loam; weak, fine, granular structure; very friable; many fine roots; medium acid; abrupt, smooth boundary. 6 to 8 inches thick.
- B_1 7 to 12 inches, dark-red (2.5YR 3/6) heavy loam; weak to medium, fine and medium, subangular blocky structure; friable; many fine roots; strongly acid; gradual, smooth boundary. 4 to 10 inches thick.
- B_{21} 12 to 30 inches, dark-red (10R 3/6) clay loam; weak to moderate, fine and medium, subangular blocky structure; friable; many fine roots; very strongly acid; gradual, smooth boundary. 10 to 30 inches thick.
- B_{22} 30 to 65 inches, dark-red (10R 3/6) clay loam; moderate, fine and medium, subangular and angular blocky structure; friable; few fine roots; many clay films on ped surfaces; few small, dark concretions, ⅛ inch in diameter; very strongly acid; gradual, smooth boundary. 15 to 40 inches thick.
- B_3 65 to 80 inches, dark-red (10R 3/6) clay loam; moderate, fine and medium, subangular and angular blocky structure; firm; many small fragments of sandstone, ⅛ to ¼ inch in diameter; streaked or splotched with ocherous yellow, partly weathered sandstone; a few partly weathered fragments of sandstone, ½ to ¾ inch in diameter; very strongly acid; gradual, wavy boundary. 15 to 30 inches thick.
- C 80 to 90 inches, mottled dark-red (10R 3/6), strong-brown (7.5YR 5/6), and yellowish-brown (10YR 5/6) sandy clay loam or sandy clay; many partly weathered fragments of sandstone, as much as 1 inch in diameter.
- D_r 90 inches, bedrock of sandstone.

The depth to bedrock in this soil ranges from 36 to 90 inches. The surface layer is brown in places where this soil grades to the Linker or Hartsells soils. A few small fragments of sandstone and shale, ⅛ to ¼ inch in diameter, are common on and in the soil.

Included with this soil are small areas that have a fine sandy loam and silt loam surface soil. Also included are a few gravelly areas.

Hanceville loam, 2 to 6 percent slopes, eroded, is low to moderate in natural fertility and contains little organic matter. It is medium acid to very strongly acid. Surface runoff and the infiltration of water are medium, permeability in the subsoil is moderate, and the hazard of erosion is moderate. The moisture-supplying capacity is high. This soil is in good tilth and responds well to management.

Almost all of this soil has been cleared and is in crops. It is suited to intensive cultivation. *Capability unit IIe-2; woodland suitability group 4B.*

Hanceville loam, 6 to 10 percent slopes, eroded (HaC2).—This soil is 1 to 3 inches thinner in the surface soil than Hanceville loam, 2 to 6 percent slopes, eroded. Also it is shallower to the parent material. The depth to

bedrock ranges from 40 to 65 inches. The moisture-supplying capacity is moderate to high; the hazard of erosion is moderate to severe.

Most of this soil has been cleared and is cropped. It is suited to moderately intensive cultivation. (*Capability unit IIIe–2; woodland suitability group 4B.*)

Hartsells Series

The Hartsells series consists of shallow to moderately deep, well-drained soils that are gently sloping or sloping in most places. These soils developed mainly in residuum weathered from sandstone that is interbedded, in places, with thin lenses of shale. The depth to bedrock ranges from about 12 to 60 inches.

In most places, the Hartsells soils have a grayish-brown to light olive-brown fine sandy loam surface soil and a yellowish-brown loam to fine sandy clay loam subsoil.

The Hartsells soils are widely distributed in this county. These soils are moderately deep in about two-thirds of the acreage. In the rest of the acreage they are 18 inches or less deep to bedrock. The shallow Hartsells soils are gently sloping to strongly sloping, and the moderately deep soils are gently sloping or sloping.

The Hartsells soils adjoin the Tilsit, Albertville, Linker, and Muskingum soils. They are similar to the Tilsit soils, but they lack the fragipan that has formed in those soils. They have a coarser textured subsoil than the Albertville soils and, in most places, have a somewhat coarser textured and yellower subsoil than the Linker soils. Unlike the Muskingum soils, the Hartsells soils contain a well-developed B horizon.

Hartsells soils are low in natural fertility and in organic matter. They are strongly acid. Infiltration of water is medium, and the permeability of the subsoil is moderate. The moisture-supplying capacity ranges from low to moderately high. The hazard of erosion is moderate to severe. Except where they are severely eroded, these soils are in good tilth.

The native vegetation consists mainly of oak, hickory, and pine, but much of the acreage has been cleared. The Hartsells soils are the most important agricultural soils in the county. The moderately deep ones are used intensively for crops and are well suited to them. Because of low moisture-supplying capacity and generally strong slopes, the shallow Hartsells soils are better suited to sod crops and to trees, mainly to loblolly pine.

Hartsells fine sandy loam, 2 to 6 percent slopes, eroded (HrB2).—This is a moderately deep, well-drained soil. It developed in residuum weathered from sandstone that contains thin lenses of interbedded shale.

Profile description in a moist, cultivated area 2.0 miles northwest of Holly Pond (SE¼SE¼ sec. 33, T. 9 S., R. 1 W.):

A_p 0 to 6 inches, grayish-brown (2.5Y 5/2) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fragments of sandstone, ¼ to ½ inch in diameter; strongly acid; clear, wavy boundary. 4 to 8 inches thick.

B_1 6 to 10 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular and subangular blocky structure; friable; many fine roots; few small fragments of sandstone, ¼ to ½ inch in diameter; strongly acid; clear, wavy boundary. 2 to 8 inches thick.

B_2 10 to 26 inches, yellowish-brown (10YR 5/6) loam; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; clear, smooth boundary. 10 to 20 inches thick.

B_3 or C 26 to 48 inches +, mottled yellowish-brown (10YR 5/6), brownish-yellow (10YR 6/6), dark-brown (7.5YR 4/4), and strong-brown (7.5YR 5/6) fine sandy clay loam; moderate, medium to coarse, angular and subangular blocky structure; friable; few fine roots; many peds coated with dark brown (7.5YR 4/4); few fragments of sandstone, ⅛ to ¼ inch in diameter; strongly acid.

The surface soil is light yellowish brown to dark brown fine sandy loam. The subsoil ranges from yellowish brown to strong brown in color and from loam to fine sandy clay loam in texture. In places, a B_1 horizon has not formed. Included with this soil are a few gravelly areas.

This soil is low in natural fertility and in organic matter. It is strongly acid. Surface runoff and the infiltration of water are medium. The permeability is moderate, and the moisture-supplying capacity is moderately high. This soil is in good tilth and responds well to management.

Most of this soil is cultivated and can be cropped intensively. Good management is needed, however, because the hazard of erosion is moderate. *Capability unit IIe–2; woodland suitability group 5A.*

Hartsells fine sandy loam, 2 to 6 percent slopes (HrB).—The surface layer of this soil is dark grayish brown. It is 2 to 3 inches thicker than the surface layer in Hartsells fine sandy loam, 2 to 6 percent slopes, eroded. Also, this uneroded soil contains more organic matter than that soil.

Most of this soil has not been cleared. It can be cultivated intensively because it has gentle slopes, a fairly thick root zone, and moderately high moisture-supplying capacity, and is in good tilth. *Capability unit IIe–2; woodland suitability group 5A.*

Hartsells fine sandy loam, 6 to 10 percent slopes (HrC).—The surface layer of this soil is dark grayish brown. It contains a little more organic matter than the surface layer of Hartsells fine sandy loam, 2 to 6 percent slopes, eroded.

Most of this soil has not been cleared. It is suited to moderately intensive cultivation because of the fairly thick root zone, moderate moisture-supplying capacity, and good tilth. The hazard of erosion, however, is moderate to severe, and this soil needs careful management. *Capability unit IIIe–2; woodland suitability group 5A.*

Hartsells fine sandy loam, 6 to 10 percent slopes, eroded (HrC2).—The surface layer of this soil is 1 to 2 inches thinner than that in Hartsells fine sandy loam, 2 to 6 percent slopes, eroded. Also, the total depth to the parent material is less than in that soil.

Most of this soil is used for crops. Small areas, however, are idle or are in trees. The soil has a fairly thick root zone and moderate moisture-supplying capacity. It is in good tilth. If it is managed so that erosion is controlled, this soil can be cultivated intensively. *Capability unit IIIe–2; woodland suitability group 5A.*

Hartsells fine sandy loam, 6 to 10 percent slopes, severely eroded (HrC3).—The plow layer of this soil is yellowish-brown heavy fine sandy loam, 4 to 6 inches thick. The combined depth of the plow layer and the subsoil is 8 to 10 inches less than that of Hartsells fine

ity unit IIIe–9; woodland suitability group 5A.
the surface layer is grayish-brown fine sandy loam, 2 to 4 inches thick. Small areas or patches of subsoil material are exposed in places. In these places, the surface soil is yellowish-brown loam or fine sandy clay loam.

Surface runoff is medium to rapid on this soil, and the hazard of erosion is severe. Infiltration of water is medium to slow, and the moisture-supplying capacity is moderately low.

Most of this soil has been cleared and is used for crops. Small areas are idle or are reverting to trees, mainly to loblolly pine. This soil can be cultivated if it is managed very carefully. It is, however, better suited to sod crops or to trees than to cultivated crops. *Capability unit IVe–2, woodland suitability group 5A.*

Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded (HsD2).—This is a shallow, well-drained soil. It developed in residuum weathered mainly from sandstone that contains thin lenses of interbedded shale. Profile in a moist, wooded area 1.0 mile west of West Point (SE¼SE¼ sec. 20, T. 9 S., R. 4 W.) :

- A_p 0 to 4 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fragments of sandstone, ¼ to 1 inch in diameter; strongly acid; clear, wavy boundary. 4 to 6 inches thick.
- B_1 4 to 6 inches, yellow (10YR 7/6) fine sandy loam; weak, fine, granular and subangular blocky structure; very friable; many fine roots; few fragments of sandstone, ¼ to 1 inch in diameter; strongly acid; clear, wavy boundary. 2 to 6 inches thick.
- B_2 6 to 14 inches, brownish-yellow (10YR 6/6) to yellowish-brown (10YR 5/6) loam; moderate, fine and medium, subangular blocky structure; friable; few fine and medium roots; few fragments of sandstone, ¼ to 1 inch in diameter; strongly acid; clear, wavy boundary. 6 to 12 inches thick.
- C 14 to 20 inches, yellow (10YR 7/8) silty clay loam; moderate, fine and medium, subangular and angular blocky structure; friable to firm; strongly acid; abrupt, smooth boundary. 5 to 10 inches thick.
- D_r 20 inches, bedrock of sandstone.

This soil is low in natural fertility and contains little organic matter. It is strongly acid. Surface runoff is medium to rapid, and permeability is moderate in the subsoil. The moisture-supplying capacity is low, and the hazard of erosion is severe. Tilth is good to fair.

Much of this soil has been cleared and used for crops. Many areas, however, are reverting to forest, mainly to loblolly pine. This soil is best suited to sod crops or to trees. It should not be cultivated. *Capability unit VIe–4; woodland suitability group 5A.*

Hartsells fine sandy loam, shallow, 2 to 6 percent slopes, eroded (HsB2).—Most of this soil has been cleared and is used for crops and pasture. Surface runoff is medium, and the hazard of erosion is moderate. This soil is fairly well suited to moderately intensive cultivation, but because of the shallow depth and low moisture-supplying capacity, it is better suited to sod crops. *Capability unit IIIe–9; woodland suitability group 5A.*

Hartsells fine sandy loam, shallow, 6 to 10 percent slopes, eroded (HsC2).—This soil is less strongly sloping than Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded. In some areas the surface layer is very dark grayish brown. In the more severely eroded areas, most of the original surface soil has been lost and the surface layer is grayish-brown to light yellowish-brown fine sandy loam or loam.

Most of the acreage of this soil has been cleared and cropped. Small areas are idle or are in pasture, and some are reverting to forest, mainly to loblolly pine. Because the hazard of erosion is moderate to severe, this soil is not well suited to cultivation. Its best uses are pasture and woods. *Capability unit IVe–9; woodland suitability group 5A.*

Hartsells fine sandy loam, shallow, 10 to 15 percent slopes (HsD).—The surface layer of this soil is 2 to 4 inches thicker than that of Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded, and the content of organic matter is slightly higher.

Most of this soil has not been cleared. It is not suited to cultivation and should remain in oak, hickory, and pine forest. *Capability unit VIe–4; woodland suitability group 5A.*

Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, severely eroded (HsD3).—The surface layer of this soil is grayish-brown to yellowish-brown fine sandy loam or loam, 3 to 5 inches thick. Erosion has removed all or nearly all of the original surface soil. Shallow rills and gullies are common, and in places, deep gullies have formed.

All of this soil has been cleared and cropped. Some areas are now idle, and some are in pasture. Much of the acreage, however, is reverting to woodland, mainly to loblolly and shortleaf pine, and is best suited to that use. *Capability unit VIIe–2; woodland suitability group 5B.*

Jefferson Series

The Jefferson series consists of moderately deep to deep, well-drained, gently sloping to strongly sloping soils on foot slopes. Dominant slopes range from 6 to 10 percent. These soils formed in old local alluvium that washed or sloughed from soils underlain mainly by sandstone but partly by shale.

In most places, the surface layer of these soils is yellowish-brown fine sandy loam and the subsoil is yellowish-brown to strong-brown fine sandy clay loam.

In this county, Jefferson soils are in a small total acreage and are mostly in the western part. They are widely scattered and are in patches that vary in size from 4 to 15 acres. They adjoin the Muse, Albertville, and Pottsville soils but are coarser textured than those soils. The Jefferson soils are lighter colored in the subsoil than the Muse soils and are deeper than the Pottsville soils.

The Jefferson soils are low in natural fertility and in organic matter. They are strongly acid to very strongly acid. Infiltration of water is medium, permeability in the subsoil is moderate, and the moisture-supplying capacity is moderate. These soils are in good tilth, but the hazard of erosion is moderate to severe.

The native vegetation consists of oak, hickory, and pine. Most of the acreage is wooded, and many areas that have been cleared are reverting to loblolly pine. The Jefferson soils in gently sloping areas have a wide range of suitability and respond well to management.

Jefferson fine sandy loam, 6 to 10 percent slopes, eroded (JeC2).—This is a moderately deep to deep, well-drained, medium-textured soil. It developed in old local alluvium on foot slopes.

Profile in a moist, wooded area that was formerly cultivated, 4.5 miles west of Hanceville (NW¼NE¼ sec. 28, T. 11 S., R. 3 W):

A_p 0 to 6 inches, yellowish-brown (10YR 5/4–5/6) fine sandy loam; weak, fine, granular structure; very friable; few fragments of sandstone, ⅛ to ¼ inch in diameter; many fine roots; very strongly acid; abrupt, smooth boundary. 4 to 10 inches thick.

A_3 6 to 12 inches, yellowish-brown (10YR 5/4) to dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular and subangular blocky structure; very friable; few fragments of sandstone, ⅛ to ¼ inch in diameter; many fine roots; strongly acid; abrupt, smooth boundary. 4 to 8 inches thick.

B_1 12 to 23 inches, yellowish-brown (10YR 5/8) light fine sandy clay loam or loam; friable; few concretions of sandstone and manganese, ⅛ to ¼ inch in diameter; many fine roots; very strongly acid; clear, wavy boundary. 6 to 15 inches thick.

B_2 23 to 33 inches, strong-brown (7.5YR 5/6–5/8) fine sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; few to many fragments of sandstone, ⅛ to ¼ inch in diameter; few fine roots; very strongly acid; clear, wavy boundary. 6 to 15 inches thick.

B_3 33 to 42 inches, mottled pale-yellow (2.5Y 7/4), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/6) light fine sandy clay loam; moderate, medium, subangular blocky structure; friable.

In most places, the surface soil is yellowish-brown to dark yellowish-brown fine sandy loam. The subsoil generally ranges from yellowish brown to strong brown.

Included with this soil are areas with a surface soil of grayish-brown to dark grayish-brown sandy loam and loam. Also included are some gravelly areas and small areas that have a yellowish-red to red subsoil.

This soil is low in natural fertility and contains little organic matter. It is strongly acid to very strongly acid. Surface runoff is medium, permeability in the subsoil is moderate, and the moisture-supplying capacity is moderate. This soil is in good tilth and responds well to management, but the hazard of erosion is moderate. *Capability unit IIIe–2; woodland suitability group 5A.*

Jefferson fine sandy loam, 2 to 6 percent slopes, eroded (JeB2).—This soil is less strongly sloping than Jefferson fine sandy loam, 6 to 10 percent slopes, eroded.

Most of this soil has been cleared and is cultivated. Some areas are in pasture, and some are reverting to trees, mainly to loblolly pine. The soil is suited to intensive cultivation because it has gentle slopes, a fairly thick root zone, and moderate moisture-supplying capacity. It is in good tilth. The hazard of erosion, however, is moderate. *Capability unit IIe–2; woodland suitability group 5A.*

Jefferson fine sandy loam, 10 to 15 percent slopes, eroded (JeD2).—This soil is more strongly sloping than Jefferson fine sandy loam, 6 to 10 percent slopes, eroded. Surface runoff is medium to rapid, and the hazard of erosion is severe.

Most of this soil has been cleared and cultivated, but many of the cleared areas have reverted to fair to good stands of loblolly pine. A few small areas are idle or are in pasture. This soil is best suited to pasture or trees, but it can be cultivated at long intervals if it is carefully managed. *Capability unit IVe–2; woodland suitability group 5A.*

Johnsburg Series

The Johnsburg series consists of moderately deep, somewhat poorly drained soils with a fragipan. These soils are on very gentle slopes and in low saddles or divides as well as in nearly level areas around the heads of drains. In most places they formed in material weathered from interbedded layers of sandstone and shale, but in some places they formed in material washed or sloughed from soils underlain by sandstone and shale.

In most places, the Johnsburg soils have a brown to light yellowish-brown loam surface soil and a yellowish-brown loam to silty clay loam subsoil. The subsoil is prominently mottled with gray and brown. The fragipan is in the lower part of the subsoil.

In this county, these soils are in small, scattered areas in the uplands, mainly in the central and western parts. Few areas are larger than 3 acres. They are in narrow bands or strips that are generally bordered by Tilsit, Hartsells, and Albertville soils on one side and, on the other side, by the local alluvium phases of the Philo, Stendal, and Atkins soils. Johnsburg soils are more poorly drained than the Tilsit, Hartsells, Albertville, and Philo soils but are better drained than the Atkins soils and are about equal in drainage to the Stendal soils. They generally are finer textured than the Philo, Stendal, and Atkins soils, which do not have a well-developed B horizon.

The Johnsburg soils are low in natural fertility and in organic matter. They are medium acid to very strongly acid. Surface runoff is slow, infiltration of water is medium, and permeability in the subsoil is moderate to slow. These soils are generally low in productivity, but they respond well to management.

The native vegetation is oak, hickory, gum, maple, and poplar. About two-thirds of the acreage has been cleared and is mostly in pasture. A small acreage is cultivated.

Only one soil in the Johnsburg series is mapped in Cullman County.

Johnsburg loam (0 to 2 percent slopes) (Jo).—This is a moderately deep, somewhat poorly drained soil. It developed on nearly flat uplands in material weathered from interbedded sandstone and shale.

Profile in a moist pasture 2.0 miles north of Cullman and slightly east of the Louisville and Nashville Railroad (SE¼NE¼ sec. 4, T. 10 S., R. 3 W.):

A_1 0 to 2 inches, very dark gray (2.5Y N 3/0) loam; weak, fine, granular structure; friable; many fine roots; strongly acid; clear, wavy boundary. 0 to 4 inches thick.

A_2 2 to 8 inches, mottled light yellowish-brown (2.5Y 6/4) and light olive-brown (2.5Y 5/4) loam; mottles are common, fine, and faint; weak, fine to medium, subangular blocky and weak, fine, granular structure; friable; few fine roots; very strongly acid; gradual, wavy boundary. 4 to 8 inches thick.

B_{21} 8 to 16 inches, mottled pale-yellow (2.5Y 7/4) and light yellowish-brown (2.5Y 6/4) loam; mottles are many, fine, and faint; weak to moderate, fine to medium, subangular blocky structure; friable; few fine roots; few small, partly weathered fragments of sandstone, ⅛ to ¼ inch in diameter; very strongly acid; gradual, wavy boundary. 6 to 12 inches thick.

B_{22} 16 to 22 inches, mottled light brownish-gray (2.5Y 6/2), pale-yellow (2.5Y 7/4), brownish-yellow (10YR 6/6), and reddish-yellow (7.5YR 6/6) light clay loam; mottles are many, medium, and faint; weak to moderate, medium, subangular blocky structure; friable;

few small, partly weathered fragments of sandstone, ¼ to ½ inch in diameter; strongly acid; gradual, wavy boundary. 4 to 10 inches thick.

B_{3m} 22 to 33 inches, mottled light yellowish-brown (2.5Y 6/4) to pale-yellow (2.5Y 7/4), yellowish-brown (10YR 5/6), strong-brown (7.5YR 5/6), and light-gray (2.5Y 7/2) clay loam; mottles are many, medium, and distinct; compact in place; moderate, medium, subangular blocky structure; friable; many small, partly weathered fragments of sandstone and shale, ¼ to ½ inch in diameter; strongly acid; gradual, wavy boundary. 6 to 15 inches thick.

C_g 33 to 57 inches, gray (10YR 6/1) silty clay loam mottled with yellowish brown (10YR 5/8) and pale yellow (2.5Y 8/4); moderate to strong, medium to coarse, subangular and angular blocky structure; friable; many small fragments of sandstone and shale, ¼ to ½ inch in diameter; medium acid; 20 to 30 inches thick.

D_r 57 inches, bedrock of sandstone and shale.

The surface soil ranges from pale brown to pale yellow. In wooded areas, it is dark gray to dark grayish brown and is about 3 inches thick. The subsoil ranges in texture from loam to silty clay loam. Its mottles vary in size, abundance, and contrast. In places, the fragipan is 24 to 30 inches below the surface. The depth to bedrock ranges from 30 to 60 inches. Included with this soil are some areas that have a fine sandy loam and silt loam surface soil.

This soil is low in natural fertility and in organic matter. It has slow surface runoff, medium infiltration of water, and moderate to slow permeability. The moisture-supplying capacity ranges from high in wet periods when the soil is saturated to moderately low during droughts. This soil is best suited to pasture and trees. *Capability unit IIIw–3; woodland suitability group 2B.*

Leadvale Series

The Leadvale series consists of moderately deep, moderately well drained, gently sloping soils with a fragipan. These soils developed in old local alluvium and colluvium. The parent materials washed from soils that formed in material weathered mostly from shale but partly from sandstone.

In most places, the Leadvale soils have a dark-brown to light yellowish-brown loam surface soil and a light olive-brown to strong-brown loam to silty clay loam subsoil. The depth to the fragipan ranges from 16 to 30 inches. This layer normally contains many concretions of iron and manganese.

In this county, most of the Leadvale soils are in the southwestern and western parts, in patches 1 to 10 acres in size. They adjoin the Johnsburg, Muse, and Pottsville soils. They are more similar to the Johnsburg soils than to the Muse and Pottsville soils but are better drained than the Johnsburg soils. They are at lower elevations, are not so well drained, and are less red than the Muse soils. The Leadvale soils are deeper than the Pottsville soils, but unlike those soils, they have a well-defined B horizon.

The Leadvale soils are low in natural fertility and contain little organic matter. They are medium acid to very strongly acid. Surface runoff is medium to slow, and infiltration of water is medium. Permeability in the subsoil is moderate above the fragipan; in the pan, it is slow. The moisture-supplying capacity is moderate. Most areas are in good tilth, but the hazard of erosion is moderate.

The natural vegetation is oak, hickory, gum, and poplar. Much of the acreage of these soils has been cleared and is in crops, a use to which it is well suited. Some areas are reverting to trees, mainly to loblolly pine. The Leadvale soils respond well to management.

Leadvale loam, 2 to 6 percent slopes, eroded (LeB2).—This is a moderately deep, moderately well drained soil. It developed on foot slopes in old local alluvium that washed from soils formed in material weathered mostly from shale but partly from sandstone.

Profile in a moist, cultivated area 1.0 mile east of Trimble (SE¼SW¼ sec. 11, T. 11 S., R. 4 W.):

A_p 0 to 5 inches, light olive-brown (2.5Y 5/4) loam; weak, fine, granular structure; very friable; many fine roots; medium acid; abrupt, smooth boundary. 4 to 8 inches thick.

B_2 5 to 22 inches, light olive-brown (2.5Y 5/6) silt loam; weak to moderate, fine and medium, subangular blocky structure; friable; few fine roots; few fragments of sandstone and shale, ¼ to ½ inch in diameter; very strongly acid; clear, wavy boundary. 16 to 24 inches thick.

B_{3m} 22 to 30 inches +, mottled strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), light yellowish-brown (2.5Y 6/4), and light-gray (10YR 7/1) silt loam; mottles are common, fine, and distinct; moderate, medium, subangular blocky structure; friable if disturbed, but compact in place; few clay skins on some peds; very strongly acid.

The surface soil is brown or dark-brown to light olive-brown or light yellowish-brown loam. The subsoil ranges from silt loam to silty clay loam or fine sandy clay loam in texture and from light yellowish brown to strong brown in color. In places, the lower part of the B_2 horizon is faintly mottled with pale brown, pale yellow, or yellowish brown. Included with this soil are some areas that have a silt loam and fine sandy loam surface soil.

Fragments of shale and sandstone, ¼ to 1 inch in diameter, and concretions of manganese and iron are common in these soils and, in many places, make up more than half of the B_{3m} horizon. The depth to the fragipan is 18 to 26 inches. This layer is generally 3 to 4 feet thick, very compact in place, and distinctly to prominently mottled.

This soil is low in natural fertility and in organic matter. It is medium acid to very strongly acid. Surface runoff and infiltration of water are medium. Permeability in the subsoil is moderate above the fragipan but is slow within this layer.

Most of this soil is in cultivated crops or pasture, but a few areas are idle or are in trees. *Capability unit IIe–5; woodland suitability group 3B.*

Leadvale loam, 2 to 6 percent slopes (LeB).—This soil is deeper to parent material than Leadvale loam, 2 to 6 percent slopes, eroded. Also, its surface layer is 2 to 4 inches thicker than the surface layer in that soil.

Much of this soil has been cleared and cropped. Some is in pasture, and some is idle. This soil is suited to intensive cultivation because it has gentle slopes, a moderately thick root zone, and moderate moisture-supplying capacity. It is in good tilth, but the hazard of erosion is moderate. *Capability unit IIe–5; woodland suitability group 3B.*

Linker Series

The Linker series consists of moderately deep to deep, well-drained, gently sloping to strongly sloping soils.

Slopes of 6 to 10 percent are dominant. These soils developed in residuum weathered mostly from sandstone but partly from interbedded shale.

In most places, the surface layer of these soils is dark grayish-brown to yellowish-brown fine sandy loam. The subsoil is yellowish-red to dark-red clay loam to fine sandy clay loam.

In this county, the Linker soils are widely distributed in a large total acreage. Most of the acreage is in the western half of the county. In most places, Linker soils adjoin the Hartsells and Tilsit soils; in some places, they adjoin the Enders and Hanceville soils. The Linker soils are redder in the subsoil than the Hartsells and the Tilsit soils and lack the fragipan formed in the Tilsit soils. Linker soils have a coarser textured subsoil than the Enders soils and a lighter colored surface layer than the Hanceville soils.

The Linker soils are low in natural fertility and in organic matter. They are medium acid to strongly acid. Infiltration of water is medium to slow, and permeability in the subsoil is moderate. Except in severely eroded areas, these soils are in good tilth, but the hazard of erosion is moderate to severe.

The native vegetation consists of oak, pine, and hickory, but much of the acreage is being reforested to loblolly pine. The uneroded, gently sloping Linker soils are among the best soils in the county for intensive cropping. Corn, cotton, truck crops, hay, and pasture are well suited. Response to management is good.

Linker fine sandy loam, 2 to 6 percent slopes (LkB).—This is a moderately deep, well-drained soil. It developed in residuum weathered mostly from sandstone but partly from interbedded shale.

Profile in a moist, wooded area 2 miles west of Arkadelphia (NE¼SE¼ sec. 19, T. 13 S., R. 4 W.):

- A_1 0 to 2 inches, very dark gray (10YR 3/1) fine sandy loam; weak, fine, granular structure; very friable; contains many fine roots and much organic matter; medium acid; clear, wavy boundary. 2 to 5 inches thick.
- A_2 2 to 8 inches, yellowish-brown (10YR 5/4) loam; weak, fine, granular and subangular blocky structure; friable; many fine roots; strongly acid; clear, wavy boundary. 4 to 8 inches thick.
- A_3 8 to 14 inches, strong-brown (7.5YR 5/6) loam; weak, fine and medium, subangular blocky structure; friable; many fine roots; few fragments of sandstone, ⅛ to ¼ inch in diameter; small pores common; strongly acid; clear, wavy boundary. 2 to 8 inches thick.
- B_1 14 to 19 inches, red (2.5YR 4/6) fine sandy clay loam; weak, fine to medium, subangular blocky structure; friable; few fine roots and small pores; medium acid; clear, wavy boundary. 4 to 8 inches thick.
- B_2 19 to 32 inches, dark-red (2.5YR 3/6) clay loam; moderate, fine and medium, angular and subangular blocky structure; friable; few fine roots; a few fragments of sandstone, 1/16 to ⅛ inch in diameter; medium acid; clear, wavy boundary. 10 to 20 inches thick.
- C 32 to 60 inches +, dark-red (2.5YR 3/6) to red (2.5YR 4/6) clay loam with mottles of yellowish brown (10YR 5/4) and light brownish gray (2.5Y 6/2); strong, medium to coarse, angular blocky structure; very compact in place; friable.

The A_1 horizon of this soil ranges from very dark gray to grayish brown and dark grayish brown; the A_2, from yellowish brown to light yellowish brown; and the A_3, from strong brown to yellowish brown. The texture of the A_2 and A_3 horizons is loam to fine sandy loam. The B_1 horizon is strong brown to red in color and heavy loam to fine sandy clay loam in texture. The B_2 horizon is yellowish-red to dark-red loam to clay loam. In most places, the depth to the parent material is 24 to 36 inches or more. Small fragments of sandstone and shale are common on and in the soil, but they are abundant in only a few isolated areas. Included with this soil are small areas that have a loam and sandy loam surface soil.

This soil is low in natural fertility and in organic matter. It is medium acid to strongly acid. Surface runoff is medium, permeability in the subsoil is moderate, and the hazard of erosion is moderate. The moisture-supplying capacity is moderate to high. This soil is in good tilth and responds well to management. It is well suited to intensive cultivation. *Capability unit IIe–2; woodland suitability group 5A.*

Linker fine sandy loam, 2 to 6 percent slopes, eroded (LkB2).—This soil is thinner and lighter colored in the surface layer than Linker fine sandy loam, 2 to 6 percent slopes. Its plow layer is brown to light yellowish-brown fine sandy loam, 5 to 7 inches thick. The subsoil is yellowish-red to dark-red clay loam to fine sandy clay loam.

Most of this soil has been cleared and is in crops. It is suited to intensive cultivation because it is in good tilth and has gentle slopes, a fairly thick root zone, and moderate moisture-supplying capacity. The hazard of erosion, however, is moderate. *Capability unit IIe–2; woodland suitability group 5A.*

Linker fine sandy loam, 6 to 10 percent slopes (LkC).—In most places, this soil is less deep to the parent material than Linker fine sandy loam, 2 to 6 percent slopes. Surface runoff is medium, the hazard of erosion is moderate to severe, and the moisture-supplying capacity is moderate to high.

Most of this soil has not been cleared and is in mixed forest of oak, hickory, and pine. This soil is suited to moderately intensive cultivation. *Capability unit IIIe–2; woodland suitability group 5A.*

Linker fine sandy loam, 6 to 10 percent slopes, eroded (LkC2).—In most places, the surface layer of this soil ranges from grayish brown or brown to yellowish brown. The surface layer is 2 to 4 inches thinner than that of Linker fine sandy loam, 2 to 6 percent slopes. Surface runoff is medium, and the hazard of erosion is moderate to severe. The moisture-supplying capacity is moderate to high.

Most of this soil has been cleared and is used for crops. Small areas are being reforested to loblolly pine; other areas are in pasture or are idle. This soil is suited to moderately intensive cultivatioin. *Capability unit IIIe–2; woodland suitability group 5A.*

Linker fine sandy loam, 6 to 10 percent slopes, severely eroded (LkC3).—This soil has lost all or nearly all of its original surface soil through erosion. In most places, the plow layer is yellowish-brown fine sandy loam to loam, 3 to 5 inches thick. In the more sloping areas, the yellowish-red to red clay loam subsoil is exposed. Shallow rills and gullies are common in places, and a few deep gullies have formed. This soil has medium to rapid surface runoff and medium to slow infiltration of water. The moisture-supplying capacity is moderate, and the hazard of erosion is severe. Tilth is only fair.

All of this soil has been cleared and cropped. Much of it, however, is reverting to trees, mainly to loblolly pine. Some areas are in pasture, and some are idle. This soil is best suited to sod crops, but a few areas can be cul-

tivated. *Capability unit IVe–2; woodland suitability group 7.*

Linker fine sandy loam, 10 to 15 percent slopes (LkD).—In most places, this soil is less deep to the parent material than Linker fine sandy loam, 2 to 6 percent slopes. Surface runoff is medium to rapid, the moisture-supplying capacity is moderate, and the hazard of erosion is moderate to severe.

The native vegetation on this soil is oak, hickory, and pine forest. Most of the soil has not been cleared. *Capability unit IVe–2; woodland suitability group 5A.*

Linker fine sandy loam, 10 to 15 percent slopes, eroded (LkD2).—This soil is 2 to 4 inches thinner in the surface layer than Linker fine sandy loam, 2 to 6 percent slopes. Also, it is less deep to the parent material. In most places, the surface layer ranges from grayish brown or brown to yellowish brown. Surface runoff is medium to rapid, the moisture-supplying capacity is moderate, and the hazard of erosion is severe.

Most of this soil has been cleared and cropped. Some areas, however, are reverting to trees, mainly to loblolly pine. *Capability unit IVe–2; woodland suitability group 5A.*

Linker fine sandy loam, 10 to 15 percent slopes, severely eroded (LkD3).—This soil has lost all or nearly all of its original surface soil through erosion. In most places, it is less deep to the parent material than Linker fine sandy loam, 2 to 6 percent slopes. The plow layer, in most places, is yellowish-brown fine sandy loam to loam, 3 to 5 inches thick. Shallow rills and gullies are common, and in a few places, deep gullies have formed.

Surface runoff is medium to rapid, and infiltration of water is medium to slow. The moisture-supplying capacity is moderate. Tilth is fair, and the hazard of erosion is severe.

All of this soil has been cleared and cropped. Most of it, however, is reverting to trees, mainly to loblolly pine. This soil is poorly suited to cultivation; its best uses are for sod crops or woods. *Capability unit VIe–2; woodland suitability group 7.*

Made Land

This miscellaneous land type consists of areas in which the soil profiles have been destroyed or so altered by earthmoving equipment that they are no longer arable. The land has been excavated and filled for commercial, residential, or other sites.

Made land (Ma).—In this county, Made land is mostly in small areas near Cullman. The soil material in these areas is a mixture of surface soil, subsoil, and bedrock. This land varies greatly in its suitability for plants and in its management needs. *Capability unit VIIe–1; woodland suitability group 8.*

Mine Pits and Dumps

This miscellaneous land type consists of areas that have been strip mined for coal. The material on the surface in these areas is a mixture of soil material, shale, and sandstone.

Mine pits and dumps (Md).—Most of this land is in the southwestern part of the county in steep, uneven piles of soil material next to deep cuts. Deep channels or unfilled cuts remain where seams of coal have been removed through strip mining.

Revegetation is difficult on this land because of the steep, uneven placement of the soil material. The hazard of erosion is severe, and the moisture-supplying capacity is poor. This land is not suited to any agricultural use. *Capability unit VIIe–1; woodland suitability group 8.*

Monongahela Series

The Monongahela series consists of moderately deep, moderately well drained soils with a fragipan. These soils are on nearly level to gently sloping low stream terraces. They formed in material washed from the Hartsells, Tilsit, Linker, Albertville, Enders, Pottsville, Muskingum, and other soils that are underlain by sandstone and shale.

Monongahela soils generally have a surface soil of light olive-brown or light yellowish-brown to very dark grayish-brown fine sandy loam. The subsoil is brownish-yellow clay loam or fine sandy clay loam. The fragipan is distinctly to prominently mottled and begins at a depth ranging from 16 to 24 inches.

In this county, the Monongahela soils are mainly in the southern part. In most places they adjoin the somewhat poorly drained Tyler soils and the poorly drained Purdy soils.

The Monongahela soils are low in natural fertility and contain little organic matter. They are strongly acid to very strongly acid. Surface runoff is slow to medium, infiltration of water is medium, and permeability in the subsoil is moderate above the fragipan. The moisture-supplying capacity is moderate. Because slopes are gentle, the erosion hazard is slight to moderate. Most of these soils are in good tilth.

The native vegetation consists of oak, hickory, poplar, gum, and pine. Most of the acreage, however, has been cleared. These are good agricultural soils that are suited to a wide range of crops. They respond well to management.

Monongahela fine sandy loam, 2 to 6 percent slopes (MoB).—This is a moderately well drained, moderately deep, medium-textured soil on a low stream terrace. The lower part of the profile is a fragipan.

Profile in a moist, cultivated field 1.5 miles west of Hanceville (SW¼NE¼ sec. 30, T. 11 S., R. 2 W.):

A_p 0 to 7 inches, light olive-brown (2.5Y 5/4) to light yellowish-brown (2.5Y 6/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fragments of sandstone, ⅛ to ¼ inch in diameter; strongly acid; clear, smooth boundary. 5 to 8 inches thick.

B_2 7 to 18 inches, brownish-yellow (10YR 6/6) clay loam; moderate, fine and medium, subangular blocky structure; friable; few fine roots; few fragments of sandstone, ⅛ to ¼ inch in diameter; very strongly acid; clear, wavy boundary. 10 to 18 inches thick.

B_{3m} 18 to 26 inches +, mottled yellowish-brown (10YR 5/6), pale-brown (10YR 6/3), and light-gray (10YR 7/1) clay loam; moderate, fine and medium, subangular blocky structure; compact in place, friable when disturbed; very strongly acid.

The depth to bedrock ranges from about 50 to 90 inches. A few small fragments of sandstone and shale, ⅛ to ½ inch in diameter, are common on the surface and in the soil. In some sloping areas, the surface soil is brown to dark brown and the subsoil is strong brown. The subsoil

Figure 5.—**Corn on Monongahela fine sandy loam, 2 to 6 percent slopes. The normal yield to be expected is between 65 and 70 bushels per acre.**

ranges from clay loam to fine sandy clay loam and loam in texture. Included with this soil are some areas that have a loam surface soil.

This soil is low in natural fertility and in organic matter. It is strongly acid to very strongly acid. Surface runoff is slow to medium, infiltration of water is medium, and permeability in the subsoil is moderate above the fragipan. The moisture-supplying capacity is moderate. This soil is in good tilth and responds well to management. The hazard of erosion, however, is moderate.

Almost all of this soil is in crops and is well suited to intensive cultivation (fig. 5). *Capability unit IIe–5; woodland suitability group 3B.*

Monongahela fine sandy loam, 0 to 2 percent slopes (MoA).—This soil is 2 to 4 inches thicker in the surface layer than Monongahela fine sandy loam, 2 to 6 percent slopes. It is also deeper to parent material than that soil. Surface runoff is slow, and infiltration of water is medium. This soil is somewhat cold early in spring and is somewhat droughty when rainfall is scarce.

Much of this soil has been cleared and is used mostly for corn, hay, and pasture. *Capability unit IIw–2; woodland suitability group 3B.*

Muse Series

The Muse series consists of moderately deep to deep, well-drained, gently sloping to strongly sloping soils on foot slopes. Slopes of 6 to 10 percent are dominant. These soils formed in old local alluvium that washed or sloughed from soils developed in material weathered mostly from acid shale but partly from sandstone.

In most places, the surface layer of the Muse soils is dark grayish-brown to dark-brown shaly silt loam or shaly loam. The subsoil is strong-brown to yellowish-red silty clay loam to silty clay.

In this county, Muse soils are mainly in the southwestern and western parts. They are inextensive and are generally in patches 3 to 15 acres in size. They adjoin the Pottsville, Leadvale, Albertville, and Enders soils. The Muse soils are redder and deeper than the Pottsville and Leadvale soils. A fragipan has not formed as it has in the Leadvale soils. Muse soils are similar to the Albertville and Enders soils, which developed in residuum instead of in old alluvium.

The Muse soils are low in natural fertility and in organic matter. They are medium acid to very strongly acid. Surface runoff is medium to rapid, infiltration of water is medium, and permeability in the subsoil is moderate to slow. The moisture-supplying capacity is moderate to moderately high. The hazard of erosion is moderate to severe.

The native vegetation is mostly loblolly pine, but oak, hickory, sassafras, persimmon, and dogwood grow in places. Most of the acreage of these soils is in trees. The gently sloping areas, however, are suited to crops.

Muse shaly silt loam, 10 to 15 percent slopes, eroded (MsD2).—This is a moderately deep to deep, well-drained soil. It developed in old local alluvium on foot slopes in the shale hill areas.

Profile in a moist, wooded area 0.75 mile southwest of Good Hope School (NE¼NE¼ sec. 18, T. 11 S., R. 3 W.):

- A_p 0 to 5 inches, dark grayish-brown (10YR 4/2) shaly silt loam; weak, fine, granular structure; very friable; many small fragments of sandstone and sandy shale, ⅛ to ¼ inch in diameter; many fine and medium roots; medium acid; clear, smooth boundary. 4 to 6 inches thick.
- B_1 5 to 11 inches, yellowish-brown (10YR 5/4) to dark yellowish-brown (10YR 4/4) loam; weak, fine, granular to weak, fine, subangular blocky structure; friable; common small fragments of sandstone and sandy shale, ⅛ to ¼ inch in diameter; many fine roots; strongly acid; clear, wavy boundary. 5 to 7 inches thick.
- B_{21} 11 to 25 inches, strong-brown (7.5YR 5/6) to yellowish-red (5YR 5/8) heavy loam; weak, fine and medium, subangular blocky structure; friable; small roots common; few small pores; strongly acid; gradual, wavy boundary. 12 to 16 inches thick.
- B_{22} 25 to 35 inches, yellowish-red (5YR 5/6) silty clay loam with a few streaks or splotches of yellowish brown (10YR 5/6); moderate, fine and medium, subangular blocky structure; friable to firm; common small fragments of sandstone and sandy shale, ⅛ to ½ inch in diameter; few clay films on some ped surfaces; very strongly acid; gradual, wavy boundary. 8 to 12 inches thick.
- B_3 or C 35 to 60 inches +, yellowish-red (5YR 5/6) to red (2.5YR 5/6) silty clay loam mottled with yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and gray (10YR 5/1); mottles are many, fine, and distinct; massive (structureless); firm; few fine roots; many small, angular and broken fragments of sandstone and shale, as much as ½ inch in diameter, that increase in quantity with increasing depth; very strongly acid.

The B_1 horizon ranges from yellowish brown to strong brown in color, and from loam to silt loam in texture. In places, it may be thin or lacking. The B_2 horizon ranges from strong brown to yellowish red.

Included with this soil are areas that have a shaly loam or very fine sandy loam surface soil. In other areas, the depth to parent material averages only about 18 inches.

This soil is low in natural fertility and in organic matter. It is medium acid to very strongly acid. Rapid surface runoff causes severe erosion in places. The permeability is moderate to slow, and the moisture-supplying capacity is moderate.

Most of this soil is in woods, consisting mainly of loblolly pine. This soil is not suited to frequent cultivation, be-

cause slopes are strong and erosion is a hazard. *Capability unit IVe–7; woodland suitability group 3A.*

Muse shaly silt loam, 2 to 6 percent slopes, eroded (MsB2).—The surface layer of this soil is slightly thicker than that of Muse shaly silt loam, 10 to 15 percent slopes, eroded. Surface runoff is medium, and the hazard of erosion is moderate.

Most of this soil is in cultivated crops, mainly cotton and corn. The soil is suited to frequent cultivation and a wide variety of crops because it has a fairly thick root zone, gentle slopes, and a moderately high moisture-supplying capacity. It is in good tilth. *Capability unit IIe–7; woodland suitability group 3A.*

Muse shaly silt loam, 6 to 10 percent slopes, eroded (MsC2).—This soil is less strongly sloping than Muse shaly silt loam, 10 to 15 percent slopes, eroded. Surface runoff is medium to rapid, and the hazard of erosion is moderate to severe. The moisture-supplying capacity is moderate.

This soil has about equal acreages in woods, pasture, and cultivated crops. It is suited to cultivation, but because of its moderate to severe erosion hazard, good management is needed. *Capability unit IIIe–7; woodland suitability group 3A.*

Muskingum Series

The Muskingum series consists of shallow and very shallow, excessively drained, strongly sloping to steep soils. These soils formed in residuum weathered mainly from sandstone but partly from shale.

In most places, the surface layer of these soils is very dark gray to very dark grayish-brown, stony fine sandy loam and the thin subsurface layer is yellowish-brown stony fine sandy loam. Angular and broken, loose fragments of sandstone, 10 to 15 inches in diameter, are common on the surface and in these soils. In places, sandstone boulders and rock outcrops also occur.

The Muskingum soils are widely distributed in this county. They adjoin the Hartsells, Linker, Albertville, and Pottsville soils but are coarser textured than those soils. They are shallower than the Hartsells, Linker, and Albertville soils.

The Muskingum soils are low in natural fertility and in organic matter. They are strongly acid. Surface runoff is medium to rapid, infiltration of water is medium, and permeability is rapid. The moisture-supplying capacity is low. The hazard of erosion is moderate to severe.

The native vegetation is mainly oak, hickory, sassafras, dogwood, and pine. Most of the acreage of these soils is wooded and should be left in trees. Pine is very well suited. These soils are not generally suitable for cultivation.

Muskingum stony fine sandy loam, 15 to 45 percent slopes (MuE).—This is a shallow to very shallow, excessively drained soil. It developed in residuum weathered mainly from sandstone but partly from shale.

Profile in a moist, wooded area 4 miles south of Joppa (SW¼NW¼ sec. 21, T. 9 S., R. 1 E.):

A_1 0 to 2 inches, very dark gray (10YR 3/1) stony fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, wavy boundary. 1 to 3 inches thick.

A_2 2 to 8 inches, grayish-brown (10YR 5/2) to dark grayish-brown (10YR 4/2) stony fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, wavy boundary. 4 to 6 inches thick.

BC 8 to 12 inches, yellowish-brown (10YR 5/6) stony fine sandy loam; weak, fine, granular and some weak, fine, subangular blocky structure; friable; strongly acid; 4 to 10 inches thick.

D_r 12 inches, partly weathered sandstone.

The depth to bedrock ranges from 10 to 18 inches or more. The surface soil is very dark gray to yellowish brown. The subsurface layer ranges from fine sandy loam to loam in texture and from yellowish brown to strong brown in color. Various amounts and sizes of stone fragments are on and in most of this soil, but a few areas are free of stones.

Included with this soil in some broken and steep areas in the southwestern part of the county are areas of Pottsville soils. In these places, Pottsville and Muskingum soils are so intricately associated that it was not practical to map them separately.

This soil is low in natural fertility and in organic matter. It is strongly acid. Surface runoff is medium to rapid, infiltration of water is medium, and the permeability is rapid. The moisture-supplying capacity is low, and the hazard of erosion is severe.

Because it is steep, stony, and shallow, this soil is not suitable for cultivation. Its best use is trees. *Capability unit VIIe–2; woodland suitability group 4A.*

Muskingum stony fine sandy loam, 10 to 15 percent slopes (MuD).—This soil is less stony and less steep than Muskingum stony fine sandy loam, 15 to 45 percent slopes. Some areas contain very few stones. Surface runoff is medium, and the hazard of erosion is moderate to severe.

This soil is not suited to cultivation, but the less sloping areas and those free of stones can be used for pasture and hay crops. About two-thirds of the soil has been cleared and is used for crops and pasture. Much of it, however, is reverting to loblolly pine, which is its best use. *Capability unit VIe–4; woodland suitability group 4A.*

Philo Series

The Philo series consists of deep, moderately well drained, level or nearly level soils. These soils are developing in general alluvium on the flood plains along the large streams of the county. The alluvium washed from the Hartsells, Linker, Tilsit, Albertville, Muskingum, Pottsville, and other soils that formed in material weathered from sandstone and shale.

In most places, the surface soil is brown to dark-brown or dark grayish-brown loam. This layer is underlain by brown to dark-brown loam that is mottled at a depth of 18 to 24 inches. Beds of waterworn gravel or sand extend from a depth of 40 to more than 60 inches.

In this county, Philo soils are mainly in the southwestern part. They are frequently flooded in winter and in spring. The Philo soils border the well-drained Pope soils on first bottoms and the well-drained Sequatchie soils on low stream terraces. They are finer textured, however, than those soils. In most places, they are at a lower elevation than the Sequatchie soils. They lack the well-defined B horizon that has formed in Sequatchie soils.

The Philo soils are naturally low in fertility, though stream deposits from overflows help to increase fertility. These soils are low to medium in organic matter and are medium acid to strongly acid. Surface runoff is slow, and

after a heavy rain or a flood, water stands on these soils for 1 to 5 days. Infiltration of water is medium, and permeability in the subsurface layers is moderate. The moisture-supplying capacity is high. These soils are in good tilth and respond well to management.

The native vegetation is mainly poplar, maple, water oak, gum, and willow. Most of the acreage, however, has been cleared and is in corn and pasture. These soils are among the best in the county for agriculture.

Philo loam (0 to 2 percent slopes) (Ph).—This is a deep, moderately well-drained soil. It occurs on flood plains along the large streams.

Profile in a moist pasture (SW¼SW¼ sec. 4, T. 13 S., R. 3 W.):

- A_p 0 to 6 inches, brown to dark-brown (10YR 4/3) loam; weak, fine, granular structure; friable; many fine roots; medium acid; gradual, smooth boundary. 4 to 8 inches thick.
- C_1 6 to 18 inches, brown to dark-brown (10YR 4/3) loam; weak, fine, granular and weak, fine, subangular blocky structure; friable; some thin lenses of sand and silt; many fine roots; strongly acid; gradual, smooth boundary. 10 to 18 inches thick.
- C_2 18 to 36 inches +, light brownish-gray (2.5Y 6/2) to grayish-brown (2.5Y 5/2) sandy loam; common, coarse, distinct mottles of brown to dark brown (7.5YR 4/4); massive (structureless); friable; few fine roots; common amount of concretions of manganese, ⅛ to ½ inch in diameter; strongly acid.

The C_1 horizon ranges from dark brown to yellowish brown in color and from loam or silt loam to fine sandy loam in texture. In most places, the C_2 horizon is mottled with brown, grayish brown, yellowish brown, and gray below a depth of 18 inches.

Near the heads of and along narrow drainageways, the texture of the C horizon is loam, silt loam, fine sandy loam, or sandy loam. The thickness of the alluvium in these areas generally ranges from 12 inches to 4 feet. The soil material contains thin lenses of silt and sand at variable depths and is underlain by water-laid strata of sandstone and shale fragments that vary from 1 to 6 inches in diameter.

Included with this soil in long, narrow draws and drainageways are areas that have many angular fragments of sandstone and sandy shale throughout the profile. These fragments are 1 to 4 inches in diameter and, in places, make up 50 to 75 percent of the soil. In other inclusions, the surface soil is silt loam and fine sandy loam. Also included are a few poorly drained areas. The poorly drained areas are normally in narrow strips or small pockets, and it is not practical to map them separately.

This soil is low in natural fertility, low to medium in organic matter, and medium acid to strongly acid. Surface runoff is slow. Infiltration of water is medium, and permeability in the subsurface layers is moderate. The moisture-supplying capacity is high.

This soil is well suited to intensive use because it is in good tilth and has a thick root zone and nearly level slopes. It responds well to management, but overflow is a hazard. *Capability unit IIIw–2; woodland suitability group 2A.*

Philo and Stendal soils, local alluvium (0 to 2 percent slopes) (Pm).—These soils occur together in swales, in depressions, and at the heads of and along narrow drainageways. They are so intermixed and their boundaries are so indistinct that it is not practical to map them separately on the soil map. These soils are widely distributed. They consist of recent local alluvium that has washed from adjacent higher lying areas that are underlain by sandstone and shale. The Philo soils are moderately well drained, whereas the Stendal soils are somewhat poorly drained.

Profile of a Philo soil in local alluvium in a moist, cultivated area 3.0 miles northeast of Cullman (NW¼ SE¼ sec. 1, T. 10 S., R. 3 W.):

- A_p 0 to 4 inches, dark-brown or brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; medium acid; abrupt, wavy boundary. 4 to 8 inches thick.
- C_1 4 to 14 inches, yellowish-brown (10YR 5/4–5/6) fine sandy loam with thin lenses of brown or dark-brown (10YR 4/3) fine sandy loam, ¼ to ¾ inch thick; weak, fine, granular structure; very friable; few fine roots; strongly acid; gradual, wavy boundary. 8 to 10 inches thick.
- C_2 14 to 24 inches, dark grayish-brown (10YR 4/2) to brown or dark-brown (10YR 4/3) fine sandy loam; few, fine, and faint mottles of light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4); weak, fine, granular structure; very friable; many angular fragments of sandstone and shale, ¼ to 1 inch in diameter; strongly acid; gradual, wavy boundary. 6 to 15 inches thick.
- C_3 24 to 32 inches +, brown or dark-brown (7.5YR 4/4) loam; weak, fine and medium, subangular blocky structure; friable.

The surface soil ranges from very dark grayish brown to light yellowish brown in color and from sandy loam to silt loam in texture. Fragments of sandstone and shale, ¼ to 1 inch in diameter, are common on the surface and in this soil. Lenses of silt and loamy sand are common at various depths. The depth of the profile ranges from 14 to 36 inches.

Profile of a Stendal soil in local alluvium in a moist, idle area 1.0 mile west of Logan (SE¼SE¼ sec 26, T. 10 S., R. 5 W.):

- A_p 0 to 5 inches, olive-brown (2.5Y 4/4) to light olive-brown (2.5Y 5/4) silt loam; weak, fine, granular and crumb structure; very friable; many fine roots; medium acid; abrupt, smooth boundary. 4 to 7 inches thick.
- C_1 5 to 15 inches, grayish-brown (2.5Y 5/2) silt loam mottled with dark grayish brown (2.5Y 4/2) and light yellowish brown (2.5Y 6/4); mottles are common, medium, and distinct; weak, fine, subangular blocky structure; very friable to friable; few fine roots; strongly acid; gradual, smooth boundary. 5 to 15 inches thick.
- C_2 15 inches +, light yellowish-brown (2.5Y 6/4) silt loam mottled with yellowish brown (10YR 5/4), strong brown (7.5YR 5/6), and light gray (10YR 7/2); mottles are many, fine, and faint; weak, fine, subangular blocky structure; friable; strongly acid.

The surface soil ranges from fine sandy loam to silt loam in texture and from dark grayish brown to olive brown and light yellowish brown in color. In many places, this layer is faintly mottled with yellow and brown. Lenses of loamy fine sand are common at various depths. The depth of the profile ranges from 14 to 48 inches.

Philo and Stendal soils, local alluvium, are medium to low in natural fertility, low to medium in organic matter, and medium acid to strongly acid. Infiltration of water is medium, and surface runoff is slow. Permeability in the subsurface layers is moderate to slow, and the moisture-supplying capacity is moderate to high. After heavy or prolonged rainfall, the water table is near the

surface and, in some areas, the soils are covered with water for several days. Seepage is a problem.

These soils are widely distributed in the county, and about half of the acreage is in crops or in pasture. Where adequately drained and protected from the runoff of adjacent higher areas, these soils are suited to moderately intensive use. *Capability unit IIIw-2; woodland suitability group 2A.*

Pope Series

The Pope series consists of deep, well-drained, level to nearly level soils. These soils are developing in general alluvium that washed mainly from soils on weathered sandstone and shale. Along the Mulberry Fork of the Black Warrior River, however, some of the alluvium washed from soils formed in weathered sediments of limestone.

In most places, the surface layer of the Pope soils is dark-brown to dark grayish-brown fine sandy loam. This layer is underlain by dark-brown fine sandy loam soil material. In many places, these soils are underlain by beds of waterworn gravel that extend from a depth of 40 to more than 60 inches.

In this county, Pope soils are on flood plains along the large streams, mainly in the southwestern part. They are flooded in winter and in spring. In most places, the Pope soils adjoin the moderately well drained Philo soils on first bottoms and the well drained Sequatchie soils on low stream terraces. They are generally coarser textured than the Sequatchie soils, and they lack the B horizon that has formed in those soils.

The Pope soils are low to medium in organic matter and are slightly acid to strongly acid. Sediments deposited in periodic flooding help to maintain medium fertility, but scouring action or prolonged flooding damages crops in some years.

The native vegetation is mainly maple, gum, poplar, water oak, sycamore, and pine. Most of the acreage of these soils, however, has been cleared and is in corn and pasture. Some of the soils are used for truck crops. These are among the best agricultural soils in the county. They are easily tilled and respond well to management, especially to fertilization.

Only one soil in the Pope series was mapped in Cullman County.

Pope fine sandy loam (0 to 2 percent slopes) (Po).—This is a deep, well-drained, friable, productive soil. It occurs on nearly level flood plains along the large streams.

Profile in a moist, cultivated area (SE¼SW¼ sec. 35, T. 12 S., R. 3 W.):

- A_p 0 to 5 inches, brown or dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; clear, smooth boundary. 4 to 8 inches thick.
- C_1 5 to 13 inches, brown or dark-brown (10YR 4/3) fine sandy loam; weak, fine and medium, granular structure; very friable; many fine roots; a few small vesicles; medium acid; gradual, wavy boundary. 4 to 8 inches thick.
- C_2 13 to 19 inches, dark-brown (10YR 4/3–3/3) fine sandy loam; weak, fine and medium, granular structure; very friable; many small vesicles; strongly acid; abrupt, smooth boundary. 5 to 15 inches thick.
- C_3 19 to 36 inches, dark-brown (10YR 4/3–3/3) silt loam; weak, fine and medium, granular to subangular blocky structure; friable to very friable; many small vesicles and some worm casts; a few mottles of light brownish-gray and light yellowish-brown (2.5Y 6/4) silt loam; gray color increases with depth.

The surface soil ranges from dark brown to dark grayish brown, and in some places, the subsurface layers are yellowish brown. Thin lenses of loamy fine sand are at various depths in some areas. Along many narrow tributaries, fragments of waterworn sandstone and shale are on the surface and in the soil. Included with this soil are areas in which the surface soil and subsurface layers are silt loam or loam.

Surface runoff is slow, permeability is moderate to rapid, and the moisture-supplying capacity is high. The soil is medium in natural fertility and low to medium in organic matter. It is medium acid to strongly acid.

This soil is well suited to intensive use because it is in good tilth and has a thick root zone, good moisture content, and nearly level slopes. Overflow, however, is a problem. *Capability units IIw-1; woodland suitability group 2A.*

Pottsville Series

The Pottsville series consists of shallow and very shallow, excessively drained, gently sloping to steep soils. These soils developed in residuum weathered mainly from thinly bedded, acid shale and sandy shale but partly from sandstone.

In most places, these soils have a grayish-brown to yellowish-brown shaly silt loam surface soil and yellowish-brown shaly silty clay loam or silty clay subsurface layers. Many thin, platy fragments of shale, ¼ to 1 inch thick, are on the surface and in these soils. In places, there are angular and broken fragments of shale and sandstone larger than 3 inches in diameter.

In this county, the Pottsville soils are mainly in the southwestern part. They adjoin the Muskingum, Albertville, Enders, and Muse soils. They are finer textured, however, than the Muskingum soils. They are shallower than the Albertville, Enders, and Muse soils and lack the well-developed B horizon that has formed in those soils.

The Pottsville soils are low in natural fertility and in organic matter. They are medium acid to very strongly acid. Surface runoff is medium to very rapid, infiltration of water is medium to slow, and permeability in the subsurface layers is slow. The moisture-supplying capacity is low to very low. The hazard of erosion is moderate to severe.

The native vegetation consists mainly of oak, hickory, and pine. A small acreage in the less sloping parts of the county has been cleared and is in crops and pasture. Most areas, however, are in trees. The Pottsville soils are not productive, and they have a narrow range of suitability for crops.

Pottsville shaly silt loam, 15 to 45 percent slopes (PsF).—This is a very shallow, excessively drained soil. It formed in residuum weathered from thinly bedded, acid shale.

Profile in a moist, wooded area 5 miles south of Hanceville (SE¼SW¼ sec. 18, T. 12 S., R. 2 W.):

- A_p 0 to 5 inches, yellowish-brown (10YR 5/4) shaly silt loam; weak, fine, granular structure; friable; first half inch stained with organic matter; many fragments of shale, ¼ to 1 inch in diameter; many roots; few wormholes;

medium acid; clear, smooth boundary. 3 to 6 inches thick.

AC 5 to 9 inches, yellowish-brown (10YR 5/4–5/6) shaly silty clay loam and silty clay; massive or platy structure; firm; few roots; interbedded thin lenses of fractured sandy shale and shaly clay; very strongly acid; abrupt, wavy boundary. 2 to 8 inches thick.

D_r 9 inches, highly fractured, dark-gray to black, fissile shale.

The depth to bedrock ranges from about 9 to 18 inches. The subsurface layers range from yellowish brown to strong brown in color and from silt loam to silty clay in texture. A 2- to 6-inch thick B horizon has formed in some places. Included with this soil are some areas that have a shaly loam or fine sandy loam surface soil.

About one-tenth of this soil is moderately eroded. In these eroded areas, the surface layer is 2 to 3 inches thinner than that in the normal profile and rills and shallow gullies occur in places.

This soil is low in natural fertility and in organic matter. It is medium acid to very strongly acid. Surface runoff is rapid, and infiltration of water is medium to slow. The permeability of the subsurface layers is rapid to slow. The moisture-supplying capacity is low, and the hazard of erosion is moderate to severe.

Nearly all of this soil is in trees, a use to which it is well suited. *Capability unit VII–2; woodland suitability group 6.*

Pottsville shaly silt loam, 2 to 10 percent slopes, eroded (PsB2).—About three-fourths of this soil is on slopes of 6 to 10 percent. The surface soil is 1 to 3 inches thinner than that of Pottsville shaly silt loam, 15 to 45 percent slopes. Rills and shallow gullies are common in places. Included with this soil are areas where the yellowish-brown shaly silty clay loam to silty clay subsurface material is exposed.

Surface runoff is medium to rapid, the moisture-supplying capacity is low to very low, and the hazard of erosion is moderate to severe.

Most of this soil has been cleared and used for crops and pasture. The greater part, however, is now reverting to trees, mainly to loblolly and Virginia pine. Some areas can be cultivated at long intervals. But this soil is better suited to perennial sod crops for pasture and hay or to trees because of its shallow depth, inadequate moisture, and hazard of erosion. *Capability unit IVe–9; woodland suitability group 6.*

Pottsville shaly silt loam, 10 to 15 percent slopes (PsD).—This soil is more gently sloping than Pottsville shaly silt loam, 15 to 45 percent slopes. Surface runoff is rapid, the moisture-supplying capacity is low to very low, and the hazard of erosion is severe.

Most of this soil has not been cleared; the vegetation consists mainly of oak, hickory, and pine trees. This soil can be planted to sod crops for hay and pasture, but its best use is trees. Virginia pine grows well. *Capability unit VIe–4; woodland suitability group 6.*

Pottsville shaly silty clay loam, 10 to 25 percent slopes, eroded (PtE2).—About three-fourths of this soil is on slopes of 15 to 25 percent. The surface soil is 1 to 3 inches thinner than that of Pottsville shaly silt loam, 15 to 45 percent slopes. Rills and shallow gullies are common. Included with this soil are severely eroded areas where part of the yellowish-brown shaly silty clay loam or silty clay subsurface layer is exposed. Also included is a small area that has a well-developed, yellowish-brown to yellowish-red silty clay B horizon, 6 to 8 inches thick.

Surface runoff is rapid to very rapid, the moisture-supplying capacity is low to very low, and the hazard of erosion is severe.

Most of this soil has been cleared and used for crops and pasture; a small area is idle. The cleared areas have now mostly reverted to trees and are best suited to them. Loblolly and Virginia pine are the common trees. *Capability unit VIIe–2; woodland suitability group 7.*

Purdy Series

The Purdy series consists of deep, poorly drained, level to nearly level soils on old, low stream terraces. These soils formed in general alluvium that washed from soils underlain by sandstone and shale.

These soils commonly have a mottled gray to grayish-brown silt loam surface layer and a well-developed B horizon of distinctly mottled silty clay loam to silty clay.

Purdy soils are near Hanceville in the eastern part of the county and are along many streams and creeks in the southwestern part. In most places in this county, these soils occur with the Tyler soils and the Monongahela soils in positions similar to the positions of those soils. The Tyler soils are somewhat poorly drained, and the Monongahela soils are moderately well drained. In some places Purdy soils are adjacent to the Philo soils, which are moderately well drained and do not have a well-developed B horizon.

The Purdy soils are low in natural fertility and in organic matter. They are very strongly acid. Surface runoff, infiltration of water, and permeability are slow. The water table is high, and water stands on these soils for long periods.

The native vegetation is mainly water oak, sweetgum, maple, poplar, beech, and hickory. Nearly all of the acreage is wooded. These soils are low in productivity but respond to management.

Only one soil in the Purdy series was mapped in Cullman County.

Purdy silt loam (0 to 2 percent slopes) (Pu).—This is a deep, poorly drained soil on low stream terraces. It developed in old alluvium washed from soils underlain by sandstone and shale.

Profile in a moist, idle area 0.5 mile west of Hanceville (NW¼NW¼ sec. 29, T. 11 S., R. 2 W.):

A_p 0 to 8 inches, gray (10YR 5/1) to grayish-brown (10YR 5/2) silt loam with common, medium, and distinct mottles of yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and yellowish red (5YR 4/6); weak, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary. 6 to 9 inches thick.

B_{1g} 8 to 15 inches, mottled gray (2.5YR N 6/0), yellowish-brown (10YR 5/6), and yellowish-red (5YR 5/6) heavy silt loam; mottles are common, medium, and distinct; weak, fine, granular structure; friable; few fine roots; very strongly acid; gradual, wavy boundary. 6 to 10 inches thick.

B_{2g} 15 to 36 inches, mottled gray (2.5Y N 6/0), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/8) silty clay loam; mottles are common, medium, and distinct; weak, fine and medium, subangular blocky structure; friable; few fine roots; very strongly acid; gradual, smooth boundary. 15 to 22 inches thick.

B_{3mg} 36 to 72 inches, mottled gray (2.5Y N 6/0), yellowish-

brown (10YR 5/6), and strong-brown (7.5YR 5/6) silty clay or clay; mottles are many, medium, and distinct; massive (structureless); firm; strongly acid.

D_r 72 inches, bedrock of sandstone and shale.

The surface soil ranges from gray to light brownish gray. The subsoil ranges from silty clay loam to clay. A claypan is at a depth of about 36 inches in most places. Bedrock is at a depth of 60 to 80 inches. Included with this soil are small areas that have a loam or fine sandy loam surface soil.

This soil is low in natural fertility and in organic matter. It is very strongly acid. Surface runoff, infiltration of water, and permeability are slow. Because it is poorly drained and is heavy and clayey, this soil is poorly suited to cultivation. *Capability unit IVw–2; woodland suitability group 2B.*

Rockland

In this county, Rockland consists of small areas in which more than half of the surface is covered by limestone and sandstone. This land is strongly sloping to steep and is not suited to crops.

Rockland, limestone (10 to 30 percent slopes) (Rk).—More than half of the surface of this land is covered with limestone in the form of outcrops, loose boulders, or fragments. Slopes of 10 to 30 percent are dominant. Intermixed with the limestone is very firm, plastic silty clay or clay. In places, a thin mantle of sandy colluvial material has sloughed from the higher lying soils that formed in material weathered from sandstone and shale. Not enough soil material for cultivation, however, is in this mapping unit.

This land type is in the northern part of the county, in a small rim at the base of the mountains along U.S. Highway No. 31. All of it is wooded. The trees are mostly oak and hickory, but there are also mixed stands of hardwood and cedar. In some of these stands, cedar is dominant. *Capability unit VIIe–1; woodland suitability group 9.*

Rockland, sandstone (15 to 45 percent slopes) (Ro).—This land type consists of areas where sandstone boulders, outcrops, and fragments of loose sandstone cover more than half of the surface. Locally, these are called bluffy areas. Slopes range from 15 to 45 percent. Surface runoff is rapid, and the moisture-supplying capacity is very low.

Rockland, sandstone, adjoins areas of Muskingum stony fine sandy loam and Pottsville shaly silt loam, but in many places, the boundary between these mapping units is not clear. *Capability unit VIIe–1; woodland suitability group 8.*

Sandy Alluvial Land

In this county, most of this land type is on ridges or benches bordering the large streams and consists of sand or loamy sand. The areas are gravelly in some places and stony in others. The soil material washed from soils that formed mainly in material weathered from sandstone. Slopes range from 0 to 30 percent.

Sandy alluvial land (0 to 30 percent slopes) (Sa).—In this county, most of this land type is along the large streams, mainly the Mulberry Fork of the Black Warrior River. It is frequently flooded but is excessively drained. Sandy alluvial land is very low in fertility and in moisture-supplying capacity.

Included with this land type is a small acreage on nearly level slopes. The soils in these areas are deep and excessively drained. They have a distinct, very dark grayish-brown to dark-brown surface layer, 6 to 8 inches thick. This layer is underlain by uniformly colored, yellowish-brown loamy sand, 48 to 72 inches thick. This loamy sand inclusion has been cleared and is used for crops and pasture.

Ash, poplar, maple, gum, and willow grow fairly well in some areas of sandy alluvial land. Cane makes up most of the undergrowth. Because mixed materials are deposited frequently in floods, this land is generally not suited to agricultural use. Sand for construction purposes is obtained in some large areas. *Capability unit VIIe–1; woodland suitability group 8.*

Sequatchie Series

The Sequatchie series consists of moderately deep to deep, well-drained, nearly level to gently sloping soils on low stream terraces. These soils developed in old mixed general alluvium that washed from soils underlain mainly by sandstone and shale.

In most places, Sequatchie soils have a dark-brown to dark yellowish-brown silt loam surface soil. Their subsoil is yellowish-brown to strong-brown silt loam to silty clay loam.

In this county, these soils are mainly in the southwestern part, along many large streams and creeks that flow into the Mulberry Fork of the Black Warrior River. They ordinarily adjoin the Pope soils and, in places, are next to the Philo soils, but they are at a slightly higher elevation than those soils. They are somewhat finer textured than the more recently formed Pope soils and Philo soils, which are on flood plains. The Pope soils are well drained and the Philo soils are moderately well drained.

The Sequatchie soils are low in natural fertility and in organic matter. They are medium acid to strongly acid. Surface runoff is slow to medium. Infiltration of water is medium, and the permeability of the subsoil is moderate. The moisture-supplying capacity is moderately high. The hazard of erosion is slight to moderate.

The native vegetation is mainly poplar, maple, gum, oak, and pine, but nearly all of the acreage has been cleared. These soils, although of limited acreage, are among the best agricultural soils in the county. They have medium to high productivity and a wide range of suitability.

Sequatchie silt loam, 0 to 2 percent slopes (SeA).—This is a moderately deep to deep, well-drained soil on low stream terraces.

Profile in a moist, idle area 1.0 mile southwest of Arkadelphia (NW¼SW¼ sec. 28, T. 13 S., R. 4 W.):

A_p 0 to 7 inches, dark-brown (10YR 3/3) to brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many fine roots; some worm casts; strongly acid; abrupt, smooth boundary. 6 to 8 inches thick.

B_1 7 to 10 inches, yellowish-brown (10YR 5/4) heavy silt loam; weak to moderate, medium, subangular blocky structure; friable; many fine roots; many worm casts; strongly acid; clear, wavy boundary. 4 to 7 inches thick.

B_2 10 to 31 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, fine and medium, subangular blocky struc-

ture; firm; few fine roots; medium acid; clear, wavy boundary. 18 to 24 inches thick.

B_3 31 to 36 inches, mottled yellowish-brown (10YR 5/8), pale-yellow (2.5Y 7/4), and strong-brown (7.5YR 5/6) fine sandy loam; weak, fine and medium, subangular blocky structure; friable; medium acid; gradual, wavy boundary. 4 to 8 inches thick.

C_1 36 to 60 inches, mottled yellowish-brown (10YR 5/8), pale-yellow (2.5Y 7/4), and strong-brown (7.5YR 5/6) sandy loam; weak, fine and medium, subangular blocky structure; very friable; medium acid; gradual, wavy boundary. 30 to 40 inches thick.

C_2 60 to 66 inches +, loose loamy sand.

The subsoil ranges from strong brown to reddish brown. The depth to the C horizon ranges from 24 to 40 inches. Included with this soil are small areas that have a dark-brown sandy loam surface soil and a strong-brown sandy loam subsoil. Also included are small areas with a loam and fine sandy loam surface soil.

Surface runoff is slow, and the hazard of erosion is slight. This soil is well suited to cultivation because it is nearly level, is in good tilth, is moderately high in moisture-supplying capacity, and responds well to management. It can be used intensively for crops. *Capability unit I–2; woodland suitability group 3A.*

Sequatchie silt loam, 2 to 6 percent slopes (SeB).—This soil is steeper than Sequatchie silt loam, 0 to 2 percent slopes, and, in most places, is less deep to the parent material. Because of erosion, about half of this soil is 2 to 3 inches thinner in the surface soil than Sequatchie silt loam, 0 to 2 percent slopes.

Although surface runoff is generally slow, it is medium in the more sloping areas and causes a moderate hazard of erosion. This soil is in good tilth and has gentle slopes, a fairly thick root zone, and a moderately high capacity for supplying moisture.

Nearly all of the acreage has been cleared and is used for cultivated crops, mainly cotton and corn. *Capability unit IIe–2; woodland suitability group 3A.*

Tilsit Series

The Tilsit series consists of moderately well drained, moderately deep, nearly level to gently sloping soils. Dominant slopes are 2 to 6 percent. These soils formed in residuum weathered mostly from sandstone but partly from interbedded shale.

These soils generally have a surface layer of grayish-brown to dark grayish-brown fine sandy loam or loam and a subsoil of yellowish-brown to light olive-brown loam or fine sandy clay loam. At a depth of 18 to 24 inches, a well-developed fragipan has formed. In most places, this fragipan is compact, multicolored fine sandy loam.

In Cullman County, Tilsit soils are mainly in the eastern half of the county, but some are near Jones Chapel and Battleground in the northwestern part. They adjoin the Hartsells, Albertville, and, in a few places, the Linker soils on broad, nearly level to gently sloping ridgetops. They resemble the Hartsells soils in color and texture but, unlike those soils, have a distinct fragipan. Tilsit soils are coarser textured than the Albertville soils and are more yellow and less red in the subsoil than the Linker soils.

The Tilsit soils are low in natural fertility and in organic matter. They are slightly acid to very strongly acid throughout the profile. Infiltration of water is medium, and the permeability of the subsoil is moderate above the fragipan. The moisture-supplying capacity is moderate. Because the slopes are gentle, erosion is only a slight to moderate hazard.

The native vegetation is mostly oak, hickory, and pine. Much of the acreage, however, has been cleared. Tilsit soils are among the best in the county for farming, but they are somewhat cold early in spring and are slightly droughty in dry weather. They are used intensively for crops and are well suited to cultivation. Their response to management is good.

Tilsit fine sandy loam, 2 to 6 percent slopes, eroded (TtB2).—This is a moderately well drained, moderately deep soil that contains a fragipan. The soil formed in residuum weathered mainly from sandstone but partly from interbedded shale.

Profile in a moist, idle area 3.5 miles northwest of Baileyton (NE¼SE¼ sec. 33, T. 8 S., R. 1 W.):

A_p 0 to 6 inches, grayish-brown (2.5Y 5/2) to dark grayish-brown (2.5Y 4/2) fine sandy loam; weak, fine, granular structure; friable; many fine roots; slightly acid; clear, wavy boundary. 4 to 8 inches thick.

B_1 6 to 10 inches, yellowish-brown (10YR 5/4) loam; weak, fine, granular structure; friable; many fine roots; slightly acid; gradual, wavy boundary. 3 to 5 inches thick.

B_2 10 to 22 inches, dark yellowish-brown (10YR 4/4) loam; weak, medium and coarse, granular structure; friable; many fine roots; strongly acid; gradual, wavy boundary. 10 to 16 inches thick.

B_{3m} 22 to 34 inches, mottled light yellowish-brown (10YR 6/4), dark yellowish-brown (10YR 4/4), gray (10YR 6/1), and light-gray (10YR 7/1) fine sandy loam; mottles are many, fine, and distinct; massive (structureless); friable and brittle, but compact in place; few fine roots in upper part; few small, red and brown fragments of sandstone, ¼ to ½ inch in diameter; few clay skins on some peds; vesicular; strongly acid; gradual, irregular boundary. 6 to 18 inches thick.

C 34 to 61 inches, mottled gray (10YR 6/1), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/6) fine sandy clay loam; massive (structureless); friable; many angular and broken fragments of sandstone and shale, ½ inch to 3 inches in diameter; very strongly acid; 15 to 30 inches thick.

D_r 61 inches, bedrock of sandstone and shale.

In a few areas, the surface soil is light yellowish brown to yellowish brown. The B_2 horizon ranges from light olive brown to strong brown in color and from loam to light clay loam in texture. Where the fragipan has formed, it ranges from heavy silt loam to loamy fine sand. Included with this soil are small areas that have a loam surface soil.

In some places, the C horizon is absent and the fragipan is underlain by a D horizon of yellowish-red to red fine sandy clay loam. Many narrow, thin tongues of the fragipan extend downward into the D horizon. In other places, there are no C and D horizons and the fragipan rests on the underlying sandstone.

This soil is low in natural fertility and in organic matter. It is slightly acid to very strongly acid. Surface runoff and infiltration of water are medium, and the moisture-supplying capacity is moderate. This soil is in good tilth and responds well to management.

Practically all of this soil is used for crops. It is one of the best soils in the county for intensive cultivation. The hazard of erosion, however, is moderate. *Capability unit IIe–5; woodland suitability group 4B.*

Tilsit fine sandy loam, 2 to 6 percent slopes (TtB).—The surface layer of this soil is 2 to 4 inches thicker than

Figure 6.—**Pasture in Coastal bermudagrass on Tilsit fine sandy loam, 2 to 6 percent slopes. The average annual yield is 4 tons of hay per acre.**

that of Tilsit fine sandy loam, 2 to 6 percent slopes, eroded, and the supply of organic matter and the moisture-supplying capacity are greater.

Because the movement of water through this soil is slowed by a fragipan, surface runoff is increased and causes a moderate erosion hazard in cultivated areas. The root zone is fairly thick, and the soil is in good tilth.

Much of this soil is wooded. It can be cultivated intensively and is suited to most locally grown crops (fig. 6). *Capability unit IIe–5; woodland suitability group 4B.*

Tilsit loam, 0 to 2 percent slopes (TsA).—This soil is finer textured through the profile than Tilsit fine sandy loam, 2 to 6 percent slopes, eroded, and, in most places, is shallower to the fragipan. The fragipan is generally well developed and is at a depth of about 18 inches or more. The subsoil ordinarily is light olive-brown silt loam.

Nearly all of this soil is cultivated. It is suited to intensive cultivation of most crops. This soil, however, warms slowly in spring and seals over and forms a thin crust after rains. These crusts sometimes cause poor stands. *Capability unit IIw–2; woodland suitability group 5A.*

Tyler Series

The Tyler series consists of somewhat poorly drained, deep, level to nearly level soils on low stream terraces. These soils formed in materials that washed from the Hartsells, Tilsit, Albertville, Linker, Enders, Muskingum, and Pottsville soils, all of which are underlain mostly by sandstone and shale.

In most places, the surface layer of the Tyler soils is distinctly mottled, dark grayish-brown to yellowish-brown silt loam. The subsoil is distinctly mottled, yellowish-brown to pale-brown silt loam or silty clay loam.

These soils are widely distributed in the county but are mostly in the southwestern part. A large acreage, however, is near Hanceville. The Tyler soils adjoin the Monongahela and the Purdy soils on low stream terraces. The Tyler soils are less well drained than the Monongahela soils and have about the same drainage as the Purdy soils.

The Tyler soils are low in natural fertility and in organic matter. They are very strongly acid. Surface runoff is slow, infiltration of water is medium to slow, and permeability is moderate to slow. These soils are saturated in wet periods.

The native vegetation consists of gum, water oak, poplar, maple, beech, and pine. Almost all of the acreage is wooded, but some cleared areas are in pasture. A small acreage is in crops.

Only one soil in the Tyler series was mapped in Cullman County.

Tyler silt loam (0 to 2 percent slopes) (Ty).—This is a somewhat poorly drained, deep, medium-textured soil on low stream terraces. It contains a fragipan.

Profile in a moist, idle area 1.5 miles west of Hanceville (SE¼NW¼ sec. 30, T. 11 S., R. 2 W.):

A_p 0 to 9 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct mottles of pale brown (10YR 6/3) and strong brown (7.5YR 5/6); weak, fine, granular structure; friable; many fine roots; very strongly acid; clear, smooth boundary. 6 to 10 inches thick.

A_3 9 to 11 inches, mottled light brownish-gray (10YR 6/2), brown (10YR 5/3), and grayish-brown (2.5Y 5/2) silt loam; mottles are common, fine, and distinct; weak, fine, granular structure; friable; many fine roots; very strongly acid; abrupt, smooth boundary. 1 to 3 inches thick.

B_{1g} 11 to 24 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/8) silt loam; mottles are common, medium, and distinct; weak, medium and coarse, subangular blocky structure; friable; many small, black concretions, ⅛ to ¼ inch in diameter; few fine roots; few small worm holes and pores; very strongly acid; gradual, wavy boundary. 10 to 15 inches thick.

B_{2g} 24 to 34 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/8) silty clay loam, reddish brown (5YR 5/4) in places; mottles are common, medium, and distinct; weak, medium and coarse, subangular blocky structure; friable; many small, black concretions; few fine roots; few fine pores and worm holes; very strongly acid; gradual, wavy boundary. 10 to 15 inches thick.

B_{3mg} 34 to 60 inches, mottled gray (10YR 6/1), yellowish-brown (10YR 5/8), and reddish-brown (5YR 5/4) silty clay; massive (structureless); firm; few small, black concretions; few small worm holes; very strongly acid; diffuse, wavy boundary. 20 to 25 inches thick.

C_g 60 to 85 inches, coarsely mottled, light-gray (10YR 7/1), gray (10YR 6/1), strong-brown (7.5YR 5/6), and red (2.5YR 4/8) shaly clay; massive (structureless); very firm; pH of gray clay material is 7.0, of strong-brown material is 4.5, and of red material is 4.0.

D_r 85 inches, bedrock of shale and sandstone.

The depth to bedrock ranges from 50 to 90 inches, and the depth to the fragipan, from 24 to 36 inches. In some places, however, this fragipan is weak or has not formed. Small fragments of sandstone and shale, ¼ to ½ inch in diameter, are common on the surface and in the profile. The surface soil is very dark grayish brown in many wooded areas and is normally stained by organic matter to a depth of 2 inches. The subsoil ranges from clay loam to silty clay. Included with this soil are some areas that have a loam and fine sandy loam surface soil.

This soil is low in natural fertility and in organic matter. Surface runoff is slow, infiltration of water is medium to slow, and permeability is moderate to slow. The moisture-supplying capacity is high in rainy periods

and low in dry periods. During rainy periods this soil becomes saturated or waterlogged, and water stands on it for a fairly long time. This soil is best suited to trees and sod crops. *Capability unit IIIw–3; woodland suitability group 2B.*

Use and Management of Soils [2]

This section consists of two main parts. In the first part, the nationwide system of capability classification is explained and the soils of the county are placed in capability units, or management groups, so that their use and management can be conveniently described. The second part gives estimated yields of the main crops in the county under two levels of management.

Capability Groups of Soils

The capability classification is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. Eight capability classes are in the broadest grouping and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, grazing, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be as many as four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

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

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping of soils for many statements about their management. Capability units are generally identified by numbers assigned locally, for example, IIe–2 or IIIe–2. These numbers are not consecutive in Cullman County, because not all of the capability units used in Alabama occur in this county. The soils in each unit have about the same hazards and limitations of use and require about the same treatment.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of permanent limitations. Not considered in this classification are major and generally expensive land-forming that would change the slope, depth, or other characteristics of the soil, and not considered are possible but unlikely major reclamation projects.

The soils of Cullman County have been grouped in the following capability classes, subclasses, and units. None of the soils in this county are in class V or class VIII.

Class I: Soils that have few limitations that restrict their use.

- Capability unit I–2.—Moderately deep to deep, well-drained, friable soil on stream terraces.

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

- Subclass IIe: Soils subject to moderate erosion if they are not protected.
  - Capability unit IIe–2.—Moderately deep to deep, well-drained, loamy soils on uplands, foot slopes, and stream terraces.
  - Capability unit IIe–5.—Moderately deep, moderately well drained loams and fine sandy loams with fragipan on uplands, foot slopes, and stream terraces.
  - Capability unit IIe–7.—Moderately deep to deep, well-drained loams and silt loams with a moderately fine textured or fine textured subsoil on uplands and foot slopes.
- Subclass IIw: Soils that have moderate limitations because of excess water.
  - Capability unit IIw–1.—Deep, well-drained, nearly level fine sandy loam on flood plains.
  - Capability unit IIw–2.—Moderately deep, moderately well drained fine sandy loam and loam on uplands and low stream terraces.

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

- Subclass IIIe: Soils subject to severe erosion if they are cultivated and not protected.
  - Capability unit IIIe–2.—Moderately deep, well-drained fine sandy loams and a loam on uplands and foot slopes.
  - Capability unit IIIe–7.—Moderately deep to deep, well-drained loams, silt loams, and a severely eroded silty clay loam on uplands and foot slopes.
  - Capability unit IIIe–9.—Shallow, well-drained, gently sloping soils on uplands.
- Subclass IIIw: Soils that have severe limitations because of excess water.
  - Capability unit IIIw–2.—Deep, moderately well drained and somewhat poorly drained, medium-textured alluvial soils.
  - Capability unit IIIw–3.—Deep to moderately deep, somewhat poorly drained, medium-

[2] By M. E. Holt, conservation agronomist, and R. B. McNutt and E. A. Perry, soil scientists, Soil Conservation Service.

textured soils with a fragipan on uplands, foot slopes, and stream terraces.

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

Subclass IVe: Soils subject to very severe erosion if they are cultivated and not protected.

Capability unit IVe–2.—Moderately deep, well-drained, sloping to strongly sloping fine sandy loams; slight to severe erosion.

Capability unit IVe–7.—Moderately deep to deep, well-drained, sloping to strongly sloping loams, silt loams, and silty clay loams; moderate to severe erosion.

Capability unit IVe–9.—Shallow to very shallow, well-drained, gently sloping to sloping soils; moderate erosion.

Subclass IVw: Soils that have very severe limitations for cultivation because of excess water.

Capability unit IVw–2.—Deep, poorly drained alluvial soils in depressions on uplands and on stream terraces.

Class VI: Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture, woodland, or food and cover for wildlife.

Subclass VIe: Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.

Capability unit VIe–2.—Moderately deep, well-drained, loamy soils on uplands.

Capability unit VIe–4.—Shallow to very shallow, stony soils that are well drained to excessively drained.

Class VII: Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation, and that restrict their use largely to woodland, grazing, or wildlife.

Subclass VIIe: Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.

Capability unit VIIe–1.—Steep, stony, and excessively drained soil materials and land types.

Capability unit VIIe–2.—Shallow to very shallow, well-drained to excessively drained soils that are stony and strongly sloping to steep.

Management by capability units

The soils of Cullman County have been placed in 19 capability units, or management groups. The soils in any one unit need about the same kind of management, respond to management in about the same way, and have essentially the same limitations.

In the discussion of the capability units, the soils in a unit are described as a group and then are listed. Suggestions are given for the use and management of the soils in each unit. Lime and fertilizer should be applied according to soil tests, which can be made by the Soil Testing Laboratory at Auburn, Alabama.

Recommendations on crop varieties and pasture mixtures can be obtained from publications of the Alabama Agricultural Experiment Station. Members of the Agricultural Extension Service and of the Soil Conservation Service can help interpret the recommendations for the soils on individual farms. Also, they can give technical assistance on land preparation, cropping systems, terracing, drainage, pasture management, forestry, and other farm problems.

CAPABILITY UNIT I–2

Sequatchie silt loam, 0 to 2 percent slopes, is the only soil in this capability unit. This soil is on stream terraces and is moderately deep to deep, well drained, and friable. Its surface soil is silt loam, 6 to 8 inches thick. The subsoil is friable silt loam to silty clay loam.

Infiltration of water is medium, permeability is moderate, and the moisture-supplying capacity is moderately high. This soil contains little organic matter, is low in fertility, and is medium acid to strongly acid.

About two-thirds of this soil is cultivated. Suitable crops are cotton, corn, sorghums, soybeans, small grains, truck crops, and most legumes and grasses. Yields of pecans are high.

A good cropping system is 1 year of a small grain or a sod crop followed by 2 years of row crops. Row crops can be grown continuously if a cover crop is grown each year and, to maintain the supply of organic matter, all crop residue is returned to the soil.

For high yields of all crops and pasture plants, add large amounts of fertilizer to this soil. Yields of most legumes and of many row crops and grasses are increased by additions of lime.

Good tilth is easy to maintain; tillage can be done within a wide range of moisture content. To control runoff, provide a good cropping system and manage the crop residue well.

CAPABILITY UNIT IIe–2

This capability unit consists of moderately deep to deep, well-drained, friable soils that are medium textured to moderately coarse textured. These soils are gently sloping and occur on uplands, foot slopes, and stream terraces. Their root zone is thick; bedrock is at a depth greater than 30 inches. The surface layer is loam, silt loam, or fine sandy loam, 5 to 8 inches thick. The subsoil is friable loam, clay loam, fine sandy clay loam, and silty clay loam.

Infiltration of water in these soils is medium, permeability is moderate, and the moisture-supplying capacity is moderate to high. Runoff causes a moderate hazard of erosion. These soils contain little organic matter, are low in fertility, and are medium acid to very strongly acid. They are:

Hanceville loam, 2 to 6 percent slopes, eroded.
Hartsells fine sandy loam, 2 to 6 percent slopes.
Hartsells fine sandy loam, 2 to 6 percent slopes, eroded.
Jefferson fine sandy loam, 2 to 6 percent slopes, eroded.
Linker fine sandy loam, 2 to 6 percent slopes.
Linker fine sandy loam, 2 to 6 percent slopes, eroded.
Sequatchie silt loam, 2 to 6 percent slopes.

About half of the acreage in these soils is cultivated. Suitable crops are cotton, corn (fig. 7), sorghums, soybeans, small grains, truck crops, and most legumes and grasses. Yields of peaches and pecans are high.

A good cropping system consists of 1 or 2 years of grass, a small grain or other close-growing crop, and 2 years of a row crop that is followed each year by a winter cover crop. A row crop can be grown for 2 or 3 successive years if the preceding crop is a reseeding legume that has

made seed. Return all crop residue to these soils to maintain the supply of organic matter.

For high yields of all crops and pasture plants, apply large amounts of fertilizer and increase the organic matter in the soils. Additions of lime increase the yields of most legumes and of many field crops, truck crops, and grasses. If alfalfa is grown, add boron.

These soils are easy to maintain in good tilth, and they can be tilled within a wide range of moisture content. To control runoff, till on the contour, build terraces, grass the waterways, and plant borders around the fields. Use a good cropping system, and manage the crop residue well.

The soils in this capability unit are suited to sprinkler irrigation.

CAPABILITY UNIT IIe–5

This capability unit consists of moderately deep, moderately well drained, friable soils that are medium textured to moderately coarse textured. These soils are on uplands, foot slopes, and stream terraces. Beginning at a depth of 16 to 30 inches is a fragipan, or compact layer, that retards the movement of roots, air, and moisture. The surface soil is loam or fine sandy loam, 5 to 7 inches thick. The subsoil is loam, clay loam, fine sandy clay loam, or silty clay loam.

Infiltration of water in these soils is medium, permeability is moderate above the fragipan, and the moisture-supplying capacity is moderate. Surface runoff is slow to medium, and the hazard of erosion is moderate. These soils contain little organic matter, are low in fertility, and are slightly acid to very strongly acid. They are:

Leadvale loam, 2 to 6 percent slopes.
Leadvale loam, 2 to 6 percent slopes, eroded.
Monongahela fine sandy loam, 2 to 6 percent slopes.
Tilsit fine sandy loam, 2 to 6 percent slopes.
Tilsit fine sandy loam, 2 to 6 percent slopes, eroded.

Almost two-thirds of the acreage in these soils is cultivated. Suitable crops are corn, cotton, small grains, sorghums, soybeans, some truck crops, and many pasture grasses and legumes (fig. 8, fig. 9). Pecan trees are also suited to these soils. In some areas, yields of peaches are fairly high.

A good cropping system on these soils consists of 1 or 2 years of a small grain, lespedeza or other close-growing crop, and 2 years of row crops. Plant a winter cover crop each year after the row crop is harvested.

For high yields of all crops and pasture plants, add large amounts of fertilizer and increase the supply of organic matter. Add lime to obtain high yields of most legumes and to increase the yields of many of the field crops, truck crops, and grasses.

These soils can be tilled within only a narrow range of moisture content. Contour tillage, terraces, grassed waterways, and field borders are needed on the stronger slopes. To control runoff, provide a good cropping system and leave all crop residue on these soils. Some areas are suited to irrigation by sprinklers.

CAPABILITY UNIT IIe–7

This capability unit consists of moderately deep to deep, well-drained soils on uplands and foot slopes. These soils are gently sloping. They have a thick root zone; bedrock is at a depth greater than 30 inches. The surface soil is friable to very friable loam, silt loam, and shaly

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***Figure 7.*—Corn on Hanceville loam, 2 to 6 percent slopes, eroded. Yields of about 80 bushels per acre can be expected on this soil if a good cropping system is followed.**

***Figure 8.*—Corn, in background, on Tilsit fine sandy loam, 2 to 6 percent slopes. Yields of 75 bushels per acre can be expected on this soil. The border of sericea lespedeza, in foreground, disposes of water from the parallel terraces in the cornfield.**

***Figure 9.*—Cows grazing sericea lespedeza on Tilsit fine sandy loam, 2 to 6 percent slopes, eroded, and loblolly pine on same soil. This soil has a site index of 74 for the pine.**

silt loam, 6 to 7 inches thick. The subsoil is friable to firm heavy loam to silty clay.

Infiltration of water in these soils is medium, permeability is moderate to slow, and the moisture-supplying capacity is moderately high to low. The medium surface runoff causes a moderate erosion hazard. These soils are low in organic matter and in fertility and are medium acid to very strongly acid. They are:

Albertville loam, 2 to 6 percent slopes.
Albertville loam, 2 to 6 percent slopes, eroded.
Enders silt loam, 2 to 6 percent slopes, eroded.
Muse shaly silt loam, 2 to 6 percent slopes, eroded.

Almost two-thirds of the acreage in these soils is cultivated. Suitable crops are corn, cotton, small grains, sorghums, soybeans, truck crops, most grasses and legumes, peaches, and pecans.

A suitable cropping system consists of 1 or 2 years of a sod crop followed by 2 years of row crops. All crop residue should be left on these soils to maintain the supply of organic matter.

For all crops and pasture plants, add large amounts of fertilizer and maintain the supply of organic matter. These soils need to be limed before they are planted to most legumes. Many other crops also respond to lime.

Fragments of shale interfere somewhat with tillage. To control runoff, the more sloping areas of these soils need contour tillage, terraces, grassed waterways, and field borders. A good cropping system and intensive use of crop residue are needed on all slopes. These soils are suited to sprinkler irrigation.

CAPABILITY UNIT IIw-1

Pope fine sandy loam is the only soil in this capability unit. This soil is deep, well drained, friable, and moderately coarse textured. It is nearly level and is on first bottoms or flood plains that are periodically flooded. The surface soil is fine sandy loam, 4 to 8 inches thick. The subsurface layers are friable fine sandy loam and loam.

Infiltration of water in this soil is medium, permeability is moderate to rapid, and the moisture-supplying capacity is high. Surface runoff is slow. This soil is low to medium in organic matter, medium in fertility, and slightly acid to strongly acid.

Almost two-thirds of this soil is cultivated. Except for peaches, berries, and melons, all crops grown in the county are suited to this soil. Fescue and whiteclover are well suited.

A good cropping system consists of 1 year of a sod crop followed by 2 years of row crops. Row crops can be grown continuously if all crop residue is left on this soil and a winter cover crop is planted each year and plowed under in spring. Crop rotations, however, are better suited to this soil than continuous row crops. Apply moderately large amounts of fertilizer and increase the supply of organic matter.

Good tilth is easy to maintain, but excess moisture interferes somewhat with tillage and other fieldwork. Because slopes are gentle, runoff is not a serious hazard. Plant close-growing crops for winter cover to prevent scouring by floods, which occur frequently.

This soil is suited to sprinkler and surface irrigation.

CAPABILITY UNIT IIw-2

This capability unit consists of moderately deep, moderately well drained, friable soils that are medium textured to moderately coarse textured. These soils are on uplands and low stream terraces. At a depth of 18 to 24 inches is a fragipan, or compact layer, which retards the movement of roots, air, and moisture. The surface soil is fine sandy loam and loam, 6 to 8 inches thick. The subsoil is friable loam, silt loam, and clay loam.

Infiltration of water in these soils is medium, and runoff is slow. Above the fragipan, permeability is moderate. These soils have a moderate moisture-supplying capacity. They warm up slowly in spring and are somewhat droughty in dry periods. They contain little organic matter, are low in fertility, and are slightly acid to very strongly acid. These soils are:

Monongahela fine sandy loam, 0 to 2 percent slopes.
Tilsit loam, 0 to 2 percent slopes.

About two-thirds of the acreage in these soils is cultivated. Suitable crops are corn, cotton, small grains, sorghums, soybeans, truck crops, grasses, legumes, and pecans. Peaches are poorly suited.

A good cropping system consists of 1 or 2 years of a close-growing crop, such as Caley peas, followed by 2 years of row crops. Leave all crop residue on these soils to maintain the supply of organic matter.

For high yields of all crops and pasture plants, apply large amounts of fertilizer and increase the organic-matter content. Lime is needed for high yields of most legumes, and many other crops respond to lime.

These soils can be tilled within only a narrow range of moisture content. To control runoff, provide a good cropping system and use crop residue extensively.

These soils are suited to sprinkler and surface irrigation.

CAPABILITY UNIT IIIe-2

This capability unit consists of moderately deep, well-drained, friable soils that are medium textured to moderately course textured. These soils are on sloping uplands and foot slopes. They have a thick root zone; bedrock is at a depth greater than 30 inches. The surface soil is loam and fine sandy loam, 4 to 6 inches thick. The subsoil is friable loam, fine sandy clay loam, and clay loam.

Infiltration of water in these soils is medium, and the permeability and moisture-supplying capacity are moderate. Runoff is medium, and the hazard of erosion is moderate to severe. Organic matter is scarce, fertility is low, and the soils are medium acid to very strongly acid. The soils in this group are:

Hanceville loam, 6 to 10 percent slopes, eroded.
Hartsells fine sandy loam, 6 to 10 percent slopes.
Hartsells fine sandy loam, 6 to 10 percent slopes, eroded.
Jefferson fine sandy loam, 6 to 10 percent slopes, eroded.
Linker fine sandy loam, 6 to 10 percent slopes.
Linker fine sandy loam, 6 to 10 percent slopes, eroded.

Almost two-thirds of the acreage in these soils is cultivated. Suitable crops are cotton, corn, sorghums, soybeans, small grains, truck crops, most grasses and legumes (fig. 10), peaches, and pecans. Row crops can be grown in any of the following cropping systems: (a) 2 years of a sod crop, such as fescue, followed by 1 or 2 years of row crops; (b) 1 year of a reseeding legume that has made seed and is followed by 2 years of row crops; or

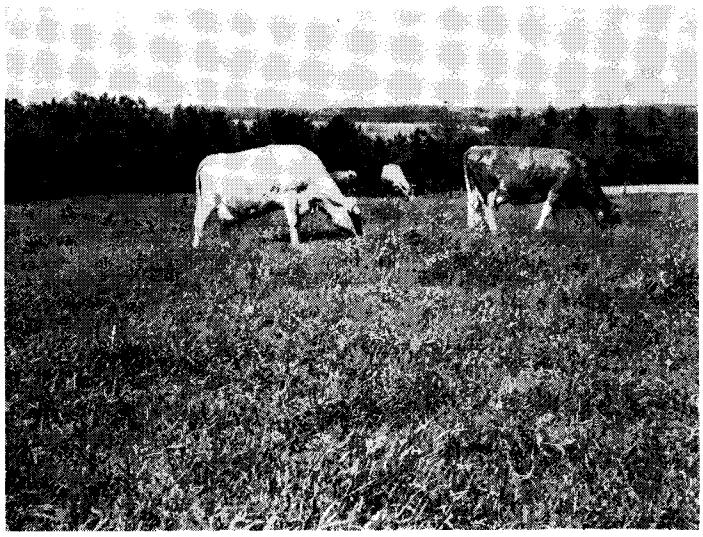

Figure 10.—Pasture of rescuegrass and sericea lespedeza on Hartsells fine sandy loam, 6 to 10 percent slopes, eroded. Well-managed areas produce as much as 180 cow-acre-days of grazing annually.

(c) 2 years of a small grain followed by 1 year of a row crop.

These soils respond well to large amounts of fertilizer, lime, and organic matter. To maintain the organic matter, leave all crop residue on these soils. If alfalfa is planted, add boron. These soils are in good tilth, which is easy to maintain. They can be worked within a wide range of moisture content. The most effective way to control runoff is by planting close-growing crops. In cultivated areas, provide contour tillage, terraces, field borders, and grassed waterways. Stripcropping also helps control runoff.

These soils are suited to sprinkler irrigation.

CAPABILITY UNIT IIIe-7

This capability unit consists of moderately deep to deep, well-drained, loamy soils on uplands and foot slopes. The soils are gently sloping to sloping. They have a moderately thick to thick root zone. Except for the severely eroded Albertville soil in this group, the surface layer of these soils is friable to very friable loam, silt loam, and shaly silt loam, 4 to 6 inches thick. The surface layer of the severely eroded Albertville soil is also 4 to 6 inches thick but is silty clay loam. The subsoil of all the soils in this group is friable to firm, heavy loam to silty clay.

Infiltration of water in these soils is medium to slow, permeability is moderate to slow, and the moisture-supplying capacity is moderate to low. Medium to rapid surface runoff causes a moderate to severe hazard of erosion. Tilth ranges from good to poor. These soils are low in organic matter and in fertility and are medium acid to very strongly acid. They are:

Albertville loam, 6 to 10 percent slopes.
Albertville loam, 6 to 10 percent slopes, eroded.
Albertville silty clay loam, 2 to 6 percent slopes, severely eroded.
Enders silt loam, 6 to 10 percent slopes, eroded.
Muse shaly silt loam, 6 to 10 percent slopes, eroded.

About half the acreage in these soils is cultivated. Suitable crops are corn, cotton, small grains, sorghums, soybeans, truck crops, most grasses and legumes (fig. 11), peaches, and pecans. A good cropping system is 2 years of a sod crop followed by 1 year of a row crop. Less suitable but adequate is 1 year of a reseeding legume that has made seed and is followed by 2 years of row crops.

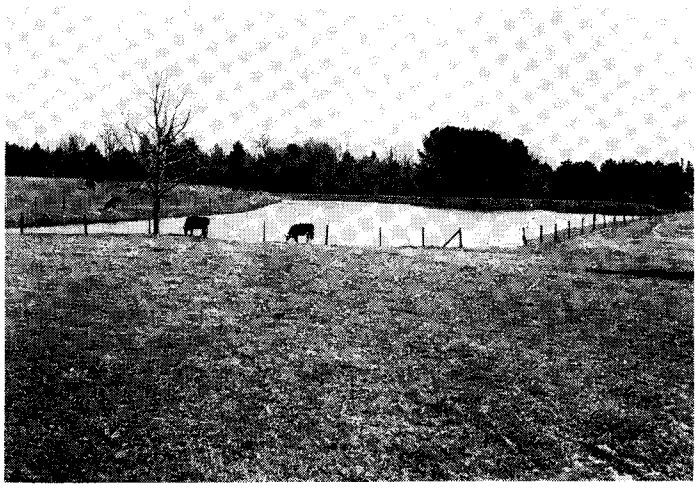

Figure 11.—Pasture of fescue and whiteclover on Albertville loam, 6 to 10 percent slopes, eroded. If well managed, this soil produces as much as 180 cow-acre-days of grazing annually. The well-located stock pond also provides fishing.

For high yields of all crops and pasture plants, add large amounts of fertilizer, lime, and organic matter. To maintain organic matter, leave all crop residue on these soils. Plant sod crops to control runoff, and in cultivated areas, provide contour tillage, field borders, terraces, and grassed waterways. Stripcropping also helps to control runoff.

These soils are suited to sprinkler irrigation.

CAPABILITY UNIT IIIe-9

This capability unit consists of shallow, well-drained, gently sloping soils on uplands. These soils have a friable, moderately coarse textured surface soil and a thin, medium- to fine-textured subsoil. The surface soil is fine sandy loam or shaly fine sandy loam, 4 to 6 inches thick. The subsoil is friable to firm loam, silty clay loam, or silty clay. The root zone is thin; bedrock is 12 to 20 inches below the surface.

Infiltration of water in these soils is medium, and permeability is moderate to slow. The moisture-supplying capacity is low. Surface runoff is medium, and the hazard of erosion is moderate. These soils contain little organic matter, are low in fertility, and are strongly acid to very strongly acid. They are:

Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded.
Hartsells fine sandy loam, shallow, 2 to 6 percent slopes, eroded.

Almost two-thirds of the acreage in these soils is cultivated. The crops best suited are small grains, grasses, forage legumes, some truck crops, and trees. Corn, cotton, and soybeans are not well suited. A row crop can be grown, however, in a cropping system in which sod crops are grown for 2 years and are followed by the row crop. A more suitable cropping system is 2 years of a sod crop followed by 2 years of a small grain.

Figure 12.—Grass waterway in a pasture containing fescue and whiteclover on Philo and Stendal soils, local alluvium. Waterways like this control water and provide hay and pasture.

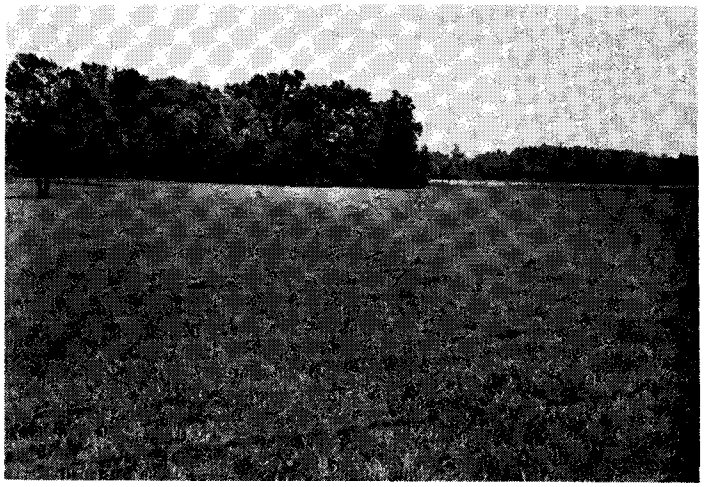

Figure 13.—Well-managed pasture containing fescue and whiteclover on Tyler silt loam. This pasture produces grazing for 200 to 220 cow-acre-days annually.

For all crops and pasture plants, add large amounts of fertilizer to these soils and increase the organic matter. These soils need to be limed before planting most legumes grown in the county and also before many other crops. To maintain organic matter, leave all crop residue on these soils. Plant sod crops to control runoff effectively, and on the stronger slopes, provide contour tillage, terraces, grassed waterways, and field borders.

CAPABILITY UNIT IIIw-2

This capability unit consists of deep, moderately well drained and somewhat poorly drained soils that are friable and medium textured. Slopes range from 0 to 2 percent. The soils in this group are:

Philo and Stendal soils, local alluvium.
Philo loam.

The Philo and Stendal soils, local alluvium, are in depressions on uplands and at the heads of and along narrow drainageways. Philo loam is in general alluvium along the large streams and is periodically flooded. During prolonged wet periods, the water table is near the surface of the soils in this group and some areas are covered with water for several days. The surface layer is loam to sandy loam, 6 to 10 inches thick, and is underlain by loam and sandy loam.

Infiltration of water is medium, and runoff is slow. Permeability is moderate to slow, and the moisture-supplying capacity is moderate to high. These soils are low to medium in organic matter, medium to low in fertility, and medium acid to strongly acid.

More than one-third of the acreage in these soils is cultivated. Suitable crops are corn, small grains, sorghums, soybeans, truck crops, pecans, and grasses and legumes, especially fescue and whiteclover (fig. 12). Good yields of cotton are produced in some areas. Peaches and alfalfa are not suited.

A suitable cropping system is 2 years of a sod crop and 2 years of row crops. One less suitable but adequate consists of 1 year of Caley peas or another reseeding legume that is followed by 2 years of row crops.

For high yields of most crops and pasture plants, add large amounts of fertilizer and organic matter and a moderately large amount of lime. To maintain organic matter, leave all crop residue on these soils. It is easy to maintain good tilth in these soils, but wet periods delay tillage and other fieldwork. Flooding is frequent in long rainy periods; many areas need drainage ditches.

CAPABILITY UNIT IIIw-3

This capability unit consists of deep to moderately deep, somewhat poorly drained soils that are friable and medium textured. These nearly level soils are on uplands, foot slopes, and stream terraces. A thick fragipan, or compact layer, at a depth of 24 to 36 inches retards the movement of roots, air, and moisture. Slopes range from 0 to 2 percent. The surface soil consists of loam or silt loam, 6 to 8 inches thick. The subsoil is friable loam to clay loam.

Infiltration of water in these soils is medium to slow, and surface runoff is slow. Above the fragipan, permeability is moderate to slow. These soils have a moderate to low moisture-supplying capacity. A perched water table is near the surface in prolonged wet periods. These soils warm up slowly in spring and are somewhat droughty in dry periods. They are low in organic matter and in fertility and are medium acid to very strongly acid. The soils in this group are:

Johnsburg loam.
Tyler silt loam.

About one-third of the acreage in these soils is cultivated. Suitable crops are sorghum, soybeans, dallisgrass, fescue (fig. 13), bahiagrass, whiteclover, Caley peas, and annual lespedeza. A good cropping system is 2 years of a sod crop and 2 years of row crops. One less suitable but adequate consists of 1 year of Caley peas that has made seed and is followed by 2 years of row crops.

To obtain high yields of most row crops and forage crops, add large amounts of fertilizer, lime, and organic matter. Leave all crop residue on these soils to help

maintain organic matter. Tillage and other fieldwork are difficult when these soils are wet. Many areas need artificial drainage to reduce flooding and to dispose of excess water in rainy periods.

CAPABILITY UNIT IVe–2

This capability unit consists of moderately deep, well-drained, friable soils that are moderately coarse textured. These soils are sloping to strongly sloping and are on uplands and foot slopes. They have a moderately thick root zone; bedrock is at a depth greater than 24 inches. The soils in this group are:

Hartsells fine sandy loam, 6 to 10 percent slopes, severely eroded.
Jefferson fine sandy loam, 10 to 15 percent slopes, eroded.
Linker fine sandy loam, 6 to 10 percent slopes, severely eroded.
Linker fine sandy loam, 10 to 15 percent slopes.
Linker fine sandy loam, 10 to 15 percent slopes, eroded.

Except for the severely eroded soils in this group, the surface soil is friable to very friable fine sandy loam, 4 to 8 inches thick. The severely eroded soils have a surface layer of friable, heavy fine sandy loam, 3 to 6 inches thick. Their clayey subsoil material is exposed in places, and tilth is not so good as in the less eroded areas. The subsoil is friable loam, fine sandy clay loam, or clay loam. Shallow gullies are common in the severely eroded soils.

Infiltration of water in these soils is medium to slow, and the permeability and moisture-supplying capacity are moderate. Medium to rapid surface runoff causes a moderate to severe hazard of erosion. These soils are low in organic matter and in fertility and are medium acid to very strongly acid.

More than one-third of the acreage in these soils is cultivated. Suitable crops are cotton, corn, sorghums, soybeans, small grains, truck crops, most grasses and legumes, peaches, and pecans. A suitable cropping system consists of 3 or more years of perennial sod crops followed by 1 year of a row crop.

For all crops, these soils need large to very large amounts of fertilizer, lime, and organic matter. Because it is difficult to keep these soils in good tilth, maintain organic matter and improve the tilth by using all crop residue. To control runoff and erosion in cultivated areas, provide a suitable cropping system and make good use of crop residue. Also provide contour tillage, terraces, grassed waterways, and field borders. Stripcropping and diversion ditches may be needed in some areas.

CAPABILITY UNIT IVe–7

This capability unit consists of moderately deep to deep, well-drained soils on uplands and foot slopes. These soils are sloping to strongly sloping. They have a moderately thick to thick root zone. They are:

Albertville loam, 10 to 15 percent slopes, eroded.
Albertville silty clay loam, 6 to 10 percent slopes, severely eroded.
Enders and Muse soils, 6 to 15 percent slopes, severely eroded.
Muse shaly silt loam, 10 to 15 percent slopes, eroded.

The eroded soils in this group have a surface layer of friable to very friable loam, silt loam, and shaly silt loam, 4 to 6 inches thick. The surface layer in the severely eroded soils is silty clay loam, 3 to 5 inches thick. It is fair to poor in tilth. The subsoil of the soils in this group is friable to firm, heavy loam to silty clay.

Infiltration of water is medium, permeability is moderate to slow, and the moisture-supplying capacity is moderately high to low. Rapid surface runoff causes a severe hazard of erosion. These soils are low in organic matter and in fertility and are medium acid to very strongly acid.

About one-third of the acreage in these soils is cultivated. The suitability for crops varies, but grasses and legumes grow best. Suited in some areas are corn, cotton, small grains, sorghums, soybeans, truck crops, peaches, and pecans. A suitable cropping system is 3 or more years of perennial sod crops followed by 1 year of a row crop.

Good tilth is difficult to maintain on these soils; tillage should be kept to a minimum. These soils need large to very large amounts of fertilizer, lime, and organic matter. To control runoff effectively, plant perennial sod crops and provide contour tillage, grassed waterways, field borders, and terraces. Stripcrop areas that are not suited to terraces, and build diversion ditches where needed.

CAPABILITY UNIT IVe–9

This capability unit consists of shallow to very shallow, well-drained soils on gently sloping to sloping uplands. These soils have a friable, medium-textured to moderately coarse textured surface soil and a thin or very thin subsoil. The surface soil is fine sandy loam, shaly fine sandy loam, or shaly silt loam and is 3 to 6 inches thick. The subsoil is friable to firm loam, silty clay loam, shaly silty clay loam, or silty clay. These soils have a thin to very thin root zone; depth to bedrock ranges from 8 to 20 inches.

Infiltration of water in these soils is medium, and permeability is moderate to slow. The moisture-supplying capacity is low to very low. Medium to rapid surface runoff causes a moderate to severe hazard of erosion. These soils are low in organic matter and in fertility and are medium acid to very strongly acid. They are:

Enders and Albertville soils, shallow, 6 to 10 percent slopes, eroded.
Hartsells fine sandy loam, shallow, 6 to 10 percent slopes, eroded.
Pottsville shaly silt loam, 2 to 10 percent slopes, eroded.

One-fourth of the acreage in these soils is cultivated. Sod crops and trees are the best suited crops. Corn, cotton, soybeans, other row crops, and truck crops are poorly suited. If these soils are cultivated, a cropping system that provides 3 or more years of perennial sod crops and 1 year of a row crop should be used.

For all crops and pasture plants, add large amounts of fertilizer, lime, and organic matter. Leave all crop residue on these soils. The most effective way to control runoff is to plant perennial sod crops. To control erosion in cultivated areas, provide contour tillage, grassed waterways, field borders, and terraces.

CAPABILITY UNIT IVw–2

This capability unit consists of deep, poorly drained, medium-textured alluvial soils in depressions on uplands and on stream terraces. The surface layer is faintly to

distinctly mottled silt loam, 6 to 18 inches thick. The subsoil is distinctly to coarsely mottled silt loam to silty clay loam.

Infiltration of water in these soils is medium to slow, permeability is slow, and the moisture-supplying capacity is high. In many places after intensive rains or prolonged wet periods, water stands on these soils for long periods. The soils are low to medium in organic matter, medium to low in natural fertility, and are strongly acid to very strongly acid. The soils in this group are:

Atkins silt loam, local alluvium.
Purdy silt loam.

Almost half of the acreage in these soils is woodland or is idle cropland; only about one-fifth is cultivated. The remaining acreage is in pasture. The crops best suited to these soils are bahiagrass, orchardgrass, dallisgrass, fescue, whiteclover, Caley peas, annual lespedeza, and trees. If drained, some areas are suited to corn, sorghums, and soybeans. A good cropping system consists of 3 or more years of a sod crop followed by 1 year of a row crop. It is best, however, to keep these soils in permanent vegetation.

To improve the tilth and fertility of these soils, add moderately large to large amounts of fertilizer, lime, and organic matter. Prolonged wetness interferes with tillage, and most areas need artificial drainage ditches to remove excess water.

CAPABILITY UNIT VIe-2

This capability unit consists of moderately deep, well-drained, severely eroded soils that are moderately coarse textured to moderately fine textured. These soils are in strongly sloping areas on uplands. Their root zone is moderately thick; bedrock is at a depth greater than 22 inches. The surface layer is silty clay loam or fine sandy loam, 3 to 5 inches thick. The subsoil is friable to firm clay loam or silty clay. In many places, the clayey subsoil material is exposed. Shallow gullies are common on these severely eroded soils.

Infiltration of water is medium to slow, permeability is moderate to slow, and the moisture-supplying capacity is moderate to low. Rapid surface runoff causes a severe hazard of erosion. These soils are low in organic matter and in fertility and are medium acid to very strongly acid. The soils in this group are:

Albertville silty clay loam, 10 to 15 percent slopes, severely eroded.
Linker fine sandy loam, 10 to 15 percent slopes, severely eroded.

More than half of the acreage in these soils is woodland and idle cropland, one-fourth is in pasture, and the rest is cultivated. Some areas are suited to bermudagrass, bahiagrass, sericea lespedeza, and other hardy perennials. The reseeding winter annual grasses like crimson clover are also suited. The best use for these soils, however, is trees.

Tilth is generally fair to fairly good, but in places where the clayey subsoil is exposed, tilth is poor. To improve fertility and tilth, add large to very large amounts of fertilizer, lime, and organic matter to these soils. Keep tillage to a minimum. Erosion is a serious hazard, but it can be controlled by maintaining a permanent cover of vegetation. If these soils are planted to sod crops, provide contour tillage and grassed waterways.

CAPABILITY UNIT VIe-4

This capability unit consists of shallow to very shallow, well-drained to excessively drained soils on uplands. These soils have a thin to very thin root zone; bedrock is at a depth of 8 to 20 inches. The surface soil is friable fine sandy loam, shaly fine sandy loam, shaly silt loam, or silty clay loam, 3 to 6 inches thick. The subsoil is thin to very thin and is fine sandy loam, loam, silty clay loam, shaly silty clay loam, or silty clay.

Infiltration of water through these soils is medium to slow, and the permeability is slow to rapid. The moisture-supplying capacity is low to very low. Surface runoff is medium to rapid, and the hazard of erosion is moderate to severe. These soils are low in organic matter and in fertility and are medium acid to very strongly acid. They are:

Enders and Albertville soils, shallow, 10 to 15 percent slopes.
Enders and Albertville soils, shallow, 10 to 15 percent slopes, eroded.
Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded.
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes.
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded.
Muskingum stony fine sandy loam, 10 to 15 percent slopes.
Pottsville shaly silt loam, 10 to 15 percent slopes.

The Muskingum soil in this group is stony. Shallow gullies are common in the severely eroded Enders and Albertville soils.

About three-fourths of the acreage in these soils is in forest and in idle cropland; only one-tenth is cultivated. The remaining acreage is in pasture. Forestry (fig. 14) is the best use, but some areas are suited to bermudagrass, bahiagrass, kudzu (fig. 15), sericea lespedeza, and to reseeding winter annuals like crimson clover.

Keep tillage to a minimum because tilth is poor. For all crops, add large amounts of fertilizer, lime, and organic matter. Erosion is a serious hazard, but it can be controlled by keeping a cover of vegetation on these soils. If these soils are planted to sod crops, provide contour tillage and grassed waterways.

CAPABILITY UNIT VIIe-1

This capability unit consists of the six miscellaneous land types that are mapped in this county. These land types vary widely in range of soil materials, characteristics, and relief. They are:

Gullied land.
Made land.
Mine pits and dumps.
Rockland, limestone.
Rockland, sandstone.
Sandy alluvial land.

Made land and Mine pits and dumps are not suited to any agricultural use, but if well managed, they can be revegetated. Generally, Gullied land; Rockland, limestone; and Rockland, sandstone, are fairly well suited to trees. Sandy alluvial land has little or no agricultural value, because it is frequently flooded and the material in the surface layer is continually changing.

Almost all of the acreage in these land types is wooded or is idle. A small part is cultivated or in pasture. If well managed, some areas are suited to hardy perennial sod crops. Keep these mapping units in permanent vegetation, preferably trees.

If sod crops are planted, add large amounts of fertilizer, lime, and organic matter. Contour tillage and mulching are also needed in some areas. Runoff is rapid in some places, but it can be controlled by a good cover of sod. In most places, tillage is very difficult and impractical.

CAPABILITY UNIT VIIe-2

This capability unit consists of shallow to very shallow, stony, well-drained to excessively drained soils on uplands. The subsoil is thin or very thin and ranges from stony fine sandy loam to silty clay. The depth to bedrock ranges from 8 to 20 inches. Shallow gullies are common on the severely eroded soils in this group.

Permeability is slow to rapid in these soils, and the moisture-supplying capacity is low to very low. Surface runoff is rapid, and the hazard of erosion is severe. These soils are low in organic matter and in fertility and are medium acid to very strongly acid. They are:

Enders and Albertville silty clay loams, shallow, 10 to 15 percent slopes, severely eroded.
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, severely eroded.
Muskingum stony fine sandy loam, 15 to 45 percent slopes.
Pottsville shaly silt loam, 15 to 45 percent slopes.
Pottsville shaly silty clay loam, 10 to 25 percent slopes, eroded.

Nearly all of the acreage in these soils is wooded. Hardy, perennial sod crops can be grown in some areas, but ordinarily these soils should be kept in permanent vegetation, preferably trees.

For sod crops, add very large amounts of fertilizer, lime, and organic matter and provide contour tillage and mulching. Tillage is very difficult or impractical in some areas. Runoff is generally rapid, but it can be controlled by a good ground cover of vegetation.

Estimated Yields

Table 5 lists, for each soil under two levels of management, the estimated average yields per acre of the principal crops grown in Cullman County. The yields in columns A can be expected under common management, or management provided by most farmers in the county. Those in columns B can be expected under improved management.

Under common management, or management from which the yields in columns A are expected: (1) the amount of fertilizer added is normally not sufficient to produce maximum yields; (2) lime and green-manure crops are seldom used; (3) continuous row crops are planted for long periods of time; (4) runoff water is not controlled, and the loss of soil and plant nutrients is not kept to a minimum; (5) improved crop varieties and certified seed are not always used; (6) overgrazing is common; and (7) weeds, insects, and diseases are not adequately controlled.

Figure 14.—A young stand of loblolly pine on Muskingum stony fine sandy loam, 10 to 15 percent slopes. This soil has a site index of 74 for this thinned stand.

Under improved management, or management from which the yields in columns B are expected: (1) fertilizer, manure, and lime are added according to the needs indicated by soil tests; (2) cropping systems suggested in the descriptions of capability units are followed; (3) water is used or is disposed of by terraces, grassed waterways, field borders, contour cultivation, and artificial drainage; (4) seedbeds are prepared and seeded properly; (5) good crop varieties and plant mixtures are used at proper planting rates; (6) diseases, insects, and undesirable plants are controlled; and (7) grazing is regulated.

Figure 15.—Kudzu on Enders and Albertville soils, shallow. Kudzu provides supplemental grazing and reduces the hazard of erosion.

TABLE 5.—*Expected average yields per acre of*

[Yields in columns A are to be expected under common management; yields in columns B, under

Soil	Capability unit	Field corn		Cotton (lint)		Oats		Sweet-potatoes		Peppers		Field peas	
		A	B	A	B	A	B	A	B	A	B	A	B
		Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Albertville loam, 2 to 6 percent slopes	IIe–7	40	70	500	800	37	58	250	325	250	400	150	275
Albertville loam, 2 to 6 percent slopes, eroded	IIe–7	38	67	475	750	35	55	235	310	235	380	140	260
Albertville loam, 6 to 10 percent slopes	IIIe–7	39	68	485	775	36	57	245	320	240	390	145	265
Albertville loam, 6 to 10 percent slopes, eroded	IIIe–7	36	65	470	740	34	54	230	305	230	370	135	250
Albertville loam, 10 to 15 percent slopes, eroded	IVe–7	34	55	425	600	32	50	210	265	210	320	125	235
Albertville silty clay loam, 2 to 6 percent slopes, severely eroded.	IIIe–7	32	60	420	675	30	50	205	275	205	330	120	225
Albertville silty clay loam, 6 to 10 percent slopes, severely eroded.	IVe–7	27	50	300	550	23	40	175	235	175	275	100	190
Albertville silty clay loam, 10 to 15 percent slopes, severely eroded.	VIe–2												
Atkins silt loam, local alluvium	IVw–2	35	60			30	45					90	175
Enders silt loam, 2 to 6 percent slopes, eroded	IIe–7	38	67	475	750	35	55	235	310	235	380	140	260
Enders silt loam, 6 to 10 percent slopes, eroded	IIIe–7	32	60	420	675	30	50	205	275	205	330	120	225
Enders and Muse soils, 6 to 15 percent slopes, severely eroded.	IVe–7	27	50	300	550	23	40	175	235	175	275	100	190
Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded.	IIIe–9	28	50	350	500	30	50	200	260	200	320	120	225
Enders and Albertville soils, shallow, 6 to 10 percent slopes, eroded.	IVe–9	20	35	260	375	22	38	150	195	150	240	90	170
Enders and Albertville soils, shallow, 10 to 15 percent slopes.	VIe–4												
Enders and Albertville soils, shallow, 10 to 15 percent slopes, eroded.	VIe–4												
Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded.	VIe–4												
Enders and Albertville silty clay loams, shallow, 10 to 15 percent slopes, severely eroded.	VIIe–2												
Gullied land	VIIe–1												
Hanceville loam, 2 to 6 percent slopes, eroded	IIe–2	45	80	600	950	45	68	325	440	275	460	160	290
Hanceville loam, 6 to 10 percent slopes, eroded	IIIe–2	43	75	525	875	42	63	300	410	250	410	140	260
Hartsells fine sandy loam, 2 to 6 percent slopes	IIe–2	44	77	525	875	44	66	325	440	265	440	150	280
Hartsells fine sandy loam, 2 to 6 percent slopes, eroded.	IIe–2	40	70	475	800	40	60	300	400	240	400	135	255
Hartsells fine sandy loam, 6 to 10 percent slopes	IIIe–2	42	74	500	840	42	63	310	420	250	420	140	270
Hartsells fine sandy loam, 6 to 10 percent slopes, eroded.	IIIe–2	38	68	450	750	38	58	280	375	230	380	130	240
Hartsells fine sandy loam, 6 to 10 percent slopes, severely eroded.	IVe–2	30	55	350	550	35	55	250	335	205	345	120	225
Hartsells fine sandy loam, shallow, 2 to 6 percent slopes, eroded.	IIIe–9	30	55	400	550	40	60	250	300	225	350	130	240
Hartsells fine sandy loam, shallow, 6 to 10 percent slopes, eroded.	IVe–9	23	42	300	440	30	45	190	225	170	260	90	180
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes.	VIe–4												
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded.	VIe–4												
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, severely eroded.	VIIe–2												
Jefferson fine sandy loam, 2 to 6 percent slopes, eroded.	IIe–2	36	67	450	725	37	58	275	360	215	365	120	230
Jefferson fine sandy loam, 6 to 10 percent slopes, eroded.	IIIe–2	34	65	425	700	35	56	265	345	205	350	110	215
Jefferson fine sandy loam, 10 to 15 percent slopes, eroded.	IVe–2	30	55	350	500	30	50	225	310	190	325	100	200
Johnsburg loam	IIIw–3	35	60	300	450	35	50			150	300	125	200
Leadvale loam, 2 to 6 percent slopes	IIe–5	40	70	450	750	35	50	200	270	225	350	140	260
Leadvale loam, 2 to 6 percent slopes, eroded	IIe–5	37	65	400	700	32	45	175	250	210	325	130	245
Linker fine sandy loam, 2 to 6 percent slopes	IIe–2	44	77	525	875	44	66	325	440	265	440	150	280
Linker fine sandy loam, 2 to 6 percent slopes, eroded.	IIe–2	40	70	475	800	40	60	300	400	240	400	135	255
Linker fine sandy loam, 6 to 10 percent slopes	IIIe–2	42	74	500	840	42	63	310	420	250	420	140	270

See footnotes at end of table.

principal crops under two levels of management

improved management. Dashed lines indicate that the soil is not suited to the crop specified]

Lima beans		Pole snap beans		Tomatoes		Irish potatoes		Strawberries		Watermelons		Alfalfa hay		Sericea hay		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Crates* [1]	*Crates* [1]	*Number*	*Number*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
170	270	210	360	220	370	125	225	95	160	700	800	2. 5	3. 5	2. 0	3. 5	90	190
160	255	200	345	210	350	115	200	85	145	650	750	2. 3	3. 2	2. 0	3. 3	80	180
165	265	205	350	215	360	120	210	90	150	675	775	2. 5	3. 5	2. 0	3. 5	90	190
155	250	195	335	200	340	110	190	80	140	625	725	2. 3	3. 2	2. 0	3. 3	80	180
145	215	185	285	190	290	100	160	70	100	590	635	2. 1	2. 8	1. 9	2. 8	70	150
140	225	175	300	180	305	90	170	65	105	575	650	2. 0	3. 0	1. 8	3. 0	65	160
115	185	145	250	150	255	80	145	60	95	475	555	1. 8	2. 5	1. 5	2. 5	60	135
														. 7	1. 2	45	120
125	190	135	250	180	310											100	200
160	255	200	345	210	350	115	200	85	145	650	750	2. 3	3. 2	2. 0	3. 3	80	180
140	225	175	300	180	305	100	170	65	105	575	650	2. 0	3. 0	1. 8	3. 0	70	160
115	185	145	250	150	255	80	145	60	95	475	555	1. 8	2. 5	1. 5	2. 5	60	135
140	225	175	300	190	320	105	180	75	120	600	700	1. 7	2. 5	1. 7	2. 5	60	140
105	170	135	225	145	240	80	135	55	90	450	525	1. 3	1. 9	1. 3	1. 9	45	105
														1. 0	1. 4	40	90
														. 7	1. 1	35	85
														. 6	. 9	30	85
														. 5	. 8	25	80
															1. 0		90
185	290	230	390	225	380	165	275	100	160	800	1, 000	3. 0	4. 0	2. 3	3. 8	100	200
170	275	215	370	215	365	160	270	95	155	775	975	2. 8	3. 9	2. 2	3. 6	95	195
175	275	220	375	220	370	165	275	95	160	800	1, 000	2. 7	3. 8	2. 0	3. 5	90	190
160	250	200	350	200	335	150	250	85	150	725	900	2. 5	3. 5	1. 8	3. 2	75	180
165	265	210	360	210	355	155	265	90	155	760	950	2. 7	3. 8	2. 0	3. 5	90	190
150	240	190	340	190	325	145	240	80	140	700	850	2. 5	3. 5	1. 8	3. 2	75	180
130	225	170	315	175	300	120	200	70	115	600	700	2. 0	2. 7	1. 7	3. 0	60	150
150	240	185	325	190	325	115	190	80	130	650	750	1. 7	2. 5	1. 8	2. 7	50	120
115	180	140	245	145	245	85	145	60	90	490	560	1. 3	1. 9	1. 4	2. 1	40	100
														1. 2	1. 7	35	95
														1. 0	1. 5	30	90
														. 5	. 7	25	80
145	225	185	320	185	300	135	225	80	140	700	800	2. 4	3. 4	1. 8	3. 2	70	165
135	210	175	305	175	285	130	210	75	130	650	750	2. 3	3. 2	1. 7	3. 0	65	155
125	200	160	290	160	275	110	190	65	115	600	700	2. 0	2. 8	1. 5	2. 5	55	140
130	200	150	290	190	320									1. 0	1. 7	125	210
160	255	200	345	210	350	100	180	50	80	400	600	1. 5	2. 5	1. 5	2. 5	90	190
150	230	180	320	200	320	80	150	35	65	350	510	1. 3	2. 2	1. 3	2. 2	80	175
175	275	220	375	220	370	165	275	95	160	800	1, 000	2. 7	3. 8	2. 0	3. 5	90	190
160	250	200	350	200	335	150	250	85	150	725	900	2. 5	3. 5	1. 8	3. 2	75	180
165	265	210	360	210	355	155	265	90	155	760	950	2. 7	3. 8	2. 0	3. 5	90	190

TABLE 5.—*Expected average yields per acre of principal*

Soil	Capability unit	Field corn		Cotton (lint)		Oats		Sweet-potatoes		Peppers		Field peas	
		A	B	A	B	A	B	A	B	A	B	A	B
		Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Linker fine sandy loam, 6 to 10 percent slopes, eroded.	IIIe–2	38	68	450	750	38	58	280	375	230	380	130	240
Linker fine sandy loam, 6 to 10 percent slopes, severely eroded.	IVe–2	30	55	350	500	30	50	200	290	175	300	85	170
Linker fine sandy loam, 10 to 15 percent slopes	IVe–2	36	64	400	700	36	55	270	350	220	360	120	220
Linker fine sandy loam, 10 to 15 percent slopes, eroded.	IVe–2	32	60	375	550	34	53	225	310	190	325	100	200
Linker fine sandy loam, 10 to 15 percent slopes, severely eroded.	VIe–2												
Made land	VIIe–1												
Mine pits and dumps	VIIe–1												
Monongahela fine sandy loam, 0 to 2 percent slopes.	IIw–2	40	70	400	700	30	45	160	240	200	300	140	260
Monongahela fine sandy loam, 2 to 6 percent slopes.	IIe–5	40	70	450	750	35	50	200	270	225	350	140	260
Muse shaly silt loam, 2 to 6 percent slopes, eroded.	IIe–7	38	67	475	750	40	60	235	310	235	380	140	260
Muse shaly silt loam, 6 to 10 percent slopes, eroded.	IIIe–7	36	64	425	700	38	57	220	300	225	360	130	250
Muse shaly silt loam, 10 to 15 percent slopes, eroded.	IVe–7	34	55	425	600	32	50	210	265	210	320	125	235
Muskingum stony fine sandy loam, 10 to 15 percent slopes.	VIe–4												
Muskingum stony fine sandy loam, 15 to 45 percent slopes.	VIIe–2												
Philo loam	IIIw–2	45	80	425	750	45	60	190	275	200	400	180	300
Philo and Stendal soils, local alluvium	IIIw–2	40	75	300	450	40	50			150	300	150	235
Pope fine sandy loam	IIw–1	50	90	500	800	45	70	250	350	200	400	180	300
Pottsville shaly silt loam, 2 to 10 percent slopes, eroded.	IVe–9	20	35	260	375	22	38					90	170
Pottsville shaly silt loam, 10 to 15 percent slopes.	VIe–4												
Pottsville shaly silt loam, 15 to 45 percent slopes.	VIIe–2												
Pottsville shaly silty clay loam, 10 to 25 percent slopes, eroded.	VIIe–2												
Purdy silt loam	IVw–2	35	60			30	45					90	175
Rockland, limestone	VIIe–1												
Rockland, sandstone	VIIe–1												
Sandy alluvial land	VIIe–1												
Sequatchie silt loam, 0 to 2 percent slopes	I–2	50	90	550	900	45	75	300	400	275	460	180	300
Sequatchie silt loam, 2 to 6 percent slopes	IIe–2	45	80	500	850	44	66	275	375	250	425	150	275
Tilsit loam, 0 to 2 percent slopes	IIw–2	40	70	450	750	35	50	175	250	225	350	145	270
Tilsit fine sandy loam, 2 to 6 percent slopes	IIe–5	45	75	500	800	44	66	310	420	250	425	150	280
Tilsit fine sandy loam, 2 to 6 percent slopes, eroded.	IIe–5	40	70	475	775	40	60	290	390	220	380	135	255
Tyler silt loam	IIIw–3	35	60	300	450	35	50			150	300	125	200

[1] A crate contains 24 quarts of berries.

[2] Cow-acre-days is the number of animal units carried per acre multiplied by the number of days during the year that animals can be grazed without injury to the pasture. For example, a soil that provides grazing for 1 animal unit per acre for 360 days of the year rates

crops under two levels of management—Continued

Lima beans		Pole snap beans		Tomatoes		Irish potatoes		Strawberries		Watermelons		Alfalfa hay		Sericea hay		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Crates* [1]	*Crates* [1]	*Number*	*Number*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
150	240	190	340	190	325	145	240	80	140	700	850	2. 5	3. 5	1. 8	3. 2	75	180
110	190	145	260	150	260	105	180	60	100	550	700	2. 1	3. 0	1. 5	2. 8	65	150
140	220	180	320	180	310	140	230	80	140	700	850	2. 6	3. 7	1. 9	3. 1	80	185
125	200	160	290	160	275	120	200	65	115	600	750	2. 3	3. 2	1. 7	3. 0	75	180
														1. 0	1. 5	60	130
130	200	150	290	190	320	80	150	35	65	350	500	1. 3	2. 2	1. 5	2. 5	100	200
160	255	200	345	210	350	100	180	50	80	400	600	1. 5	2. 5	1. 5	2. 5	90	190
160	255	200	245	210	350	115	200	85	145	650	750	2. 3	3. 2	2. 0	3. 3	80	180
150	240	190	330	200	330	105	190	80	135	620	720	2. 2	3. 1	2. 0	3. 3	75	175
145	215	185	285	190	290	100	160	70	100	590	635	2. 1	2. 8	1. 9	2. 8	70	150
																30	90
200	300	240	400	215	360	95	170	30	50	350	525			1. 3	2. 1	140	225
175	250	190	300	190	340									1. 0	1. 7	125	215
200	300	240	400	240	400	125	225	35	65	400	600	2. 3	3. 2	2. 0	3. 3	150	225
105	170	135	225	145	240									1. 0	1. 5	35	90
														. 8	1. 3	40	85
														. 5	1. 0	35	80
														. 4	. 8	30	70
																110	210
200	300	240	400	240	400	165	275	100	160	800	1, 000	2. 7	3. 8	. 7	1. 4	25	40
170	265	210	360	220	370	150	250	85	150	725	900	2. 5	3. 5	2. 3	3. 8	120	220
165	260	200	335	210	350	90	170	45	75	375	550	1. 5	2. 5	1. 5	3. 0	100	200
175	275	220	375	220	370	155	260	90	150	750	950	2. 3	3. 3	1. 5	2. 5	100	200
160	250	200	350	200	335	140	235	80	140	650	825	2. 1	3. 0	2. 0	3. 4	90	190
130	200	150	290	190	320									1. 5	3. 0	75	180
														1. 0	1. 7	125	220

360; a soil that provides grazing for 1 animal unit on 2 acres for 180 days rates 90; and a soil that provides grazing for 1 animal unit on 4 acres for 100 days rates 25.

Use and Management of Woodland [3]

This section consists of three main parts. In the first part, the soils of the county are placed in woodland suitability groups. The growth of trees on these groups of soils and limitations to growth are discussed. The second part suggests practices for the management of stands of pine in three size classes. The third part consists of two tables that list stand and yield data for loblolly, shortleaf, and Virginia pine.

Woodland Suitability Groups

To assist in planning the use of soils for growing trees, the soils in Cullman County have been placed in 13 woodland suitability groups. A woodland suitability group consists of soils that have about the same limitations to growth of trees and that need about the same management. Pine is generally best suited to the soils of the county, and some hardwoods are well suited to the soils of a few woodland groups.

Table 6 lists the available site indexes of the soils in each group for loblolly, shortleaf, and Virginia pine. The site index of a soil for a species of tree is the average height of the dominant trees in a stand at the age of 50 years. The site indexes for hardwoods are not listed. Table 6 also gives ratings for degrees of limitations to seedling mortality, plant competition, equipment limitations, erosion hazard, and windthrow hazard.

Seedling mortality is the failure of seedlings to grow after adequate natural seeding or after suitable seedlings have been planted. It is affected by the nature of the soil and by other environmental factors. The ratings given in the discussions of the woodland groups and in table 6 are for trees that are in a normal environment. Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are sufficient seeds. It is *moderate* if 25 to 50 percent of the planted seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places, replanting will be necessary to fill open spaces. Mortality is *severe* if more than 50 percent of the planted seedlings die, or if trees do not ordinarily reseed naturally in places where there are enough seeds. Where mortality is severe, plant seedlings where the seeds do not grow, prepare special seedbeds, and use good methods of planting to assure a full stand of trees.

Plant competition is rated according to the degree that undesirable plants invade the woodlots. Competition is *slight* if unwanted plants do not cause a special problem. It is *moderate* if the invaders delay but do not prevent the establishment of a normal, fully stocked stand. Seedbed preparation is generally not needed, and simple methods can be used to prevent undesirable plants from invading. Competition is *severe* if trees cannot regenerate naturally. Where competition is severe, carefully prepare the site and use management that includes controlled burning, spraying with chemicals, and girdling.

Equipment limitations are rated according to the degree that soils restrict or prevent the use of forestry equipment. Limitations are *slight* if there are no restrictions on the type of equipment or on the time of year that equipment can be used. They are *moderate* where slopes are moderately steep or where heavy equipment is restricted by wetness in winter and early in spring. In some areas, the firm, clayey subsoil may be excessively wet and may be exposed by erosion. Equipment limitations are *severe* on moderately steep and steep soils that are stony and have rock outcrops. They are also severe on wet bottom lands and low terraces in winter or early in spring.

Erosion hazard is rated according to the risk of erosion on well-managed woodland. The hazard of erosion is *slight* where only a slight loss of soil is expected. Generally, soils have only slight erosion if slopes range from 0 to 2 percent, and runoff is slow or very slow. Erosion hazard is *moderate* where there would be a moderate loss of soil if runoff is not controlled and the vegetative cover is not adequate for protection. It is *severe* where steep slopes, rapid runoff, slow infiltration and permeability, and past erosion make the soil susceptible to severe erosion.

Windthrow hazard depends on the development of roots and on the ability of the soils to hold trees firmly. If the hazard is *slight*, the trees are firmly rooted and will not fall over in a normal wind. If *moderate*, roots develop enough to hold the trees firmly, except when the soil is excessively wet and the wind is strong. Windthrow hazard is *severe* if roots do not provide enough stability to prevent the trees from blowing over when they are not protected by other trees.

WOODLAND SUITABILITY GROUP 1

Atkins silt loam, local alluvium, is the only soil in this group. This deep, friable, poorly drained soil is in recent local alluvium at the heads of and along narrow drainageways and draws. In some places, water stands on this nearly level soil for a long time after heavy rains or in wet periods. Infiltration of water is medium to slow, permeability is slow, and the moisture-supplying capacity is high.

Loblolly pine is the best suited marketable pine on Atkins silt loam, local alluvium, which has a site index range of 82 to 90 for this tree. Gum and ash are well-suited commercial hardwoods.

On this soil, most limitations to the growth of trees and most problems of management are caused by excess water. Though seedling mortality is generally slight, some seedlings are killed in wet places. Plant competition is severe because the moisture-supplying capacity is high. In winter and early in spring, wet soil and standing water limit the use of equipment. Though the windthrow hazard is moderate, trees are likely to be uprooted by strong winds in wet periods when the soil is saturated. The hazard of erosion is slight.

WOODLAND SUITABILITY GROUP 2A

In this group are deep, friable, medium-textured soils that are well drained to somewhat poorly drained. They are:

Philo loam.
Philo and Stendal soils, local alluvium.
Pope fine sandy loam.

Philo loam and Pope fine sandy loam are on first bottoms, which are occasionally flooded. Philo and Stendal soils, local alluvium, are in swales and depressions and

[3] By M. A. PETERS, woodland conservationist, and R. B. MCNUTT and E. A. PERRY, soil scientists, Soil Conservation Service.

TABLE 6.—*Growth of trees on woodland suitability groups and hazards to growth and management*

[Dashed lines indicate absence of data]

Group number	Soil name and symbol	Site index			Seedling mortality	Plant competition	Equipment limitations	Erosion hazard	Windthrow hazard
		Loblolly pine	Shortleaf pine	Virginia pine					
1	Atkins silt loam, local alluvium (At).	86±4			Slight	Severe	Severe	Slight	Moderate.
2A	Philo loam (Ph)	81±5	79		Slight	Severe	Severe	Slight	Slight.
	Philo and Stendal soils, local alluvium (Pm).	81±5	79		Slight	Severe	Severe	Slight	Slight.
	Pope fine sandy loam (Po)	81±5	79		Slight	Severe	Severe	Slight	Slight.
2B	Johnsburg loam (Jo)	81±5	79		Slight	Severe	Severe	Slight	Moderate.
	Purdy silt loam (Pu)	81±5	79		Slight	Severe	Severe	Slight	Moderate.
	Tyler silt loam (Ty)	81±5	79		Slight	Severe	Severe	Slight	Moderate.
3A	Albertville loam (AbB, AbB2, AbC, AbC2, AbD2).	79±7	69±3		Slight	Moderate	Slight	Moderate to severe.	Moderate.
	Muse shaly silt loam (MsB2, MsC2, MsD2).	79±7	69±3		Slight	Moderate	Moderate	Moderate to severe.	Slight.
	Sequatchie silt loam (SeA, SeB).	79±7	69±3		Slight	Severe	Moderate	Moderate	Slight.
3B	Leadvale loam (LeB, LeB2)	79±7	69±3		Slight	Moderate	Moderate	Moderate	Moderate.
	Monongahela fine sandy loam (MoA, MoB).	79±7	69±3		Slight	Severe	Moderate	Moderate	Moderate.
4A	Muskingum stony fine sandy loam (MuD, MuE).	74±7	62±15	72	Moderate	Moderate	Severe	Severe	Moderate.
4B	Enders and Albertville soils, shallow (EsB2, EsC2, EsD, EsD2).	58±4	58±11	58±10	Slight	Moderate	Slight	Moderate	Moderate.
	Enders silt loam (EnB2, EnC2).	58±4	58±11	58±10	Slight	Moderate	Slight	Moderate	Moderate.
	Hanceville loam (HaB2, HaC2).	74±7	62±15	72	Slight	Moderate	Slight	Moderate	Moderate.
	Tilsit fine sandy loam (TtB, TtB2).	74±7	62±15	72	Slight	Moderate	Slight	Moderate	Moderate.
5A	Hartsells fine sandy loam (HrB, HrB2, HrC, HrC2, HrC3).	68±8	62±9	66±19	Slight	Moderate	Slight	Moderate	Slight.
	Hartsells fine sandy loam, shallow (HsB2, HsC2, HsD, HsD2).	68±8	62±9	66±19	Slight	Moderate	Slight	Moderate	Moderate.
	Jefferson fine sandy loam (JeB2, JeC2, JeD2).	68±8	62±9	66±19	Slight	Moderate	Slight	Moderate	Slight.
	Linker fine sandy loam (LkB, LkB2, LkC, LkC2, LkD, LkD2).	68±8	62±9	66±19	Slight	Moderate	Slight	Moderate	Slight.
	Tilsit loam (TsA)	68±8	62±9	66±19	Slight	Moderate	Slight	Moderate	Moderate.
5B	Albertville silty clay loam (AcB3, AcC3, AcD3).	68±8	62±9	66±19	Moderate	Slight	Slight	Moderate to severe.	Moderate.
	Enders and Muse soils (EsC3).	68±8	62±9	66±19	Moderate	Moderate	Slight	Moderate	Moderate.
	Hartsells fine sandy loam, shallow (HsD3).	68±8	62±9	66±19	Slight	Moderate	Slight	Moderate	Moderate.
6	Pottsville shaly silt loam, (PsB2, PsD).	58±4	58±11	58±10	Slight	Slight	Slight	Moderate	Moderate.
	Pottsville shaly silt loam (PsF).	58±4	58±11	58±10	Moderate	Slight	Severe	Severe	Moderate.
7	Enders and Albertville silty clay loams, shallow (ErC3, ErD3).				Moderate	Slight	Slight	Moderate to severe.	Moderate.
	Linker fine sandy loam (LkC3, LkD3).				Slight	Moderate	Slight	Moderate to severe.	Slight.
	Pottsville shaly silty clay loam (PtE2).				Moderate	Slight	Moderate	Severe	Moderate.
8	Gullied land (Gu)				Slight to severe.	Slight	Severe	Moderate to severe.	Slight.
	Made land (Ma)				Slight to severe.	Slight	Slight	Moderate to severe.	Slight.
	Mine pits and dumps (Md)				Slight to severe.	Slight	Severe	Moderate to severe.	Slight.
	Rockland, sandstone (Ro)				Slight to severe.	Moderate	Severe	Moderate to severe.	Moderate.
	Sandy alluvial land (Sa)				Slight to severe.	Slight to severe.	Slight to severe.	Slight	Slight.
9	Rockland, limestone (Rk)				Slight to severe.	Moderate	Severe	Moderate to severe.	Moderate.

Figure 16.—**Selectively cut loblolly pine on Albertville loam, 6 to 10 percent slopes. This woodland has a site index of 70 and will provide yearly 500 board feet of lumber per acre.**

at the heads of and along narrow drainageways. These soils have moderate to rapid permeability and moderate to high moisture-supplying capacity.

Loblolly and shortleaf pines are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 76 to 86; that for shortleaf pine is 79. Yellow-poplar, gum, water oak, and ash are well-suited hardwoods.

On these soils, most limitations to the growth of trees and most problems of management are caused by medium fertility and by wetness. The supply of moisture and of plant nutrients is so good that the mortality of seedlings is slight and competition from unwanted plants is severe. In winter and early in spring, floods and wet soils severely limit the use of equipment. These nearly level soils have a deep, permeable root zone, and their windthrow hazard is slight. The erosion hazard is also slight.

WOODLAND SUITABILITY GROUP 2B

In this group are moderately deep to deep, somewhat poorly drained to poorly drained soils. These soils are on low saddles and divides on uplands and low stream terraces. They are moderate to slow in permeability and moderate to high in moisture-supplying capacity. The soils are:

Johnsburg loam.
Purdy silt loam.
Tyler silt loam.

The Tyler and Johnsburg soils are normally saturated in wet weather. The Purdy soil has a high water table, and water stands on the surface much of the time.

Loblolly and shortleaf pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 76 to 86; that for shortleaf pine is 79. Gum and ash are well-suited hardwoods.

On these soils, most limitations to the growth of trees and most problems of management are caused by excess water. Seedling mortality is generally slight, but small seedlings may be killed by standing water. Competition from undesirable plants is severe because plenty of moisture is available. In winter and early in spring, too much moisture and standing water make equipment hard to use. Though the windthrow hazard is moderate, a fragipan in these soils restricts the root zone and keeps the upper part of the subsoil wet. The erosion hazard is slight because the soils are nearly level.

WOODLAND SUITABILITY GROUP 3A

In this group are moderately deep to deep, well-drained soils on uplands, stream terraces, and foot slopes. These soils are:

Albertville loam, 2 to 6 percent slopes.
Albertville loam, 2 to 6 percent slopes, eroded.
Albertville loam, 6 to 10 percent slopes.
Albertville loam, 6 to 10 percent slopes, eroded.
Albertville loam, 10 to 15 percent slopes, eroded.
Muse shaly silt loam, 2 to 6 percent slopes, eroded.
Muse shaly silt loam, 6 to 10 percent slopes, eroded.
Muse shaly silt loam, 10 to 15 percent slopes, eroded.
Sequatchie silt loam, 0 to 2 percent slopes.
Sequatchie silt loam, 2 to 6 percent slopes.

Loblolly and shortleaf pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 72 to 86, and for shortleaf pine from 66 to 72. For some of the Albertville soils, the site indexes are lower than for the other soils in this group (fig. 16). Some areas of these soils have a thin surface layer, no B_1 horizon, and a firm B_2 horizon of silty clay. In these areas, the site index ranges from 54 to 62 for loblolly pine and from 47 to 69 for shortleaf pine.

Most limitations to the growth of trees on these soils and most problems of management are caused by an abundance of water, steep slopes, and a thin root zone. Because the supply of moisture is good, seedling mortality is slight. Plant competition is severe on the Sequatchie soils and is only moderate on the Muse and Albertville, because more moisture is available in the Sequatchie soils than in the Muse and Albertville soils. The mild slopes and permeable subsoil of the Sequatchie soils cause only a moderate hazard of erosion. On the Muse and Albertville soils, the erosion hazard is moderate to severe because these soils are generally steeper than the Sequatchie soils and their subsoil contains more clay. The windthrow hazard is slight on the Muse and Sequatchie soils and is moderate on the Albertville soils, mainly because the root zone of the Albertville soils is thinner than that of the Muse and Sequatchie.

WOODLAND SUITABILITY GROUP 3B

In this group are moderately deep, moderately well drained soils on foot slopes and stream terraces. These soils contain a well-developed fragipan at a depth of 16 to 30 inches. Permeability is moderate above the fragipan but is slow beneath it. The moisture-supplying capacity is moderate. These soils are:

Leadvale loam, 2 to 6 percent slopes.
Leadvale loam, 2 to 6 percent slopes, eroded.
Monongahela fine sandy loam, 0 to 2 percent slopes.
Monongahela fine sandy loam, 2 to 6 percent slopes.

Loblolly and shortleaf pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 72 to 86, and for shortleaf pine from 66 to 72.

Most limitations to the growth of trees on these soils and most problems of management are caused by excess water and by the fragipan. Seedling mortality is slight because the moisture-supplying capacity is moderate.

Mainly because the moisture supply is good, plant competition is severe on the Monongahela soils and is moderate on the Leadvale soils. In winter and spring, these soils are normally saturated and equipment limitations are moderate. To prevent it from miring down, heavy equipment should be used with care. The erosion hazard is moderate because these soils are saturated quickly above the fragipan during rains and surface runoff is increased. The pan restricts the growth of roots and causes a moderate windthrow hazard.

WOODLAND SUITABILITY GROUP 4A

In this group are friable, shallow to very shallow, stony soils that are excessively drained and strongly sloping to steep. These soils have rapid permeability and low moisture-supplying capacity, especially on the south-facing slopes. Sandstone bedrock is at a depth ranging from less than 10 to as much as 18 inches. The soils are:

Muskingum stony fine sandy loam, 10 to 15 percent slopes.
Muskingum stony fine sandy loam, 15 to 45 percent slopes.

Loblolly, shortleaf, and Virginia pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 67 to 81, and for shortleaf pine from 47 to 77. It is 72 for Virginia pine.

On these soils, most limitations to the growth of trees and most problems of management are caused by a low moisture-supplying capacity, shallowness, and steep slopes. Because moisture is scarce and fertility is low, seedling mortality and plant competition are moderate. Strong slopes, stoniness, and rock outcrops cause severe limitations to the use of equipment in most places. The erosion hazard is severe because the soils are shallow and steep and runoff is rapid. The windthrow hazard is moderate because roots cannot penetrate these soils deeply.

WOODLAND SUITABILITY GROUP 4B

In this group are shallow to very deep soils on the uplands. These soils are well drained and are gently sloping to strongly sloping. Their permeability ranges from moderate to slow. They are:

Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded.
Enders and Albertville soils, shallow, 6 to 10 percent slopes, eroded.
Enders and Albertville soils, shallow, 10 to 15 percent slopes.
Enders and Albertville soils, shallow, 10 to 15 percent slopes, eroded.
Enders silt loam, 2 to 6 percent slopes, eroded.
Enders silt loam, 6 to 10 percent slopes, eroded.
Hanceville loam, 2 to 6 percent slopes, eroded.
Hanceville loam, 6 to 10 percent slopes, eroded.
Tilsit fine sandy loam, 2 to 6 percent slopes.
Tilsit fine sandy loam, 2 to 6 percent slopes, eroded.

The Tilsit soils have a fragipan at a depth of 18 to 24 inches. The moisture-supplying capacity of the soils in this group varies widely. It is low in the shallow soils, high in the deep to very deep Hanceville soils, and moderate in the Tilsit soils.

Loblolly, shortleaf, and Virginia pine are the commercial trees best suited to these soils. The site index for loblolly pine on the Hanceville and Tilsit soils ranges from 67 to 81, and for shortleaf pine from 47 to 77. Virginia pine has a site index of 72. Because the Enders and Albertville soils and the Enders silt loams have a thin A horizon and a firm silty clay to clay B horizon, the site indexes of those soils are only 54 to 62 for loblolly pine, 47 to 69 for shortleaf pine, and 48 to 68 for Virginia pine.

Most limitations to the growth of trees and most problems of management on the soils of this group are caused by lack of water and by shallowness. Although these soils vary in their moisture-supplying capacity, their moisture content is generally better than that of the soils in group 4A. Their seedling mortality is slight, and competition from undesirable plants is moderate. There is only slight limitation in the use of equipment. The erosion hazard is moderate because drainage is good and slopes are generally mild. The windthrow hazard is moderate.

WOODLAND SUITABILITY GROUP 5A

The soils in this group are well drained to moderately well drained and shallow to moderately deep. They are on nearly level to strongly sloping uplands and foot slopes. This group includes:

Hartsells fine sandy loam, 2 to 6 percent slopes.
Hartsells fine sandy loam, 2 to 6 percent slopes, eroded.
Hartsells fine sandy loam, 6 to 10 percent slopes.
Hartsells fine sandy loam, 6 to 10 percent slopes, eroded.
Hartsells fine sandy loam, 6 to 10 percent slopes, severely eroded.
Hartsells fine sandy loam, shallow, 2 to 6 percent slopes, eroded.
Hartsells fine sandy loam, shallow, 6 to 10 percent slopes, eroded.
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes.
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded.
Jefferson fine sandy loam, 2 to 6 percent slopes, eroded.
Jefferson fine sandy loam, 6 to 10 percent slopes, eroded.
Jefferson fine sandy loam, 10 to 15 percent slopes, eroded.
Linker fine sandy loam, 2 to 6 percent slopes.
Linker fine sandy loam, 2 to 6 percent slopes, eroded.
Linker fine sandy loam, 6 to 10 percent slopes.
Linker fine sandy loam, 6 to 10 percent slopes, eroded.
Linker fine sandy loam, 10 to 15 percent slopes.
Linker fine sandy loam, 10 to 15 percent slopes, eroded.
Tilsit loam, 0 to 2 percent slopes.

Most of these soils are moderately permeable, but a fragipan at a depth of 18 to 24 inches in the Tilsit soil is slowly permeable. Except in the shallow Hartsells soils where it is low, the moisture-supplying capacity is moderate to high.

Loblolly, shortleaf, and Virginia pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 60 to 76, for shortleaf pine from 53 to 71, and for Virginia pine from 47 to 85.

On these soils, most limitations to the growth of trees and most problems of management are caused by low fertility and by shallowness. Because the moisture-supplying capacity is good, seedling mortality is slight. The generally low fertility causes moderate plant competition. The slopes are not steep enough to limit use of equipment or to cause much erosion. The windthrow hazard is generally slight, but it is moderate on the shallow Hartsells soils and on the Tilsit soil. The Hartsells soils have a thin root zone, and the fragipan in the Tilsit soil retards the penetration of water and roots.

WOODLAND SUITABILITY GROUP 5B

The soils in this group are well drained, moderately deep, and severely eroded. They are gently sloping to strongly sloping and occur on uplands. Their surface runoff is medium to rapid; permeability is slow in their

firm, clayey subsoil; and their moisture-supplying capacity is moderate to low. These soils are:

Albertville silty clay loam, 2 to 6 percent slopes, severely eroded.
Albertville silty clay loam, 6 to 10 percent slopes, severely eroded.
Albertville silty clay loam, 10 to 15 percent slopes, severely eroded.
Enders and Muse soils, 6 to 15 percent slopes, severely eroded.
Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, severely eroded.

Loblolly, shortleaf, and Virginia pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 60 to 76, for shortleaf pine from 53 to 71, and for Virginia pine from 47 to 85.

Most limitations to the growth of trees on these soils and most problems of management are caused by low fertility, generally low moisture-supplying capacity, shallowness, and severe erosion. Because of these features, seedling mortality is moderate and plant competition is slight. Slopes are not steep enough to cause more than slight limitations to the use of equipment. Erosion has been severe on these soils and is now moderate to severe. In some areas, the root zone is so thin that the windthrow hazard is moderate.

WOODLAND SUITABILITY GROUP 6

This group consists of shallow to very shallow, excessively drained soils that are gently sloping to steep. These soils formed in material weathered mainly from acid shale but partly from interbedded sandstone. Their depth to bedrock ranges from 9 to about 18 inches. The moisture-supplying capacity is low to very low, and the south-facing slopes are droughty. The soils in this group are:

Pottsville shaly silt loam, 2 to 10 percent slopes, eroded.
Pottsville shaly silt loam, 10 to 15 percent slopes.
Pottsville shaly silt loam, 15 to 45 percent slopes.

Loblolly, shortleaf, and Virginia pine are the commercial trees best suited to these soils. The site index for loblolly pine ranges from 54 to 62, for shortleaf pine from 47 to 69, and for Virginia pine from 48 to 68.

On these soils, most limitations to the growth of trees and most problems of management are caused by steep slopes, a shallow root zone, low fertility, and low moisture-supplying capacity. Seedling mortality is slight on the milder slopes but is moderate on steep slopes. Plant competition is slight. Because of stones, shale outcrops, rock ledges, and slopes, equipment limitations are severe on the steep soil and are slight on the other soils in this group. The erosion hazard is severe on the steep soil and moderate on the others. A shallow root zone retards penetration of roots and causes a moderate windthrow hazard.

WOODLAND SUITABILITY GROUP 7

In this group are sloping to moderately steep soils on uplands. Except for an eroded soil, these soils are severely eroded. They are:

Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded.
Enders and Albertville silty clay loams, shallow, 10 to 15 percent slopes, severely eroded.
Linker fine sandy loam, 6 to 10 percent slopes, severely eroded.
Linker fine sandy loam, 10 to 15 percent slopes, severely eroded.
Pottsville shaly silty clay loam, 10 to 25 percent slopes, eroded.

The Linker soils have moderate permeability and moderate moisture-supplying capacity. The Enders and Albertville soils have a shallow root zone, slow permeability, and low moisture-supplying capacity. In the Pottsville soil, the moisture-supplying capacity is low to very low.

Loblolly, shortleaf, and Virginia pine are fairly well suited to these soils. Site indexes calculated from field data are not available, but estimated indexes are 54 to 62 for loblolly pine, 47 to 69 for shortleaf pine, and 48 to 68 for Virginia pine.

On these soils, most limitations to the growth of trees and most problems of management are caused by severe erosion and by a moderate to very low capacity to supply moisture. The Linker soils in this group have a moderate moisture-supplying capacity, and their seedling mortality is slight; competition from undesirable plants is moderate. The other soils have less capacity to hold water than the Linker soils, and their seedling mortality is moderate; plant competition is slight. Equipment limitations are slight on all except the moderately steep Pottsville soil and are moderate on that soil. The erosion hazard is moderate to severe. Windthrow is a slight hazard on the deep Linker soils and is a moderate hazard on the other soils in this group.

WOODLAND SUITABILITY GROUP 8

This group consists of most land types in the county. These mapping units contain little soil material, and their suitability for trees should be determined at each site. Site indexes are not listed. In this group are:

Gullied land.
Made land.
Mine pits and dumps.
Rockland, sandstone.
Sandy alluvial land.

Because of their varied characteristics, the land types in this group have slight to severe seedling mortality. Plant competition is generally slight but ranges from slight to severe. Equipment limitations range from slight to severe, and the windthrow hazard, from slight to moderate. The erosion hazard is moderate to severe except on Sandy alluvial land, where it is slight.

WOODLAND SUITABILITY GROUP 9

Rockland, limestone, is the only mapping unit in this group. It is well suited to redcedar but is not suited to pine. The site indexes are not listed for this group. The characteristics in this land type are varied. Seedling mortality ranges from slight to moderate. Competition from unwanted plants is moderate. The equipment limitations are severe, and the erosion hazard is moderate to severe. There is a moderate windthrow hazard.

Management of Woodland in Pine

The size of trees and the density of a stand have much to do with the management needed on woodland. Suggested in the following paragraphs are practices for managing pine in stands of the seedling, the post or pulpwood, and the sawtimber size classes.

Seedlings.—Well-stocked and understocked stands in seedlings should be protected by firebreaks and should not be grazed. The removal of undesirable trees is also required on these stands. Plant seedlings in the understocked areas.

Posts and pulpwood.—Firebreaks should be constructed to protect well-stocked and understocked stands in trees of post and pulpwood size. Grazing on these stands should be regulated and undesirable trees removed. The well-stocked stands require general intermediate cutting, and understocked stands require intermediate cutting in their denser parts.

Sawtimber.—Construct firebreaks and regulate grazing on well-stocked and understocked stands of sawtimber. These stands also require harvest cutting and the removal of undesirable trees. The well-stocked areas of sawtimber need intermediate cutting, and the understocked areas should be planted to trees or should seed naturally. Prepare a site before planting trees or before an area seeds naturally.

Open areas.—Construct firebreaks and do not permit cattle to graze in open areas that are planted to trees. Prepare a site before trees are planted or before the areas seed naturally.

Yield Data

Table 7 lists, according to stated site indexes and ages of trees, data on yields of merchantable timber and on the size and number of trees in well-stocked, naturally occurring, normal stands of loblolly pine and shortleaf pine. These data are based on published research (*11*).

TABLE 7.—*Stand and yield data for well-stocked, unmanaged, naturally occurring, normal stands of loblolly and shortleaf pine*

[Data compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*11*)]

LOBLOLLY PINE

Site index	Age	Total volume per acre			Average height of dominant trees	Average diameter at breast height	Trees
	Years	*Cu. ft.*	*Cords*	*Bd. ft. (Doyle)*	*Feet*	*Inches*	*Number per acre*
60	20	1, 500	12	-------	35	3. 6	1, 600
	30	2, 750	25	-------	48	5. 4	850
	40	3, 700	35	1, 000	55	6. 8	585
	50	4, 300	41	3, 000	60	7. 9	440
	60	4, 700	46	5, 000	64	8. 9	360
	70	5, 000	49	7, 000	67	9. 7	310
	80	5, 200	51	8, 500	69	10. 4	275
70	20	1, 900	17	-------	42	4. 3	1, 185
	30	3, 350	31	1, 000	55	6. 5	640
	40	4, 500	42	3, 500	64	8. 1	435
	50	5, 200	50	6, 500	70	9. 4	325
	60	5, 700	55	10, 000	75	10. 6	270
	70	6, 000	59	12, 500	78	11. 5	230
	80	6, 200	62	15, 000	80	12. 3	205
80	20	2, 350	22	-------	48	5. 0	950
	30	4, 000	38	2, 000	63	7. 4	510
	40	5, 300	51	6, 000	73	9. 2	345
	50	6, 150	60	11, 500	80	10. 7	255
	60	6, 650	66	16, 000	85	12. 0	210
	70	7, 000	70	19, 500	89	13. 1	185
	80	7, 300	73	22, 000	92	14. 0	160
90	20	2, 850	27	-------	54	5. 6	790
	30	4, 700	46	4, 000	71	8. 2	420
	40	6, 200	61	10, 000	82	10. 2	290
	50	7, 200	71	16, 500	90	12. 0	220
	60	7, 800	78	22, 000	96	13. 4	180
	70	8, 200	82	26, 000	100	14. 6	150
	80	8, 550	85	29, 000	103	15. 6	135
100	20	3, 300	32	500	59	6. 1	690
	30	5, 400	53	6, 000	78	9. 0	375
	40	7, 150	71	14, 500	91	11. 2	255
	50	8, 400	84	23, 000	100	13. 1	190
	60	9, 150	92	29, 500	107	14. 6	155
	70	9, 600	96	33, 000	112	15. 9	135
	80	9, 950	100	35, 500	115	17. 1	115
110	20	3, 850	37	1, 000	65	6. 6	615
	30	6, 200	62	9, 000	85	9. 7	335
	40	8, 200	82	20, 000	100	12. 1	225
	50	9, 650	96	29, 500	110	14. 1	170
	60	10, 550	106	36, 500	118	15. 9	140
	70	11, 150	112	40, 500	122	17. 3	120
	80	11, 500	116	43, 500	126	18. 4	105

TABLE 7.—*Stand and yield data for well-stocked, unmanaged, naturally occurring, normal stands of loblolly and Shortleaf pine*—Continued

Site index	Age	Total volume per acre			Average height of dominant trees	Average diameter at breast height	Trees
	Years	*Cu. ft.*	*Cords*	*Bd. ft. (Doyle)*	*Feet*	*Inches*	*Number per acre*
SHORTLEAF PINE							
50	20	1, 350	-----	-------	32	2. 5	3, 425
	30	2, 460	23	-------	39	3. 9	1, 855
	40	3, 390	33	-------	46	5. 1	1, 085
	50	4, 070	43	1, 600	50	6. 1	760
	60	4, 500	48	3, 200	55	6. 9	590
	70	4, 820	51	5, 050	59	7. 6	485
	80	5, 090	53	7, 000	62	8. 3	420
60	20	1, 720	12	-------	37	2. 9	2, 520
	30	3, 140	32	-------	47	4. 6	1, 370
	40	4, 300	46	1, 550	54	6. 0	815
	50	5, 150	54	4, 350	60	7. 2	570
	60	5, 720	60	7, 600	66	8. 2	445
	70	6, 180	65	10, 250	71	9. 0	370
	80	6, 530	68	12, 700	74	9. 8	315
70	20	2, 120	18	-------	43	3. 5	1, 965
	30	3, 900	41	750	53	5. 4	1, 060
	40	5, 290	56	4, 000	62	7. 0	625
	50	6, 300	66	8, 650	70	8. 3	440
	60	7, 030	73	12, 600	77	9. 4	345
	70	7, 600	79	16, 250	82	10. 4	285
	80	8, 030	83	19, 400	86	11. 2	240
80	20	2, 540	25	-------	50	4. 1	1, 495
	30	4, 510	48	1, 950	62	6. 2	815
	40	6, 150	65	7, 650	72	8. 0	485
	50	7, 400	77	13, 550	80	9. 5	335
	60	8, 270	85	18, 850	88	10. 8	260
	70	8, 930	92	23, 450	94	11. 9	215
	80	9, 480	97	27, 550	99	12. 9	185
90	20	2, 820	30	-------	56	5. 0	1, 080
	30	5, 120	54	4, 550	70	7. 3	590
	40	7, 050	73	12, 600	81	9. 4	345
	50	8, 490	87	20, 450	90	11. 2	245
	60	9, 510	98	27, 400	99	12. 8	185
	70	10, 300	105	32, 850	106	14. 1	160
	80	10, 920	112	37, 400	111	15. 3	140

TABLE 8.—*Stand and yield data for Virginia pine in well-stocked, naturally occurring stands*

[Data interpreted from "Virginia Pine," Technical Bulletin No. 100, N.C. Agricultural Experiment Station (7) and from Research Notes 135 of the S.E. Forest Experiment Station (4)]

Site index	Age	Average height of dominant trees	Trees per acre (1 inch DBH [1] and larger)	Average DBH [1]	Basal area per acre	Potential yields per acre			Average annual growth per acre		
	Years	*Feet*	*Number*	*Inches*	*Sq. ft.*	*Cu. ft.*	*Cords* [2]	*Bd. ft.*[3] *(Int. ¼ in. rule)*	*Cu. ft.*	*Cords* [2]	*Bd. ft.*[3] *(Int. ¼ in. rule)*
40	20	19	2, 500	2. 1	60	390	4		19	0. 2	
	30	29	1, 660	3. 4	104	1, 250	14	5, 900	42	. 5	197
	40	36	1, 300	4. 2	125	1, 630	18	7, 700	41	. 4	192
	50	40	1, 110	4. 7	133	1, 820	20	8, 600	37	. 4	172
	60	42	1, 010	5. 0	138	1, 980	22	9, 400	33	. 4	156
	70	43	910	5. 3	139	2, 100	23	9, 900	30	. 3	141
50	20	25	2, 000	2. 8	86	960	11		48	. 5	
	30	37	1, 320	4. 2	127	2, 000	22	9, 500	67	. 6	317
	40	45	970	5. 2	142	2, 700	30	12, 800	67	. 7	320
	50	50	790	5. 9	151	3, 100	34	14, 700	62	. 7	294
	60	52	750	6. 1	153	3, 400	38	16, 100	57	. 6	268
	70	54	700	6. 4	156	3, 600	40	17, 100	51	. 6	244
60	20	31	1, 710	3. 4	108	1, 600	18	7, 600	80	. 9	380
	30	44	1, 030	5. 0	140	2, 650	29	12, 500	85	1. 0	417
	40	54	720	6. 3	156	3, 630	40	17, 200	88	1. 0	430
	50	60	580	7. 2	164	4, 300	47	21, 000	86	. 9	420
	60	63	520	7. 7	168	4, 720	52	22, 400	79	. 9	373
	70	65	490	8. 0	170	5, 050	56	23, 900	72	. 8	341
70	20	37	1, 460	4. 0	127	1, 700	19	8, 100	85	. 9	405
	30	52	790	6. 0	154	3, 200	35	15, 200	107	1. 2	509
	40	63	540	7. 5	167	4, 360	48	21, 400	109	1. 2	535
	50	70	410	8. 9	176	5, 200	58	24, 600	104	1. 2	492
	60	73	360	9. 6	179	5, 700	63	27, 000	95	1. 0	450
	70	75	340	9. 8	180	6, 150	68	29, 200	88	1. 0	419
80	20	42	1, 230	4. 5	136	1, 950	22	9, 200	98	1. 1	460
	30	59	630	6. 9	163	3, 500	39	16, 600	117	1. 3	553
	40	72	380	9. 3	178	4, 900	54	23, 200	123	1. 4	580
	50	80	230	12. 2	186	5, 800	64	27, 400	116	1. 3	548
	60	83	190	13. 6	189	6, 430	72	30, 400	107	1. 2	506
	70	85	160	14. 6	191	6, 900	77	32, 800	98	1. 1	469

[1] Diameter at breast height, or 4½ feet above the ground.
[2] Converting factor: 90 cubic feet equals 1 cord.
[3] Converting factor: 4.74 board feet equals 1 cubic foot.

Table 8 is a composite table, interpreted from published research (*7*, *4*), that lists much stand and yield data for well-stocked, naturally occurring stands of Virginia pine. These data are listed according to stated site indexes and ages of trees. Table 8 contains information on the size and number of trees, potential yields, and average annual growth.

Engineering Applications

Soil engineering, including soil mechanics, is well established in engineering. It is a part of structural engineering and deals with soil as the foundation material on which structures rest, or with soil used as a structural material. Generally, soils are used in the locality and in the condition in which they are found. A large part of soil engineering consists of locating the various soils, of determining their engineering properties and how those properties meet the requirements of the job, and of selecting the best material available for each job.

This soil survey report contains information about the soils of Cullman County that will be helpful to engineers in constructing farm ponds and other structures to control and conserve soil and water; in selecting and developing industrial, residential, and recreational sites; in selecting locations for highways and pipelines; in locating sand and gravel for use in construction; and in supplementing information obtained from other published maps and reports and from aerial photographs, for the purpose of making soil maps and reports that can be used readily by engineers.

The soil maps and descriptions in this report do not give enough information for the design and construction of specific structures. They should be used only in planning more detailed field surveys and soil tests to determine the condition of the soil in place at the site of the proposed structures.

Soil Science Terms

This report uses agricultural terms to describe soils and their uses in farming and related fields. Many of these

terms have a meaning to the soil scientist and other agricultural workers that differs from the meaning understood by the engineer. These terms are defined in the Glossary in their agricultural sense. Some of the most common of these terms are also defined as follows:

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

Gravel.—A size group of coarse mineral particles varying in diameter from 2 millimeters to 3 inches. Fine gravel ranges from 2 millimeters to 0.5 inch in diameter.

Sand.—A size group of mineral particles ranging in diameter from 2.0 millimeters to 0.05 millimeter. As a textural class, sand consists of soil material that contains 85 percent or more sand and not more than 10 percent clay.

Silt.—A size group of mineral particles having diameters ranging from 0.05 millimeter to 0.002 millimeter. As a textural class, silt consists of soil material that contains 80 percent or more silt and less than 12 percent clay.

Clay.—A size group of mineral particles less than 0.002 millimeter in diameter. Clay as a textural class consists of soil material containing 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Topsoil.—Surface soil material, generally fairly high in organic matter, used to topdress roadbanks, gardens, and lawns.

Subsoil.—Roughly, that part of the soil profile below plow depth and above the unweathered parent rock; normally the subsoil contains more clay than the topsoil.

Aggregates.—A cluster of primary soil particles held together by internal forces to form a clod or fragment.

Engineering Classifications

AASHO classification system.—Most highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials (*1*, *10*). In this system, soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol in the next to last column in table 11. Table 9 and the other two tables on engineering are near the end of this section.

Unified classification system.—Some engineers prefer to use the Unified soil classification system (*12*, *10*). In this system, soil materials are identified as coarse grained (eight classes), fine grained (six classes), or highly organic. The classification of the layers of soil tested in the laboratory according to the Unified system is given in table 9, and that of the soils tested for engineering purposes is given in table 11.

Physical Properties of Soils

In table 9 are brief descriptions of the soils in the county and their estimated physical properties. These descriptions are condensed from the more detailed descriptions in the subsection "Descriptions of Soils." The depth from the surface listed in table 9 is that of the typical profile.

The material in each layer of soil is classified by the system used by the United States Department of Agriculture, and by the Unified and the AASHO systems. The percentage of particles passing the No. 200, 10, and 4 sieves was determined by mechanical analysis. Permeability, or the rate that a soil transmits water, was estimated for the soils when they were not compacted.

The available water is approximately the amount of water in a soil when it is wet to field capacity, or when the percolation of water downward has practically stopped. It is the amount of water in inches needed to wet 1 foot of air-dried soil. Hence, if a layer of soil 6 inches thick has a capacity for available water of 3 inches, this layer needs 1.5 inches of water to wet it.

Reaction is listed in pH values. Soil material with a pH value of less than 7.0 is acid, and that with a value of more than 7.0 is alkaline.

Dispersion refers to the degree and rapidity that a soil breaks down, or disperses, into individual particles and thereby is unstable.

The shrink-swell potential indicates the volume change that is caused in soil material by a change in moisture content. Generally, a soil decreases in volume as moisture decreases and increases as moisture increases.

Engineering Interpretation of Soils

In table 10 are listed ratings for suitability of the soils in the county for engineering work and for agricultural structures. Also listed are ratings for the suitability of the soil material as a source of building materials, and properties of soils that affect agricultural structures and alinement for highways. The suitability of the soils and the factors affecting structures are evaluated on the basis of the information in the soil descriptions and on information obtained in actual field tests and performance.

In evaluating the features affecting the vertical alinement for highways, bedrock and other features that influence the grade of a road are listed. Also given are drainage conditions that might favor or impair construction.

The construction or maintenance of irrigation structures may be impaired by obstacles to excavating or to using canals, by the water-holding capacity, by the capacity of the surface to take in water, by the leveling of shallow soils, or by other hazards.

Soil Test Data

To help evaluate the soils for engineering purposes, soil samples of the principal soil types of nine soil series were tested in accordance with standard procedures (*1*). The test data are given in table 11. Some of the soil series were sampled in more than one place. All samples were obtained at a depth of less than 6 feet. The test data, therefore, may not be adequate for estimating the characteristics of soil materials in rolling or hilly areas where deep cuts are needed.

The engineering soil classifications in table 11 are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods. The percentage of clay obtained by the hydrometer method should not be used in naming soil textural classes.

The test to determine liquid limit and plastic limit measures the effect of water on the consistence of the soil material. As the moisture content of a clayey soil

increases from a very dry state, the material changes from a solid to a semisolid or plastic state. As the moisture content is further increased, the material changes from the plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material changes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Soil Engineering Data

Some of the information important in engineering can be obtained from the soil map that accompanies this report and from tables 9, 10, and 11. This information can be supplemented by reading other parts of the soil survey report, particularly the sections "General Nature of the County," "Descriptions of Soils," and "General Soil Map."

The data and recommendations in tables 9 and 10 are a result of studying the soil test data in table 11, the information given in the rest of the report, and information gained from experience with the same soils in other counties. The texture (grain size) of the materials in one layer of a soil may vary considerably from the texture in another layer of the same soil. The engineering soil classification given in table 11, therefore, will not apply to all soils in a soil series.

Considerable rock will probably have to be excavated where roads are constructed in Rockland, limestone; Rockland, sandstone; in the shallow parts of the Hartsells and of the Enders and the Albertville soils; and in the Muskingum and the Pottsville soils. This stony and rocky material prevents the preparation of a smooth surface for roads and may be placed in the lower part of embankments. Where practicable, earthy materials should be used to fill the spaces between the stones and rock fragments. In places, stones in Muskingum stony fine sandy loam and other stony soils prevent the use of tamping rollers to compact the stony material if it is used in embankments.

In areas that are shallow to bedrock, work on highways can continue in winter if the soil materials can be compacted enough and if the required standards of construction are met.

Many of the soils in this county have a high perched water table. In addition, seepage in the back slopes of cuts may cause settling or sliding of the overlying material. The need, therefore, for interceptor ditches and drains should be determined. As a result of the perched water table, a decrease in the bearing capacity of the foundation soil below the pavement may cause the pavement to break up. Excess water may be intercepted by deep side ditches.

On ridges and mountains, roads should be located vertically so that rock excavation will be at a minimum. Such location may require a slight embankment section in much of the uplands. Considerable excavation by means of sidehill cuts in bedrock is required where the roads traverse the valley walls. The unweathered bedrock normally must be blasted before it can be excavated.

Because the lower parts of bottom lands are flooded in places each year, a continuous embankment may be needed to keep the roadways from being flooded. Suitable material for building these embankments may be obtained from nearby stream terraces and from the colluvial soils.

The soils in Cullman County are rated in table 10 as sources of topsoil suitable for growing vegetation on the slopes of embankments and cuts of highways and in ditches. In addition to being fertile, the topsoil should be free of stones or large pieces of gravel.

The weathered sandstone in which the Hartsells and many of the Tilsit, Hanceville, and Linker soils formed may be used in foundation courses for pavements. The unweathered sandstone and the very small limited acreage of limestone may be quarried for use in the base course of pavements. Crushed limestone may be used in bituminous and concrete pavements and in other concrete structures. The quality of these materials should be determined before they are used in highway construction.

At construction sites, the engineer may excavate soils of many different kinds within a short distance. The soil maps and profile descriptions, as well as the engineering data and recommendations given in this section, should be used in planning detailed surveys of soils at construction sites. By using the information in the soil survey reports, the soil engineer can concentrate on the most suitable soils. Then, a minimum number of soil samples will be required for laboratory testing, and an adequate soil investigation can be made at minimum cost.

Formation and Classification of Soils

This section is in two main parts. In the first part, the factors of soil formation are listed and the effect these factors have had in the formation of soils in Cullman County is discussed. In the second part, the soil series are placed in their soil orders and great soil groups and the morphology of the soils of each series in the county is described.

Formation of Soils in Cullman County

Soil is the product of soil-forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of a soil at any given point are determined by (1) the composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil development have acted on the soil material. Climate is very important in soil development, for it affects the temperature and the moisture in the soil. The effect that any one of the five factors has on soil formation, however, is strongly influenced by the other four factors.

Climate and vegetation are the active factors of soil genesis. They act on the parent material and change it into a natural body having definite soil characteristics. The effects of climate and vegetation on the parent material are conditioned by relief. Relief affects surface drainage, the quantity of water that percolates through

the soil, the rate of erosion, and the kind of vegetation that grows on the soil. The nature of the parent material also affects the kind of soil profile that is formed. Time is needed for changing the parent material into soil. Normally, a long interval is required for the development of distinct soil horizons.

The factors of soil genesis are so closely related in their effects on the soil that few generalizations can be made regarding the effects of any one factor acting alone. The interrelationship of the factors is so complex that many of the processes that take place in the development of the soils are not known.

PARENT MATERIAL AND PARENT ROCK.—Parent material is the unconsolidated mass from which a soil develops. It is largely responsible for the chemical and mineralogical composition of soils. The parent material of the soils in Cullman County is in two broad classes (1) material residual from the weathering of rocks in place and (2) material transported by water or gravity and laid down as unconsolidated deposits of clay, silt, and sand. Material in the first class is related directly to the underlying rock from which it formed. Material in the second class is related to the soils from which it washed or rolled, but not necessarily to the underlying bedrock where it is deposited.

The parent material that weathered in place consists of residuum from consolidated sedimentary rocks. In Cullman County, these rocks are sandstone and shale in most places and limestone in a very small area. Geologically, the rocks are very old. They were laid down originally as unconsolidated sediments and were gradually converted into consolidated rock.

Soils that formed in residual material have some characteristics related to particular rock formations or parts of rock formations. The Hartsells, Linker, Hanceville, Tilsit, and Muskingum soils were generally derived from residuum of the sandier members of rocks in the Pottsville formation of the Pennsylvanian system. In contrast, the Albertville, Enders, Johnsburg, and Pottsville soils were generally derived from residuum of the more shaly rock formations in the Pottsville formation.

Some of the characteristics of the parent rock are reflected in those soils that formed from transported material.

The soils along the large streams in the county formed in alluvial material that has been transported and deposited by streams. Most of this alluvium washed from soils formed in material weathered from sandstone and shale on the nearby uplands. The soils on the first bottoms—Philo and Pope soils—have a weakly developed profile and continually receive new soil material through floods. Soils on the older, slightly higher terraces and benches have been in place long enough for distinct horizons to form. The Sequatchie, Monongahela, Tyler, and Purdy soils are of this kind. Soils that formed in old colluvium on foot slopes, such as the Jefferson, Leadvale, and Muse soils, have also been in place long enough for a distinct soil profile to form.

CLIMATE.—Climate as a genetic factor affects the physical, chemical, and biological relationships in the soil primarily through the influence of precipitation and of temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the soil profile. In a large area, the amount of water that actually percolates through the soil depends mainly on rainfall, relative humidity, and the length of the frost-free period. At a given point, the amount of downward percolation is also affected by physiographic position and by soil permeability. Temperature influences the kinds and growth of organisms and the speed of physical and chemical reactions in soils.

Cullman County has a humid-temperate climate. Summers are rather long and hot. Winters are cold but are not severe. Rainfall is fairly high throughout the county. The moderately high temperatures are conducive to rapid chemical reaction in the soil, which is moist much of the year. Because of the high rainfall, most of the soluble materials are leached from the soil. Under the influence of percolating water, soil colloids are also translocated downward in the soil.

The soil is frozen for short periods to shallow depths, but freezing and thawing in this county have little effect on weathering and soil formation. The average annual rainfall is 55.76 inches, and the average annual temperature is 60.9° F. Snow is fairly common, but it is normally light and remains on the ground for only brief periods. The average frost-free period of 201 days extends from April 8 to October 26.

PLANT AND ANIMAL LIFE.—Trees, grasses, micro-organisms, earthworms, and various other forms of plants and animals live on and in the soil and are active in its formation. The kinds of plants and animals that live on and in the soil are determined by environmental factors, which include climate, parent material, relief, age of the soil, and other organisms.

The most plentiful soil organisms are fungi and other micro-organisms, which are found mainly in the top few inches. The activity of earthworms and small invertebrates is also greatest in the A_1 horizon, where they carry on slow, continuous soil mixing.

Bacteria, fungi, and other micro-organisms aid in decomposing organic matter and act indirectly upon weathering of rocks through the production of acids and other compounds. The larger plants furnish organic matter and transfer elements from the subsoil to the surface soil.

The native vegetation on the well-drained soils on uplands in this county was dominantly deciduous hardwoods, mainly oak, chestnut, and hickory intermixed with some pine. On the bottom lands the trees were also hardwoods, mostly yellow-poplar, sweet gum, ash, oak, and sycamore. Willow, river birch, blackgum, beech, water oak, and willow oak are common on the poorly drained bottom lands.

RELIEF OR TOPOGRAPHY.—The relief or topography of the county is determined largely by the hardness of the underlying bedrock, the geologic history of the region, and the effects of dissection by rivers and streams. Relief influences soil formation by affecting internal drainage, runoff, the rate of erosion, and other results of water action. The influence of relief is modified by the other four factors of soil formation.

The Linker, Albertville, Hanceville, and similar soils on slopes of less than 15 percent have a moderately deep or deep profile with well-developed soil horizons. On steeper slopes of 15 to 45 percent, the rate of geological removal of weathered rock material is about equal to the rate of soil formation, and soil profiles are thin and only

TABLE 9.—*Brief description of soils*

Soil [1]	Depth to seasonally high water table [2]	Depth to bedrock	Soil description	Depth from surface (typical profile)	Classification	
					USDA	Unified
	Feet	*Feet*		*Inches*		
Albertville	20+	1. 5 to 4+	1.5 to 4 feet of well-drained loam to silty clay loam or silty clay underlain by thinly bedded shale and some sandstone.	0 to 7	Loam	ML, SM, or ML-CL.
				7 to 17	Silty clay loam	CL or MH
				17 to 41	Silty clay	MH or ML
Albertville, shallow	20+	1 to 1. 7	12 to 20 inches of well-drained fine sandy loam, loam, and silty clay loam to silty clay over thinly bedded shale and some sandstone.	0 to 10	Fine sandy loam or loam.	ML or CL
				10 to 20	Silty clay loam	CL or MH
Atkins	(3)	3 to 6+	3 to 6 feet of poorly drained silt loam over stratified local alluvium of loam, silt, and sand overlying shale and sandstone.	0 to 21	Silt loam	ML or CL
				21 to 75	Fine sandy loam or fine sandy clay loam.	ML or CL
Enders	20+	1. 5 to 4+	1.5 to 4 feet of well-drained silt loam and silty clay over shale.	0 to 8. 5	Silt loam	ML or ML-CL.
				8. 5 to 33	Silty clay	MH or CL
Enders, shallow	20+	1. 0 to 1. 7	12 to 20 inches of well-drained shaly fine sandy loam and silty clay over shale.	0 to 5	Fine sandy loam	SM, ML, or CL.
				5 to 12	Silty clay	CL or MH
Hanceville	20+	3. 0 to 8+	3 to 8 feet of well-drained loam and clay loam underlain by sandstone with thin beds of shale.	0 to 12	Loam	CL or ML
				12 to 80	Clay loam	CL or ML
				80 to 90	Sandy clay loam or sandy clay.	CL or ML
Hartsells	20+	1. 5 to 5. 0+	1.5 to 5 feet of well-drained fine sandy loam, loam, or fine sandy clay loam over sandstone with thin lenses of shale.	0 to 10	Fine sandy loam	CL or SM
				10 to 26	Loam	ML or CL
				26 to 48+	Fine sandy clay loam.	SC-CL, SM or ML.
Hartsells, shallow	20+	1 to 1. 5	12 to 18 inches of well-drained fine sandy loam, loam, and silty clay loam over sandstone with thin lenses of shale.	0 to 6	Fine sandy loam	SM or CL
				6 to 14	Loam	ML or CL
				14 to 18	Silty clay loam	ML or CL
Jefferson	20+	4 to 10	4 to 10 feet of well-drained fine sandy loam, loam, and fine sandy clay loam; in local alluvium washed from soils underlain by sandstone and shale.	0 to 12	Fine sandy loam	SM or CL
				12 to 33	Fine sandy clay loam.	ML or CL
Johnsburg	[4] 0 to 2	3 to 5	3 to 5 feet of somewhat poorly drained loam to silty clay loam over shale and sandstone; fragipan at a depth of 20 to 30 inches.	0 to 16	Loam	ML or CL
				16 to 22	Clay loam	ML or CL
				22 to 33	Clay loam	ML or CL
				33 to 57	Silty clay loam	ML or CL
Leadvale	2 to 4	3 to 6	3 to 6 feet of moderately well drained loam and silt loam; old local alluvium over shale and sandstone; fragipan at a depth of 16 to 30 inches.	0 to 5	Loam	ML or SM
				5 to 22	Silt loam	ML or CL
				22 to 30+	Silt loam	ML or CL

See footnotes at end of table.

and their estimated physical properties

Classification	Percentage passing sieve—			Permeability	Soil structure	Available water	Reaction	Dispersion	Shrink-swell potential
AASHO	No. 200 (0.074 mm.)	No. 10 (2.0 mm.)	No. 4 (4.76 mm.)						
				Inches per hr.		*Inches per ft of depth*			
A–4	45–80	85–95	90–100	0. 8 to 2. 0	Granular	1. 2 to 1. 8	5. 1 to 5. 5	High	Low.
A–4 or A–7	55–95	90–100	90–100	. 8 to 2. 0	Subangular blocky	1. 0 to 1. 6	4. 5 to 5. 0	Moderate	Moderate.
A–6 or A–7	60–95	95–100	95–100	. 2 to 0. 8	Subangular blocky	. 8 to 1. 4	4. 5 to 5. 0	Moderate	Moderate.
A–4	50–70	80–90	85–95	. 8 to 2. 0	Granular to subangular blocky.	1. 2 to 1. 8	4. 5 to 5. 0	High	Low.
A–4, A–6, or A–7.	60–90	90–100	90–100	. 2 to 2. 0	Subangular blocky	. 6 to 1. 2	4. 5 to 5. 0	Moderate	Moderate.
A–4	85–100	95–100	100	. 2 to 0. 8	Granular	1. 8 to 2. 4	4. 5 to 5. 5	High	Low.
A–4, A–6, or A–7.	55–85	90–100	100	. 2 to 0. 8	Massive	1. 8 to 2. 4	4. 5 to 5. 0	Moderate	Moderate.
A–4	55–80	85–95	90–100	. 8 to 2. 0	Granular to subangular blocky.	1. 2 to 1. 8	5. 1 to 6. 0	High	Low.
A–4 or A–7	55–85	90–100	90–100	. 2 to 0. 8	Subangular blocky	. 8 to 1. 4	5. 1 to 5. 5	Moderate	Moderate.
A–4 or A–6	45–70	80–90	85–95	. 8 to 2. 0	Granular	1. 2 to 1. 8	4. 5 to 5. 0	High	Low.
A–4, A–6, or A–7.	60–90	90–100	90–100	. 2 to 2. 0	Subangular blocky	. 6 to 1. 2	4. 5 to 5. 0	Moderate	Moderate.
A–4	75–90	90–100	95–100	. 8 to 2. 0	Granular and subangular blocky.	1. 8 to 2. 4	5. 1 to 6. 0	High	Low.
A–4 or A–6	80–95	90–100	95–100	. 8 to 2. 0	Subangular blocky and angular blocky.	1. 8 to 2. 4	4. 5 to 5. 0	Moderate	Low to moderate.
A–6	55–65	90–100	90–100	. 8 to 2. 0	Massive	1. 8 to 2. 4	4. 5 to 5. 0	Moderate	Low to moderate.
A–4	40–70	90–100	97–100	2. 0 to 5. 0	Granular and subangular blocky.	1. 8 to 2. 4	5. 1 to 5. 5	High	Low.
A–4 or A–6	55–75	95–100	95–100	. 8 to 2. 0	Subangular blocky	1. 8 to 2. 4	5. 1 to 5. 5	High	Low.
A–4 or A–6	40–70	90–100	90–100	. 8 to 2. 0	Subangular blocky and angular blocky.	1. 5 to 2. 1	5. 1 to 5. 5	High to moderate.	Low.
A–4	40–70	90–100	97–100	2. 0 to 6. 0	Granular and subangular blocky.	1. 8 to 2. 4	5. 1 to 5. 5	High	Low.
A–4 or A–6	55–75	95–100	95–100	. 8 to 2. 0	Subangular blocky	1. 8 to 2. 4	5. 1 to 5. 5	High	Low.
A–6 or A–4	50–70	90–100	90–100	. 8 to 2. 0	Subangular blocky and angular blocky.	1. 5 to 2. 1	5. 1 to 5. 5	High to moderate.	Low to moderate.
A–4	45–65	90–100	95–100	2. 0 to 5. 0	Granular and subangular blocky.	1. 8 to 2. 4	4. 5 to 5. 5	High	Low.
A–4 or A–6	50–70	95–100	95–100	. 8 to 2. 0	Subangular blocky	1. 8 to 2. 4	4. 5 to 5. 0	High to moderate.	Low to moderate.
A–4	75–85	90–100	95–100	. 8 to 2. 0	Granular and subangular blocky.	1. 2 to 1. 8	4. 5 to 5. 5	High	Low.
A–4 or A–6	75–95	90–100	95–100	. 8 to 2. 0	Subangular blocky	1. 2 to 1. 8	5. 1 to 5. 5	Moderate	Moderate.
A–4 or A–6	75–95	90–100	90–100	. 2 to 0. 8	Subangular blocky	. 6 to 1. 2	5. 1 to 5. 5	Low	Low.
A–4 or A–6	75–95	75–100	80–100	. 2 to 0. 8	Angular blocky and subangular blocky.	. 6 to 1. 2	5. 6 to 6. 0	Low to moderate.	Moderate.
A–2 or A–4	30–60	80–95	80–100	. 8 to 2. 0	Granular	1. 2 to 1. 8	5. 6 to 6. 0	High	Low.
A–6 or A–4	60–80	90–100	95–100	. 8 to 2. 0	Subangular blocky	1. 2 to 1. 8	4. 5 to 5. 0	High	Low.
A–4 or A–6	55–75	60–95	70–100	. 2 to 0. 8	Subangular blocky	. 6 to 1. 2	4. 5 to 5. 0	Low	Low.

TABLE 9.—*Brief description of soils*

Soil [1]	Depth to seasonally high water table [2]	Depth to bedrock	Soil description	Depth from surface (typical profile)	Classification	
					USDA	Unified
	Feet	*Feet*		*Inches*		
Linker	20+	3 to 8	3 to 8 feet of well-drained fine sandy loam, loam, and clay loam on sandstone and some shale.	0 to 14	Loam	ML or CL
				14 to 60+	Clay loam	ML, CL, or MH.
Monongahela	1.5 to 4	4 to 8	4 to 8 feet of moderately well drained fine sandy loam to clay loam; compact, cemented layer at a depth of 16 to 24 inches; in old local alluvium from soils underlain by sandstone and shale.	0 to 7	Fine sandy loam	ML
				7 to 18	Clay loam	ML or CL
				18 to 26+	Clay loam	ML or CL
Muse	20+	4 to 10	4 to 10 feet of well-drained shaly silt loam, loam, and silty clay loam; old local alluvium on foot slopes derived from shale.	0 to 5	Shaly silt loam	ML or CL
				5 to 25	Loam	ML or CL
				25 to 60+	Silty clay loam	ML or CL
Muskingum	20+	.8 to 1.5	10 to 18 inches of excessively drained stony fine sandy loam and loamy fine sand over sandstone with thin lenses of shale.	0 to 12	Stony fine sandy loam.	SM or SC
Philo	1 to 2	2 to 6	2 to 6 feet of moderately well drained loam and fine sandy loam; on flood plains in general alluvium washed from soils derived from sandstone and shale.	0 to 18	Loam	ML or CL
				18 to 36+	Silt loam	ML or CL
Philo and Stendal	0 to 2	2 to 5	2 to 5 feet of moderately well drained to somewhat poorly drained fine sandy loam to silt loam; in local alluvium that washed from soils derived from sandstone and shale; subject to flooding.	0 to 15	Fine sandy loam or silt loam.	ML or CL
				15+	Fine sandy loam or silt loam.	ML or CL
Pope	2 to 3	3 to 6	3 to 6 feet of well-drained fine sandy loam and silt loam over stratified gravel, silt, and sand; subject to periodic overflow.	0 to 19	Fine sandy loam	SM, SC, or ML.
				19 to 36+	Silt loam	ML or CL
Pottsville	20+	.75 to 1.5	9 to 18 inches of excessively drained shaly silt loam and shaly silty clay; primarily on shale.	0 to 5	Shaly silt loam	ML–CL or SM–SC.
				5 to 9	Shaly silty clay	ML, MH, or GM.
Purdy	0 to 1	5 to 7	5 to 7 feet of poorly drained silt loam to silty clay and clay; on low stream terraces in alluvium washed from soils derived from sandstone and shale; water stands for long periods.	0 to 15	Silt loam	ML or CL
				15 to 36	Silty clay loam	CL or ML
				36 to 72	Silty clay or clay	CL or ML
Rockland, limestone.	20+	0 to 2	0 to 2 feet of moderately well drained silty clay or clay with ledges and boulders of limestone.	0 to 24	Silty clay or clay	CH or MH
Rockland, sandstone.	20+	0 to 3	0 to 3 feet of well-drained fine sandy loam and loamy fine sand with ledges, boulders, and stones (sandstone).	0 to 36	Loamy fine sand or fine sandy loam.	SM or ML
Sandy alluvial land	0 to 15	1 to 15	1 to 15 feet of excessively drained loamy fine sand; stony and gravelly in places.	1 to 180	Loamy fine sand	GM or SM

See footnotes at end of table.

and their estimated physical properties—Continued

Classification		Percentage passing sieve—		Permeability	Soil structure	Available water	Reaction	Dispersion	Shrink-swell potential
AASHO	No. 200 (0.074 mm.)	No. 10 (2.0 mm.)	No. 4 (4.76 mm.)						
				Inches per hr.		*Inches per ft of depth*			
A–4	50–70	90–100	90–100	2.0 to 4.0	Granular and subangular blocky.	1.2 to 1.8	5.1 to 6.0	High	Low.
A–4 or A–6	65–80	90–95	95–100	.8 to 2.0	Subangular blocky and angular blocky.	1.5 to 2.1	5.1 to 6.0	Moderate	Moderate.
A–4	55–75	95–100	95–100	.8 to 2.0	Granular	1.2 to 1.8	5.1 to 5.5	High	Low.
A–4 or A–6	60–80	90–100	95–100	.8 to 2.0	Subangular blocky	1.2 to 1.8	4.5 to 5.0	Moderate	Low to moderate.
A–4 or A–6	60–80	90–100	90–100	.2 to 0.8	Subangular blocky	.6 to 1.2	4.5 to 5.0	Moderate	Low.
A–4	70–80	85–100	95–100	.8 to 2.0	Granular	1.2 to 1.8	5.6 to 6.0	High	Low.
A–4, A–6, or A–7.	80–95	90–100	95–100	.8 to 2.0	Granular and subangular blocky.	1.2 to 1.8	5.1 to 5.5	High to moderate.	Low.
A–6 or A–7	75–95	85–100	95–100	.8 to 2.0	Subangular blocky and massive.	1.2 to 1.8	4.5 to 5.0	Moderate	Moderate
A–4 or A–2	30–50	80–95	80–95	2.0 to 10.0	Granular and subangular blocky.	.6 to 1.2	5.1 to 5.5	High	Low.
A–4 or A–6	70–90	90–100	95–100	.8 to 2.0	Granular and subangular blocky.	1.8 to 2.4	5.1 to 6.0	High	Low.
A–4 or A–6	60–85	85–100	95–100	.8 to 2.0	Massive	1.8 to 2.4	5.1 to 5.5	High	Low.
A–4 to A–6	50–80	85–100	95–100	.8 to 2.0	Granular and subangular blocky.	1.5 to 2.1	5.1 to 6.0	High	Low.
A–4 or A–6	50–80	75–100	95–100	.2 to 2.0	Granular and subangular blocky.	1.5 to 2.1	5.1 to 5.5	High	Low.
A–4	45–75	90–100	95–100	.8 to 5.0	Granular	1.8 to 2.4	5.1 to 6.5	High	Low.
A–4 or A–6	55–75	95–100	95–100	.8 to 5.0	Granular	1.8 to 2.4	5.1 to 5.5	High	Low.
A–4	40–75	75–85	75–90	.8 to 2.0	Granular	.6 to 1.2	5.6 to 6.0	High	Low.
A–4 or A–7	40–90	60–95	60–95	.2 to 4.0	Platy and massive in places.	.6 to 1.2	4.5 to 5.0	High to moderate.	Low to moderate.
A–4	80–90	95–100	95–100	.2 to 0.8	Granular	.6 to 1.2	4.5 to 5.5	High	Low.
A–4 or A–6	80–90	95–100	95–100	.2 to 0.8	Subangular blocky	.6 to 1.2	4.5 to 5.0	Moderate	Moderate.
A–6 or A–7	80–90	95–100	95–100	.2 to 0.8	Massive	.6 to 1.2	5.1 to 5.5	Low	Moderate to high.
A–6 or A–7	75–85	90–100	90–100	.2 to 0.8	Massive	.0 to 1.2	5.1 to 7.0	Low	Moderate to high.
A–2, A–4, or A–6.	30–55	95–100	95–100	2.0 to 10.0	Granular	.5 to 1.0	4.5 to 5.0	High	Low.
A–1 or A–2	10–25	20–95	20–100	2.0 to 10.0	Granular	.5 to 1.0	5.1 to 5.5	High	Low.

TABLE 9.—*Brief description of soils*

Soil [1]	Depth to seasonally high water table [2]	Depth to bedrock	Soil description	Depth from surface (typical profile)	Classification	
					USDA	Unified
	Feet	*Feet*		*Inches*		
Sequatchie	4	5 to 8	2 to 4.5 feet of well-drained silt loam and silty clay loam over stratified, thin beds of sand, silt, and gravel; in old general alluvium washed from soils underlain by shale and sandstone.	0 to 10	Silt loam	ML or CL
				10 to 31	Silty clay loam	CL or ML
				31 to 60	Sandy loam	SM, SC, or ML.
				60 to 66+	Loamy fine sand	SM or SP
Tilsit	[4] 1. 5 to 2	4 to 7	1.5 to 2.0 feet of moderately well drained fine sandy loam and loam over compact fragipan; 6 to 18 inches thick over fine sandy clay loam or fine sandy clay on sandstone with some shale.	0 to 6	Fine sandy loam.	SM or ML
				6 to 22	Loam	CL or ML
				22 to 34	Fine sandy loam	ML or CL
				34 to 61	Fine sandy clay loam.	CL
Tyler	. 5 to 2	4 to 8	1 to 3 feet of somewhat poorly drained silt loam and silty clay loam over a compact layer of silty clay loam to silty clay over raw shaly clay; on low stream terraces in old alluvium washed from soils derived from shale and sandstone.	0 to 24	Silt loam	ML or CL
				24 to 34	Silty clay loam	CL, ML or MH.
				34 to 60	Silty clay	CL or ML
				60 to 85	Shaly clay	CL or MH

[1] Gullied land, Made land, and Mine pits and dumps are not included in table.
[2] Normally the water table rises to a point near the surface during winter.

weakly developed. Thus, the Muskingum, Pottsville, and other soils on steep slopes have a thin or very thin surface layer that overlies partly weathered parent material or parent rock.

TIME.—The length of time required for soils to develop depends largely on the other four factors of soil formation. Generally, it takes less time for a soil to develop in humid, warm regions with luxuriant vegetation than it does for one to develop in dry or cold regions with scanty vegetation or moisture.

The soils in Cullman County range from very young to very old. The young soils in the county are in two broad groups. In one group, the soil material has been in place for only a short time and has not been affected enough by climate and vegetation for a profile with well-defined, genetically related horizons to form. Most soils on first bottoms are of this kind. In the other group, the soil material forms on steep slopes. Here, genetically related horizons do not form because the soil material is removed by erosion almost as fast as it forms.

Soils are mature or old if they have been in place for a long time and are about in equilibrium with their environment. In some places, nearly level, well-drained soils that are only slightly eroded have more strongly marked profile characteristics than have some well-drained, well-developed soils on sloping uplands.

Classification of Soils

From the broadest category to the narrowest, soils are ordinarily classified by order, great soil group, series, type, and phase. Series, type, and phase are defined in the section "How a Soil Survey is Made." The category of the soil order consists of three classes—zonal, intrazonal, and azonal soils. Each of these orders consists of a number of great soil groups. In a great soil group are soils that have fundamental characteristics in common.

The zonal soil order consists of those great soil groups that have soils with well-developed profile characteristics that reflect the influence of the active factors of soil genesis. The active factors are climate and living organisms, chiefly vegetation. In Cullman County, the great soil groups in the zonal order are the Red-Yellow Podzolic soils, the Reddish-Brown Lateritic soils, and the Gray-Brown Podzolic soils.

The intrazonal order consists of those great soil groups with distinct, genetically related horizons that reflect the dominating influence of some local factor of topography or parent material over the effects of climate and living organisms. In Cullman County, the profile characteristics of intrazonal soils are influenced generally by their nearly level relief, which is greatly modified by the effects of parent material and vegetation. The intrazonal soils in this county are members of the Planosol and Low-Humic Gley great soil groups.

The azonal order consists of soils that lack well-developed profile characteristics. Resistant parent material, steep topography, or insufficient time since deposition have prevented the development of normal profile characteristics. In Cullman County, azonal soils have a moderately dark to very dark A_1 horizon that is fairly high in organic matter. They have no B horizon, and their

and their estimated physical properties—Continued

Classification		Percentage passing sieve—		Permeability	Soil structure	Available water	Reaction	Dispersion	Shrink-swell potential
AASHO	No. 200 (0.074 mm.)	No. 10 (2.0 mm.)	No. 4 (4.76 mm.)						
				Inches per hr.		*Inches per ft of depth*			
A–4 or A–6	80–95	95–100	95–100	.8 to 2.0	Granular and subangular blocky.	1.5 to 2.1	5.1 to 5.5	High	Low.
A–6 or A–7	80–95	95–100	95–100	.8 to 2.0	Subangular blocky	1.5 to 2.1	5.6 to 6.0	High to moderate.	Low to moderate.
A–4	40–60	90–95	95–100	.8 to 4.0	Subangular blocky	.9 to 1.5	5.6 to 6.0	High	Low.
A–2 or A–4	30–50	90–95	95–100	2.0 to 10.0	Granular	.6 to 1.2		High	Low.
A–4	45–75	95–100	95–100	.8 to 2.0	Granular	1.2 to 1.8	6.1 to 6.5	High	Low.
A–4	60–80	95–100	95–100	.8 to 2.0	Subangular blocky	1.2 to 1.8	5.1 to 6.5	High	Low.
A–4 or A–6	50–80	90–100	95–100	.2 to 0.8	Massive and vesicular	.6 to 1.2	5.1 to 5.5	Low	Low.
A–6	50–75	80–100	80–100	.8 to 2.0	Massive	1.2 to 1.8	4.5 to 5.0	Moderate	Low.
A–4 or A–6	90–100	95–100	95–100	.2 to 2.0	Granular and subangular blocky.	.6 to 1.2	4.5 to 5.0	High	Low.
A–4 or A–6	85–95	95–100	95–100	.2 to 2.0	Subangular blocky	.6 to 1.2	4.5 to 5.0	Moderate	Low to moderate.
A–6	90–100	95–100	95–100	.2 to 0.8	Massive	.6 to 1.2	4.5 to 5.0	Low	Moderate to high.
A–6 or A–7	90–100	95–100	95–100	.2 to 0.8	Massive	.6 to 1.2	4.0 to 7.0	Low	Moderate to high.

[3] Water table is at the surface most of the year.
[4] Perched water table.

parent material is normally lighter in color than the A_1 horizon. Azonal soils in the county belong to the Alluvial and Lithosol great soil groups.

Most soil series have characteristics that are representative of one or another of the great soil groups, and are classified accordingly. A few soil series, however, have some characteristics of two great soil groups; such soil series are grouped with the great soil group they resemble most closely, but are classified as intergrading to the other great soil group. For example, soil series of the Red-Yellow Podzolic group that have some additional characteristics of the Planosol group, such as wetness and a dense subsoil, are classified as Red-Yellow Podzolic soils intergrading to Planosols.

In table 12 the soil series of Cullman County are placed in soil orders and great soil groups, and for each series are listed the characteristic topographic position, parent material, drainage, slope range, and degree and kind of profile development.

Red-Yellow Podzolic soils

The typical Red-Yellow Podzolic soils in this county are well drained and acid. These soils have a thin, well-developed profile consisting of a dark-colored organic A_0 and an organic-mineral A_1 horizon, which overlie a light-colored, sandy, bleached A_2 horizon with granular structure. The A_2 horizon is underlain by a reddish or yellowish, sticky B horizon containing an accumulation of clay (*2*). The parent material of the soils in Cullman County is more or less siliceous.

In general, soils in this group have a low cation exchange capacity and a low base saturation (commonly 20 to 35 percent). Kaolinite is the dominant clay mineral, and B horizons have a moderate to strong, subangular blocky structure. The colors are of medium to high chroma. On the basis of predominant color, the soils of this group may be further divided into red members and yellow members.

Red members.—Soils of the Enders, Linker, and Muse series are the red members of the Red-Yellow Podzolic great soil group in Cullman County. All except the Enders soils are well drained and moderately deep to deep. The Enders soils range from shallow to moderately deep. Slopes range from 2 to 15 percent. All the soils in this group have apparently developed under fairly similar climate and vegetation.

The Enders soils developed on uplands in residuum, mainly from acid shale but partly from sandstone. They have a red (2.5YR 4/6), fine-textured, friable B_2 horizon with moderate, fine and medium, subangular blocky structure. The Linker soils, which developed on uplands, mostly in residuum from sandstone but partly from shale, have a dark-red (2.5YR 3/6), friable, fine-textured B_2 horizon with moderate, fine and medium, subangular blocky and angular blocky structure. The Muse soils formed on foot slopes in old local alluvium that washed from soils developed in material weathered from sandstone and shale. These soils have a yellowish-red (5YR 5/8), friable to firm, fine-textured B_2 horizon with moderate, fine and medium, subangular blocky structure.

TABLE 10.—*Engineering*

Soil [1]	Suitability of soil for grading in winter and wet weather	Suitability of soil material for—			Suitability as source of—		Features affecting vertical alinement for highways
		Septic tanks	Road subgrade [2]	Road fill	Topsoil [3]	Sand	
Albertville	Fair to poor	Fair to poor	Fair to poor	Good to fair	Good	Unsuitable	Bedrock; good drainage.
Albertville, shallow.	Fair to poor	Fair to poor	Fair to poor	Good to fair	Good	Unsuitable	Bedrock; good drainage.
Atkins	Unsuitable	Unsuitable	Fair to poor	Fair	Fair to poor	Unsuitable	High water table most of year; highway 2 to 4 feet above water table.
Enders	Fair to poor	Fair to poor	Fair to poor	Good to fair	Good	Unsuitable	Bedrock; good drainage.
Enders, shallow	Fair to poor	Fair to poor	Fair to poor	Good to fair	Good	Unsuitable	Bedrock; good drainage.
Hanceville	Fair to poor	Good	Good to fair	Good	Good	Unsuitable	Bedrock; good drainage.
Hartsells	Good to fair	Good	Good	Good	Good	Fair to unsuitable.[5]	Bedrock; good drainage.
Hartsells, shallow	Good to fair	Good to fair	Good	Good	Good	Fair to unsuitable.[5]	Bedrock; good drainage.
Jefferson	Good to fair	Good	Good	Good	Good	Unsuitable	Bedrock; good drainage.
Johnsburg	Poor	Poor	Fair to poor	Fair	Fair	Unsuitable	Seasonal high water table; highway 2 feet above surface.
Leadvale	Poor	Poor	Good to fair	Good	Fair	Unsuitable	Bedrock; seasonal high water table.
Linker	Fair to poor	Good	Good	Good	Good	Unsuitable	Bedrock; good drainage.
Monongahela	Poor	Poor	Good to fair	Good	Fair	Unsuitable	Seasonal high water table; highway 2 to 4 feet above surface.
Muse	Fair to poor	Fair to poor	Fair to poor	Good	Fair to good	Unsuitable	Bedrock; good drainage.

See footnotes at end of table.

interpretation of soils

Soil features affecting agricultural structures					
Farm ponds		Drainage structures	Irrigation structures	Terraces and diversions [4]	Waterways
Reservoir areas	Embankments				
Fairly impervious material.	Moderate strength and stability.	Not needed	Medium infiltration; moderate to low water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Fairly impervious material.	Moderate strength and stability.	Not needed	Medium infiltration; low water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Fairly impervious material; high water table.	Low strength and stability.	Slow permeability; high water table, ponding or flooding.	Medium to slow infiltration; high water-holding capacity.	Not needed	Not needed.
Fairly impervious material.	Moderate strength and stability.	Not needed	Medium infiltration; moderate to low water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Fairly impervious material.	Moderate strength and stability.	Not needed	Medium infiltration; low water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Fairly impervious material.	Adequate strength and stability.	Not needed	Medium infiltration; moderate to high water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation; some shaping.
Excess seepage where underlain by soft sandstone.	Adequate strength and stability.	Not needed	Medium infiltration; moderate to high water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Excess seepage where underlain by soft sandstone.	Adequate strength and stability.	Not needed	Medium infiltration; low water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Fairly impervious material.	Adequate strength and stability.	Not needed	Medium infiltration; moderate water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation, some shaping.
Fairly impervious material.	Low strength and stability.	Slow permeability; high water table.	Medium infiltration; moderate to low water-holding capacity.	Not needed	Not needed.
Fairly impervious material.	Moderate strength and stability.	Moderate permeability to fragipan.	Medium infiltration; moderate water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation.
Fairly impervious material.	Adequate strength and stability.	Not needed	Medium infiltration; moderate to high water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation.
Fairly impervious material.	Moderate strength and stability.	Moderate permeability to fragipan.	Medium infiltration; moderate water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation.
Fairly impervious material	Moderate strength and stability.	Not needed	Medium infiltration; moderate to high water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation.

TABLE 10.—*Engineering*

Soil [1]	Suitability of soil for grading in winter and wet weather	Suitability of soil material for—			Suitability as source of—		Features affecting vertical alinement for highways
		Septic tanks	Road subgrade [2]	Road fill	Topsoil [3]	Sand	
Muskingum	Good to fair	Poor	Good	Good	Unsuitable	Unsuitable	Bedrock; good drainage.
Philo	Unsuitable	Poor	Good to fair	Good	Good [6]	Unsuitable	Seasonal high water table; highway 2 to 4 feet above water table.
Philo and Stendal	Unsuitable	Poor	Good to fair	Good	Good to fair	Unsuitable	Seasonal high water table; highway 2 to 4 feet above water table.
Pope	Fair to poor	Fair to good	Good	Good	Good [6]	Unsuitable	Seasonal high water table; highway 2 to 4 feet above water table.
Pottsville	Fair	Poor	Fair to poor	Good	Poor	Unsuitable	Bedrock; excessive drainage.
Purdy	Unsuitable	Unsuitable	Poor to fair	Fair	Poor	Unsuitable	Seasonal high water table; highway 2 to 4 feet above surface.
Rockland, limestone.	Good to fair	Unsuitable	Unsuitable	Poor	Unsuitable	Unsuitable	Bedrock; good drainage.
Rockland, sandstone.	Good to fair	Unsuitable	Unsuitable	Poor	Unsuitable	Unsuitable	Bedrock; good drainage.
Sandy alluvial land.	Fair	Fair to good	Good to fair	Fair to poor	Poor	Good	Excessive drainage; highway 2 to 4 feet above ground surface.
Sequatchie	Fair	Fair to poor	Fair to poor	Good	Good	Unsuitable	Good drainage; highway 2 to 4 feet above surface.
Tilsit	Poor	Fair to poor	Good to fair	Good	Good	Unsuitable	Bedrock; perched water table.
Tyler	Unsuitable (high water table).	Unsuitable	Fair to poor	Good	Fair	Unsuitable	Seasonal high water table 2 to 4 feet above surface.

[1] Gullied land, Made land, and Mine pits and dumps are not included in table.
[2] Rating is for disturbed material; proper surface drainage will have to be provided in places.
[3] Rating is for material in A horizon for use on slopes of embankments and in ditches to help growth of vegetation.

interpretation of soils—Continued

Soil features affecting agricultural structures					
Farm ponds		Drainage structures	Irrigation structures	Terraces and diversions [4]	Waterways
Reservoir areas	Embankments				
Excess seepage	Moderate strength and stability.	Not needed	Medium infiltration; low water-holding capacity.	Not recommended	Not recommended.
Fairly impervious material.	Low to moderate strength and stability.	Moderate permeability, periodic flooding.	Medium infiltration; high water-holding capacity.	Not needed	Not needed.
Fairly impervious material.	Low to moderate strength and stability.	Moderate to slow permeability; some flooding or ponding.	Medium infiltration; moderate to high water-holding capacity.	Not needed	Not needed.
Fairly impervious material; excess seepage in places.	Low to moderate strength and stability.	Moderate to rapid permeability; periodic flooding.	Medium to rapid infiltration; high water-holding capacity.	Not needed	Not needed.
Fairly impervious material.	Low strength and stability.	Not needed	Medium to slow infiltration; low to very low water-holding capacity.	Not recommended	Not recommended.
Impervious material	Low strength and stability.	Slow permeability	Slow infiltration; low water-holding capacity.	Not needed	Not needed.
Excess seepage	Low strength and stability.	Not needed	Unsuitable	Not recommended	Not needed.
Excess seepage	Low strength and stability.	Not needed	Unsuitable	Not recommended	Not needed.
Excess seepage	Low strength and stability.	Not needed	Unsuitable	Not recommended	Not needed.
Fairly impervious material.	Moderate strength and stability.	Moderate permeability.	Medium infiltration; moderate to high water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation.
Fairly impervious material.	Adequate strength and stability.	Moderate permeability to fragipan.	Medium infiltration; moderate water-holding capacity.	Needed; easy to build and maintain.	Erodible; needs vegetation.
Fairly impervious material.	Moderate strength and stability.	Slow permeability	Medium to slow infiltration; low water-holding capacity.	Not needed	Not needed.

[4] When used for cultivated crops, terraces are needed on slopes of 2 to 10 percent. Generally, slopes of more than 10 percent are not recommended for terraces.

[5] Material is fair to good in places where underlain by soft, partly weathered saccharoidal sandstone.

[6] Material good to a depth of 2 feet.

TABLE 11.—*Engineering test data* [1] *for*

Soil name and location	Parent material or parent rock	Bureau of Public Roads report no.	Depth	Horizon	Mechanical analysis [2]				
					Percentage passing sieve [3]				
					2 in.	1½-in.	1 in.	¾-in.	⅜-in.
			Inches						
Albertville loam:									
NE¼SW¼ sec. 2, T. 9 S., R. 1 W. (Modal.)	Interbedded shale and sandstone.	S34697	0–5	A_p	------	------	------	------	100
		S34698	5–16	B_2	------	------	------	100	99
		S34699	28–80	C_{12}	------	------	------	------	------
NE¼SE¼ sec. 22, T. 10 S., R. 3 W. (B_1 horizon.)	Interbedded shale and sandstone.	S34700	0–7	A_p	------	------	------	100	99
		S34701	11–17	B_1	------	------	------	------	100
		S34702	17–29	B_2	------	------	------	------	------
		S34703	29–41	B_3	------	------	------	------	------
NW¼NE¼ sec. 16, T. 10 S., R. 1 W. (Grading to Hartsells.)	Interbedded shale and sandstone.	S34704	0–7	A_p	------	------	------	100	98
		S34705	7–17	A_3	------	------	------	100	99
		S34706	17–28	B_2	------	------	------	------	100
		S34707	35–66	C_1	------	------	------	100	99
Atkins silt loam, local alluvium:									
NE¼NE¼ sec. 27, T. 10 S., R. 3 W. (Modal.)	Alluvium	S34708	0–9	A_{11}	------	------	------	------	------
		S34709	19–30	C_{11g}	------	------	------	------	------
		S34710	30–45	C_{12g}	------	------	------	------	------
		S34711	45–68	C_{13g}	------	------	------	------	------
NE¼SW¼ sec. 26, T. 10 S., R. 1 W.	Alluvium	S34712	0–14	A_{1p}	------	------	------	------	------
		S34713	15½–21	A_{2gb}	------	------	------	------	------
		S34714	21–29	C_{11g}	------	------	------	------	------
		S34715	29–75	C_{12g}	------	------	------	------	------
SW¼SE¼ sec. 17, T. 10 S., R. 1 W.	Alluvium	S34716	0–6	A_{pg}	------	------	------	------	------
		S34717	6–13	A_{3g}	------	------	------	------	------
		S34718	13–30	B_{2g}	------	------	------	------	------
		S34719	30–76	C_g	------	------	------	------	------
Enders and Albertville soils, shallow:									
SE¼NW¼ sec. 1, T. 11 S., R. 3 W.	Interbedded shale and sandstone.	S34736	0–5	A_p	100	99	99	98	91
		S34737	5–12	B_2	------	------	------	100	99
Johnsburg loam:									
NW¼NW¼ sec. 19, T. 11 S., R. 2 W. (Thick B_2; no B_1 horizon.)	Colluvial fan accumulation.	S34728	0–8	A_p	------	------	------	------	100
		S34729	8–26	B_2	------	------	------	100	99
		S34730	26–44	B_{3m1}	------	------	------	100	99
		S34731	44–68+	B_{3m2}	------	100	99	98	97
Leadvale loam:									
NE¼SE¼ sec. 13, T. 11 S., R. 4 W. (Modal.)	Colluvial fan accumulation.	S34720	0–8	A_p	100	99	96	95	93
		S34721	10½–17½	B_2	------	------	------	100	99
		S34722	17½–26	B_{3m1}	------	100	99	99	97
		S34723	26–33	B_{3m2}	------	------	------	100	99
		S34724	33–55+	B_{3m3} or C	95	93	91	88	79
Pottsville shaly silt loam:									
SE¼SW¼ sec. 18, T. 12 S., R. 2 W. (Modal.)	Black fissile shale	S34732	0–5	A_p	100	99	98	97	93
		S34733	5–9	A–C	100	99	92	84	70
NE¼SW¼ sec. 4, T. 12 S., R. 2 W. (Thick C horizon.)	Interbedded shale and sandstone.	S34734	3–10	A_3	88	86	83	81	76
		S34735	10–26	C	------	100	99	98	89
Purdy silt loam:									
NW¼NW¼ sec. 29, T. 11 S., R. 2 W. (Modal.)	Alluvium (terrace)	S34738	0–8	A_p	------	------	------	------	------
		S34739	15–36	B_{2g}	------	------	------	------	------
		S34740	36–72	B_{3mg}	------	------	------	------	------

See footnotes at end of table.

soil samples taken from 18 soil profiles

Mechanical analysis [2]—Continued									Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]—Continued					Percentage smaller than [3]						AASHO [4]	Unified [5]
No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
96	89	86	84	78	68	35	21	17	23	3	A-4(8)	ML.
96	96	93	92	89	84	67	56	50	60	26	A-7-5(18)	MH.
----	100	95	94	88	79	54	38	27	41	13	A-7-6(9)	ML.
97	93	90	88	75	70	46	19	13	24	4	A-4(8)	ML-CL.
99	96	93	92	84	81	58	31	24	33	11	A-6(8)	ML-CL.
----	100	99	99	95	93	75	48	39	52	20	A-7-5(14)	MH.
----	100	99	99	96	93	75	52	40	53	22	A-7-5(15)	MH.
97	93	92	85	46	39	24	7	5	[6] NP	[6] NP	A-4(2)	SM.
95	91	90	86	57	53	37	16	11	18	4	A-4(4)	ML-CL.
98	92	90	84	57	53	41	27	20	30	10	A-4(4)	CL.
97	95	93	84	62	59	47	35	28	40	12	A-6(6)	ML.
----	----	----	100	98	96	78	36	20	36	7	A-4(8)	ML.
----	100	99	98	84	76	51	25	14	20	4	A-4(8)	ML-CL.
----	100	98	96	82	75	54	32	23	27	2	A-4(8)	ML.
----	----	100	97	74	67	48	33	27	31	14	A-6(9)	CL.
----	----	----	100	90	86	62	25	16	27	5	A-4(8)	ML-CL.
----	----	100	98	76	72	52	23	11	20	3	A-4(8)	ML.
----	----	100	97	61	52	34	17	11	18	2	A-4(5)	ML.
----	----	100	97	65	57	40	24	19	25	6	A-4(6)	ML-CL.
----	----	100	99	88	85	67	35	21	31	7	A-4(8)	ML-CL.
----	----	100	99	84	79	58	32	22	25	7	A-4(8)	ML-CL.
----	----	----	100	94	91	76	53	42	50	25	A-7-6(16)	CL.
----	----	100	98	55	43	23	10	7	[6] NP	[6] NP	A-4(4)	ML.
83	80	75	74	54	49	34	20	14	24	4	A-4(4)	ML-CL.
97	97	95	95	89	87	76	61	50	58	24	A-7-5(17)	MH.
99	98	94	93	79	70	44	19	13	24	2	A-4(8)	ML.
97	96	93	92	80	74	51	26	17	26	5	A-4(8)	ML-CL.
97	96	93	91	79	72	51	26	17	25	5	A-4(8)	ML-CL.
95	94	90	89	77	72	50	29	21	29	7	A-4(8)	ML-CL.
88	81	73	70	34	29	17	7	5	[6] NP	[6] NP	A-2-4(0)	SM.
96	91	86	85	61	57	43	27	20	30	9	A-4(5)	ML-CL.
92	86	78	77	57	43	42	28	21	33	10	A-4(4)	ML-CL.
98	96	93	92	72	68	51	34	25	35	11	A-6(8)	ML-CL.
70	60	50	47	33	30	24	16	12	32	9	A-2-4(0)	SM-SC.
88	84	74	72	70	68	56	33	18	35	7	A-4(7)	ML.
61	59	53	52	50	48	42	27	14	35	7	A-4(3)	GM.
70	68	59	57	45	40	29	15	9	25	4	A-4(3)	SM-SC.
80	78	69	67	54	49	35	23	14	27	5	A-4(4)	ML-CL
----	----	100	99	84	80	54	20	14	25	4	A-4(8)	ML-CL.
----	100	99	98	85	80	60	35	28	32	11	A-6(8)	CL.
----	100	99	98	83	79	59	37	30	34	13	A-6(9)	CL.

TABLE 11.—*Engineering test data* [1] *for*

Soil name and location	Parent material or parent rock	Bureau of Public Roads report No.	Depth	Horizon	Mechanical analysis [2]				
					Percentage passing sieve [3]				
					2 in.	1½-in.	1 in.	¾-in.	⅜-in.
Tilsit loam:			*Inches*						
SW¼SE¼ sec. 35, T. 8 S., R. 1 W. (No B_1 horizon.)	Sandstone and shale	S34756	0–6	A_p				100	99
		S34757	6–17	B_2				100	99
		S34758	17–27	B_{3m1}					100
		S34759	27–38	B_{3m2}					100
		S34760	38–65	B_{3m3} or C					100
Tilsit fine sandy loam:									
NE¼SE¼ sec. 33, T. 8 S., R. 1 W. (Modal.)	Sandstone and shale	S34748	0–6	A_p				100	99
		S34749	10–22	B_2				100	99
		S34750	23–34	B_{3m}				100	98
		S34751	34–61	C	91	91	89	87	84
NE¼NW¼ sec. 13, T. 9 S., R. 2 W. (Red D horizon.)	Sandstone and shale	S34752	0–5	A_p					
		S34753	9–27	B_2					100
		S34754	24–41	B_{3m}					100
		S34755	41–80	D					100
Tyler silt loam.									
SE¼NW¼ sec. 30, T. 11 S., R. 2 W.	Alluvium (terrace)	S34741	0–9	A_p					
		S34742	11–24	B_{1g}					
		S34743	37–60	B_{3mg}					
		S34744	60–85	C_g					
SE¼SE¼ sec. 33, T. 11 S., R. 3 W.	Alluvium (terrace)	S34745	7–21	B_{1g}					
		S34746	21–30	B_{21g}					
		S34747	40–72	B_{3g}					
SW¼NE¼ sec. 4, T. 12 S., R. 2 W. (Grading to Tyler.)	Colluvial fan accumulation.	S34725	0–8	A_p				100	99
		S34726	12–33	B_2				100	97
		S34727	33–72+	B_{3m}		100	98	95	87

[1] Tests performed by the Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

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

soil samples taken from 18 soil profiles—Continued

Mechanical analysis [2]—Continued									Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]—Continued					Percentage smaller than [3]						AASHO [4]	Unified [5]
No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
98	97	96	94	76	72	47	16	11	21	3	A–4(8)	ML.
97	96	95	93	78	75	51	22	15	24	6	A–4(8)	ML–CL.
99	98	97	95	76	73	49	26	19	28	9	A–4(8)	CL.
99	98	97	95	76	72	49	28	22	30	9	A–4(8)	ML–CL.
99	98	97	95	76	70	48	28	22	32	11	A–6(8)	CL.
97	96	95	82	48	45	29	12	7	[6] NP	[6] NP	A–4(3)	SM.
97	96	95	83	62	59	45	24	17	26	10	A–4(5)	CL.
95	92	91	77	52	49	36	20	14	22	6	A–4(3)	ML–CL.
82	80	79	68	50	47	40	28	22	36	13	A–6(4)	SM–SC.
		100	97	56	52	32	12	8	[6] NP	[6] NP	A–4(4)	ML
99	98	97	94	62	58	42	24	16	23	6	A–4(5)	ML–CL
99	98	97	94	52	48	34	18	13	19	3	A–4(3)	ML
99	98	97	94	50	47	38	29	26	24	11	A–6(3)	SM–SC
			100	97	90	55	22	16	29	6	A–4(8)	ML–CL.
	100	99	98	92	88	68	39	22	28	8	A–4(8)	CL.
	100	99	99	96	93	79	54	37	38	14	A–6(10)	ML–CL.
	100	98	97	92	89	77	56	40	41	18	A–7–6(11)	CL.
		100	99	84	80	56	27	17	20	3	A–4(8)	ML.
		100	99	89	86	68	42	31	30	11	A–6(8)	CL.
		100	99	88	84	64	42	33	36	15	A–6(10)	CL.
96	89	83	82	68	59	37	16	11	26	4	A–4(7)	ML–CL.
94	90	84	84	74	68	48	27	17	29	7	A–4(8)	ML–CL.
80	74	68	67	59	56	41	26	18	33	9	A–4(5)	ML–CL.

[3] All percentages except those for A_3 layer of Pottsville shaly silt loam are based on total material; fragments of shale and sandstone up to and exceeding 3 inches in diameter were discarded from A_3 layer of the Pottsville shaly silt loam before mechanical analyses.

[4] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes. AASHO Designation M 145–49.

[5] Based on the Unified soil classification system. Tech. Memo. No. 3–357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

[6] Nonplastic.

TABLE 12.—*Soil series classified by higher categories, and factors of soil formation that have contributed to differences in soils*

ZONAL SOILS

Great soil group and soil series	Topographic position	Parent material	Drainage	Slope range	Degree of profile development [1]	Generalized description of moist profile [2]
Red-Yellow Podzolic soils:						
Red members:						
Enders	Uplands	Residuum of weathered shale and sandstone.	Good	Percent 2–15	Strong	Dark grayish-brown to brown silt loam or loam surface soil over a red to yellowish-red silty clay loam to silty clay subsoil.
Linker	Uplands	Residuum of weathered sandstone and some interbedded shale.	Good	2–15	Strong	Dark grayish-brown to yellowish-brown fine sandy loam surface soil over a yellowish-red to dark-red clay loam to fine sandy clay loam subsoil.
Muse	Foot slopes	Old local alluvium from shale and some sandstone.	Good	2–15	Strong	Dark grayish-brown to dark-brown shaly silt loam or shaly loam surface soil over a strong-brown to yellowish-red silty clay loam to silty clay subsoil.
Yellow members:						
Albertville	Uplands	Residuum of weathered shale and sandstone.	Good	2–15	Strong	Grayish-brown to yellowish-brown loam or fine sandy loam surface soil over a yellowish-brown to strong-brown silty clay loam to silty clay subsoil.
Hartsells	Uplands	Residuum of weathered sandstone and, in places, thin lenses of weathered shale.	Good	2–15	Strong to moderate.	Grayish-brown to light olive-brown fine sandy loam surface soil over a yellowish-brown loam to fine sandy clay loam subsoil.
Jefferson	Foot slopes	Old local alluvium from sandstone and some shale.	Good	2–15	Strong to moderate.	Yellowish-brown fine sandy loam surface soil over a yellowish-brown to strong-brown fine sandy clay loam subsoil.
Red-Yellow Podzolic soils (intergrading to Planosols):						
Leadvale	Foot slopes	Old local alluvium from shale and some sandstone.	Moderately good.	2–6	Strong	Dark-brown to light yellowish-brown loam surface soil over a light olive-brown to strong-brown loam to silty clay loam subsoil; depth to fragipan ranges from 16 to 30 inches.

See footnotes at end of table.

TABLE 12.—*Soil series classified by higher categories, and factors of soil formation that have contributed to differences in soils*—Continued

ZONAL SOILS

Great soil group and soil series	Topographic position	Parent material	Drainage	Slope range	Degree of profile development [1]	Generalized description of moist profile [2]
Red-Yellow Podzolic soils—Continued						
Monongahela	Stream terraces.	Old mixed general alluvium washed from upland areas underlain by shale and sandstone.	Moderately good.	*Percent* 0–6	Strong	Light olive-brown or light yellowish-brown to very dark grayish-brown fine sandy loam surface soil over a brownish-yellow clay loam or fine sandy clay loam subsoil; fragipan is at a depth of 16 to 24 inches.
Tilsit	Uplands	Residuum of weathered sandstone and some weathered shale.	Moderately good.	0–6	Strong	Grayish-brown to dark grayish-brown fine sandy loam or loam surface soil over a yellowish-brown to light olive-brown loam or fine sandy clay loam subsoil; fragipan at a depth of 18 to 24 inches.
Reddish-Brown Lateritic soils:						
Hanceville	Uplands	Residuum of weathered sandstone and some weathered shale.	Good	2–10	Moderate	Dark reddish-brown to dark-brown loam surface soil over a dark-red to red clay loam or fine sandy clay loam subsoil.
Gray-Brown Podzolic soils (intergrading to Alluvial soils):						
Sequatchie	Stream terraces.	Old mixed general alluvium washed from upland areas underlain by sandstone and shale.	Good	0–6	Moderate to weak.	Dark-brown to dark yellowish-brown silt loam surface soil over a yellowish-brown to strong-brown silt loam to silty clay loam subsoil.

INTRAZONAL SOILS

Planosols:						
Johnsburg	Uplands	Residuum of weathered acid sandstone and shale and, in places, material washed from soils underlain by sandstone and shale.	Somewhat poor.	0–2	Strong	Brown to light yellowish-brown loam surface soil over a yellowish-brown loam to silty clay loam subsoil that is prominently mottled with shades of gray and brown; fragipan at a depth of 18 to 26 inches.
Purdy	Stream terraces.	General alluvium washed from soils underlain by sandstone and shale.	Poor	0–2	Strong	Gray to grayish-brown, mottled silt loam surface soil over a distinctly mottled silty clay loam to silty clay subsoil; fragipan at a depth of 26 to 40 inches.
Tyler	Stream terraces.	Old mixed general alluvium washed from upland areas underlain by shale and sandstone.	Somewhat poor.	0–2	Strong	Dark grayish-brown to yellowish-brown, distinctly mottled silt loam surface soil over a yellowish-brown to pale-brown, distinctly mottled silt loam or silty clay loam subsoil; fragipan at a depth of 26 to 40 inches.

See footnotes at end of table.

TABLE 12.—*Soil series classified by higher categories, and factors of soil formation that have contributed to differences in soils*—Continued

Great soil group and soil series	Topographic position	Parent material	Drainage	Slope range	Degree of profile development [1]	Generalized description of moist profile [2]
INTRAZONAL SOILS—Continued						
Low-Humic Gley soils:						
Atkins	Depressions in uplands and along drainageways.	Recent local alluvium washed from upland areas underlain by sandstone and shale.	Poor	*Percent* 0–2	Weak	Grayish-brown or dark grayish-brown to gray, faintly to distinctly mottled silt loam surface soil over gray, distinctly to prominently mottled silt loam or loam subsurface layers.
AZONAL SOILS						
Alluvial soils:						
Philo	Flood plains	Recent general and local alluvium washed from upland areas underlain by sandstone and shale.	Moderately good.	0–2	Very weak	Brown to dark-brown or dark grayish-brown loam surface soil over brown to dark-brown loam subsurface layers that are mottled at a depth ranging from 18 to 24 inches.
Pope	Flood plains	Recent general alluvium washed from upland areas underlain by sandstone and some shale.	Good	0–2	Very weak	Dark-brown to dark grayish-brown fine sandy loam surface soil over dark-brown fine sandy loam subsurface layers.
Alluvial soils (intergrading to Low-Humic Gley soils):						
Stendal	Swales, depressions, and at heads of and along drainageways.	Recent local alluvium washed from upland areas underlain by sandstone and shale.	Somewhat poor.	0–2	Weak	Olive-brown to light olive-brown silt loam surface soil over distinctly mottled, grayish-brown or light yellowish-brown silt loam subsurface layers.
Lithosols (intergrading to Red-Yellow Podzolic soils):						
Muskingum [3]	Uplands	Residuum of weathered sandstone and some weathered shale.	Excessive	10–45	Very weak	Very dark gray to very dark grayish-brown stony fine sandy loam surface soil and thin, yellowish-brown stony fine sandy loam subsurface layers; depth to bedrock ranges from 10 to 20 inches.
Pottsville	Uplands	Residuum of weathered acid shale, some weathered sandy shale, and some weathered sandstone.	Excessive	2–45	Weak	Grayish-brown to yellowish-brown shaly silt loam surface soil over thin, yellowish-brown shaly silty clay loam or silty clay subsurface layers; depth to bedrock ranges from 8 to 20 inches.

[1] Estimated from the number of important genetic horizons and the degree of contrast between the horizons.

[2] Profiles described have not been materially affected by erosion.

[3] As mapped in this county, the Muskingum soils are somewhat shallower and more sandy and have weaker profile development than the Muskingum soils of other areas, particularly to the north.

The degree of maturity of these soils varies somewhat, but all are old enough to have a profile that has distinctly developed horizons.

Yellow members.—Soils of the Albertville, Hartsells, and Jefferson series are the yellow members of the Red-Yellow Podzolic great soil group in Cullman County. They are well drained and are on slopes of 2 to 15 percent. The Jefferson soils are moderately deep to deep, whereas the Albertville and Hartsells soils range from shallow to moderately deep.

The Albertville soils developed on uplands in residuum derived mostly from acid shale but partly from sandstone. They have a brownish-yellow (10YR 6/6) to yellowish-brown (10YR 5/6), firm, fine-textured B_2 horizon with moderate, fine and medium, subangular blocky structure. The Hartsells soils developed on uplands in residuum derived mostly from acid sandstone but partly from shale. These soils have a yellowish-brown (10YR 5/6), friable, medium-textured B_2 horizon with weak, medium, subangular blocky structure. The Jefferson soils developed on foot slopes in material washed from soils derived from sandstone and shale. They have a strong-brown (7.5YR 5/6 to 5/8), friable, medium-textured B_2 horizon with moderate, fine and medium, subangular blocky structure.

The degree of maturity of these yellow members varies somewhat, but all are old enough to have a moderately well developed profile.

In Cullman County, the Leadvale, Monongahela, and Tilsit soils are Red-Yellow Podzolic soils that have some characteristics of Planosols. These soils have the normal morphology of Red-Yellow Podzolic soils, except that, at a depth of 16 to 30 inches, they have a fragipan. This fragipan has slow permeability and retards the downward movement of water, especially in the lower part of the subsoil. Consequently, when rainfall is normal or excessive, the upper parts of these soils are saturated with water. In periods of dry weather, these soils tend to be droughty because the upward movement of water is retarded by the pan.

These soils are moderately well drained and are on slopes ranging from 0 to 6 percent. The Leadvale soils formed on foot slopes in old local alluvium that washed or sloughed from soils underlain by sandstone and shale. They have a light olive-brown (2.5Y 5/6), friable, medium-textured B_2 horizon with weak to moderate, fine and medium, subangular blocky structure. This B horizon overlies a compact fragipan layer at a depth of 16 to 30 inches.

The Monongahela soils formed on stream terraces in old general alluvium that washed from soils underlain by sandstone and shale. They have a brownish-yellow (10YR 6/6), friable, medium- to fine-textured B_2 horizon with moderate, fine and medium, subangular blocky structure. This horizon also overlies a compact fragipan layer at a depth of 16 to 24 inches.

The Tilsit soils formed on uplands in residuum from sandstone and interbedded shale. They have a dark yellowish-brown (10YR 4/4), friable, medium-textured B_2 horizon with weak, medium and coarse, granular structure. This horizon overlies a compact fragipan at a depth ranging from 18 to 24 inches.

Reddish-Brown Lateritic soils

The Reddish-Brown Lateritic soils have a well-drained profile with a dark reddish-brown, granular surface soil; a red, friable clayey B horizon; and red or reticulately mottled, lateritic parent material. They formed under forest vegetation in a warm, humid climate having wet and dry seasons (*2*). In Cullman County, only the Hanceville soils are classified in this group. The clay in the subsoil is probably mainly kaolinite rather than sesquioxides. These soils differ from Red-Yellow Podzolic soils in that they lack an A_2 horizon. The nature of the clay fraction and the reaction in the Hanceville soils, however, are not significantly different from those of the Red-Yellow Podzolic soils.

The Hanceville soils in Cullman County are characterized by a dark reddish-brown to dark-brown surface layer and by a thick, dark-red, fairly friable B horizon. These soils are deep to very deep and are well drained. They formed on uplands in residuum mainly of sandstone but partly of shale. They are the reddest soils in this county.

Gray-Brown Podzolic soils

Gray-Brown Podzolic soils have rather thin A_0 and A_1 horizons above a grayish-brown A_2 horizon. The A_2 is underlain by a darker colored, more clayey B_2 horizon. These soils formed under deciduous forest in a temperate, moist climate (*2*).

The Sequatchie soils in this county have been classified with the Gray-Brown Podzolic soils, but they are recognized as intergrading to Alluvial soils because the profile development is weakly expressed in many places. The areas mapped have all been disturbed by cultivation, and the present A_p layer probably includes soil material of the former thin A_1 and A_2 horizons. The surface layer is dark-brown to dark yellowish-brown silt loam. It is underlain by a slightly finer textured B_2 horizon that has about the same color as the surface layer.

In Cullman County, the Sequatchie soils have a small total acreage and are on low stream terraces. Normally, they adjoin the Pope and Philo soils on first bottoms. They formed in old general alluvium, but their profile shows some evidence of age by the degree of its development. Thus, in this county Sequatchie soils are classified as Gray-Brown Podzolic soils that intergrade toward Alluvial soils.

Planosols

This intrazonal great soil group consists of soils having one or more horizons that, because of cementation, compaction, or high clay content, are abruptly separated from and in sharp contrast to an adjacent horizon (*9*). These soils have formed in level or nearly level, imperfectly drained areas under grass or forest vegetation and in a humid or subhumid climate.

In this county, the Planosols are represented by the Johnsburg, Purdy, and Tyler series, all of which contain a fragipan. The Johnsburg soils are on level to nearly level divides and saddles on the uplands and are somewhat poorly drained. The Purdy and Tyler soils are on level to nearly level low stream terraces. The Purdy soils are poorly drained, whereas the Tyler soils are somewhat poorly drained. All the soils in this group have a more

dense or compact B horizon than that in typical zonal soils, but the degree of development varies.

The Planosols in this county developed in a climate similar to that in which the typical zonal soils developed, but they are generally more moist and more poorly aerated. The vegetation on the Planosols was probably somewhat different from that on the Red-Yellow Podzolic soils, but deciduous forests predominated on both. Most Planosols appear to be older in development than the Red-Yellow Podzolic soils because they have a leached or lighter colored surface soil and a more compact subsoil. Because of the relief of Planosols, geologic erosion has been slow. But slow geologic erosion alone is not likely to have been responsible for the formation of Planosols. Possibly, slow internal drainage, combined with slow surface drainage and unusual siltiness of the parent material, has caused the abnormal cementation in or below the B_1 horizon.

Low-Humic Gley soils

The Low-Humic Gley great soil group consists of somewhat poorly drained and poorly drained soils that have a very thin surface horizon and a moderately high content of organic matter. Their surface soil is underlain by mottled gray and brown, gleyed mineral horizons that do not differ greatly from the surface horizon in texture (*9*).

The Atkins soils are the only Low-Humic Gley soils in this county. They are poorly drained and are forming on the plateau in local alluvium along the many narrow drainageways and draws and in depressions.

Alluvial soils

Alluvial soils are forming in alluvium that was deposited fairly recently. Because the soil-forming processes have not had enough time to modify this alluvium, these soils lack genetically related horizons and strongly reflect the character of the Alluvial deposits in which they are forming.

The Alluvial soils in Cullman County are of the Pope, Philo, and Stendal series. These soils are forming in similar parent material, but they range from well drained to somewhat poorly drained. They are on first bottoms along streams, in narrow drainageways and draws, and around the heads of drainageways.

The Pope soils are deep and well drained. They have a brown to dark-brown (10YR 4/3) fine sandy loam surface layer underlain by brown to dark-brown (10YR 4/3 to 3/3) fine sandy loam. The deep, moderately well drained Philo soils have a brown to dark-brown (10YR 4/3) loam surface soil. Their subsurface layers are brown to dark-brown (10YR 4/3) loam, mottled with shades of gray at a depth of 18 inches or more.

The Stendal soils, which in this county are forming in local alluvium, are mapped with the local alluvium phase of the Philo soils in a group of undifferentiated soils. The Stendal soils are somewhat poorly drained. Their surface layer is olive-brown (2.5Y 4/4) to light olive-brown (2.5Y 5/4) silt loam. It is underlain by distinctly mottled, grayish-brown (2.5Y 5/2) subsurface layers of silt loam. Because of the poorly drained conditions under which they have formed, the Stendal soils show some evidence of gleying and, therefore, are classified as Alluvial soils intergrading to the Low-Humic Gley group.

Lithosols

Lithosols are azonal soils that have no clearly expressed soil morphology. They consist of a freshly and imperfectly weathered mass of hard rocks or hard rock fragments and are mostly on steep slopes (*9*). They have developed where there was ample moisture and generally consist of material that erodes easily.

The Muskingum and Pottsville soils are classified as Lithosols in this county. Because their profiles include weakly expressed, discontinuous B or BC horizons, however, they are recognized as intergrading to the Red-Yellow Podzolic group.

These soils have the same general relief, but they differ mainly in parent material. The Muskingum soils formed in material weathered chiefly from acid sandstone but partly from thin beds of acid shale. Their depth to bedrock normally ranges from 10 to 20 inches. Stones are common on these soils. The Pottsville soils formed in material weathered mainly from acid shale but partly from sandy shale. Bedrock is at a depth of 8 to 20 inches. Fragments of shale are common on and in these soils.

Glossary

Acidity. The degree of acidity or alkalinity of a soil mass, expressed in pH values or in words, as follows:

	pH		*pH*
Extremely acid	below 4.5	Neutral	6.6–7.3
Very strongly acid	4.5–5.0	Mildly alkaline	7.4–7.8
Strongly acid	5.1–5.5	Moderately alkaline	7.9–8.4
Medium acid	5.6–6.0	Strongly alkaline	8.5–9.0
Slightly acid	6.1–6.5	Very strongly alkaline	9.1 and higher

Aggregate (of soil). Many fine soil particles held in a single mass or cluster, such as a clod, prism, crumb, or block.

Alluvium. Soil material deposited on land by streams.

Available moisture. That part of the moisture in a soil that can be taken up by plants at rates significant to their growth.

Bedrock. The solid rock underlying soils and other earthy surface formations.

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

Claypan. A compact, slowly permeable soil horizon rich in clay and separated more or less abruptly from the overlying soil. Claypans are commonly hard when dry and plastic or stiff when wet.

Colluvium. Mixed deposits of soil material and rock fragments near the base of steep slopes. The deposits have accumulated through soil creep, slides, and local wash.

Consistence, soil. The combination of properties of soil material that determine its resistance to crushing and its ability to be molded or changed in shape. Consistence depends mainly on forces of attraction between soil particles. Consistence is described by the words *compact, firm, friable, loose, hard, plastic,* and *sticky.*

COMPACT. Dense and firm but without any cementation.

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

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

LOOSE. Particles do not stick together.

HARD. Moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.

PLASTIC. Soil material forms wirelike shape when rolled between thumb and forefinger, and moderate pressure is required to deform the soil mass.

STICKY. After pressure, soil material adheres to both thumb and forefinger and tends to stretch somewhat and pull apart rather than to pull free.

Contour tillage. Plowing or cultivating at right angles to the natural direction of slope, at the same level throughout, and ordinarily at reasonably close intervals.

Cropland. Land regularly used for crops, except forest crops. Cropland includes rotation pasture, cultivated summer fallow, and areas ordinarily used for crops but temporarily idle.

Crumb structure. Very porous, granular structure in soils.

Drainage, soil. The rapidity and extent of the removal of water from the soil by runoff, by flow through the soil to underground spaces, or by both processes. As a condition of the soil, drainage refers to the frequency and duration of periods when the soil is free of saturation. Terms used to describe drainage are *runoff, internal drainage, permeability,* and *natural drainage.*

RUNOFF. The surface flow of water from an area, or the total volume of surface flow during a specified time. The amount and rapidity of runoff is closely related to slope, and it is affected by the texture, structure, and porosity of the surface soil. The relative degrees of runoff are *ponded, very slow, slow, medium, rapid,* and *very rapid.*

INTERNAL DRAINAGE. The movement of water through the soil profile. Terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

PERMEABILITY. The quality of a soil that enables it to transmit water and air. The classes of permeability are *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

NATURAL DRAINAGE. Drainage that existed during the development of a soil, as opposed to altered drainage. The terms used to express natural drainage are *very poorly drained, poorly drained, imperfectly drained* or *somewhat poorly drained, moderately well drained, well drained, somewhat excessively drained,* and *excessively drained.*

Erosion. The wearing away of the land surface by detachment and transport of soil and rock materials through the action of moving water, wind, and other geological agents. The classes of erosion used in this report are *slightly eroded, moderately eroded, severely eroded,* and *gullied land.*

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of plants when light, moisture, temperature, and the physical condition of the soil are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Forest. Land not in farms, bearing a stand of trees of any age or size, including seedlings, and of species that attain a minimum average height of 6 feet at maturity; or land from which such a stand has been removed, but which has been put to no other use. Forest on farms is commonly called woodland or farm forest.

Fragipan. A compact horizon rich in silt, sand, or both, and normally fairly low in clay. It is dense and hard when dry but is friable when moist. A fragipan normally interferes with the movement of water through the soil and with the penetration of roots.

Granular structure. Soil structure in which the individual soil grains are grouped into spherical aggregates with indistinct sides.

Gravel. Coarse mineral particles ranging from 2 millimeters to 3 inches in diameter. Fine gravel ranges from 2 millimeters to ½ inch in diameter.

Green-manure crop. Any crop grown for the purpose of being turned under while green to improve the soil.

Infiltration. The entry of water into a soil and its movement downward through the soil. The rate of infiltration is normally expressed in inches per hour.

Leaching. The removal of material in solution by the passage of water through soil.

Loam. As a soil textural class, soil material that contains 7 to 27 percent of clay, 28 to 50 percent of silt, and less than 52 percent of sand.

Mapping unit. Any soil, miscellaneous land type, soil complex, or group of undifferentiated soils shown on the detailed soil map and identified by a letter symbol.

Massive, soil. Large uniform masses of cohesive soil, sometimes with poorly defined and irregular breakage, as in some of the fine-textured alluvial soils; structureless.

Mottled. Irregularly marked with spots of color. Descriptive terms for mottles are: For contrast—*faint, distinct,* and *prominent;* for abundance—*few, common,* and *many;* and for size—*fine, medium,* and *coarse* (*6*).

Nutrient, plant. Any element taken in by a plant, which is essential to its growth and used by it in elaboration of its food and tissues. These elements include nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and other elements obtained mainly from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The unconsolidated mass of rock material (or peat) from which the soil profile develops. Horizon C of the soil profile.

Permeability, soil. (See Drainage, soil.)

Productivity, soil. The capability of a soil to produce a specified plant or sequence of plants under a defined set of management practices.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Relief. Elevations or inequalities of the land surface, considered collectively.

Sand. Individual rock or mineral fragments in soils. Diameter of the fragments ranges from 0.05 millimeter to 2.0 millimeters. As a soil textural class, soil material that contains 85 percent or more of sand and not more than 10 percent of clay.

Silt. Individual mineral particles of soil that range in diameter between the upper size of clay, 0.002 millimeter, and the lower size of very fine sand, 0.05 millimeter. As a soil textural class, soil material that contains 80 percent or more of silt and less than 12 percent of clay. The term "silt" is also used for water-deposited sediment that has individual grains approximately the size of silt, although the term is sometimes applied loosely to sediment containing considerable sand and clay.

Soil. The natural medium for the growth of land plants. A soil is a natural three-dimensional body on the surface of the earth, unlike the adjoining bodies.

Stripcropping. The practice of growing crops in a systematic arrangement of strips, or bands. Generally, cultivated crops and sod crops are alternated in strips to protect the soil and vegetation against running water or wind. Alternate strips are laid out approximately on the contour on erosive soils or at approximate right angles to the prevailing direction of the wind where soil blowing is a hazard.

Structure, soil. The aggregation of primary soil particles into compound particles, or clusters of primary particles, which are separated from adjoining aggregates by surfaces of weakness. Soil structure is classified according to distinctness (grade), size (class), and shape and arrangement (type) as follows:

DISTINCTNESS. *Structureless, weak, moderate,* and *strong.*

SIZE. *Very fine* or *very thin, fine* or *thin, medium, coarse* or *thick,* and *very coarse* or *very thick.*

SHAPE AND ARRANGEMENT. *Platy, prismatic, columnar, blocky, subangular blocky, granular,* and *crumb.*

Subsoil. Roughly, that part of the profile below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil; about 5 to 8 inches in thickness.

Terrace. An embankment or ridge of earth constructed across a slope to control runoff and minimize erosion. The terrace intercepts surplus runoff and retards this water so that more of it can infiltrate into the soil. Excess water flows to a prepared outlet without damaging the soil.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil; specifically, the proportions of clay, silt, and sand. Sand makes up a large part of a coarse-textured soil, and clay a large part of a fine-textured soil.

Tilth, soil. The physical condition of a soil, especially the soil structure, that affects the growth of plants. A soil in good tilth has high porosity and stable, granular structure. A soil in poor tilth is not friable or aggregated and is hard and difficult to till.

Topsoil. Surface soil material, usually rich in organic matter, used to topdress roadbanks, parks, gardens, and lawns.

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GUIDE FOR MAPPING UNITS

Map symbol	Soil name	Page	Capability unit	Page	Woodland suitability group	Page
AbB	Albertville loam, 2 to 6 percent slopes	10	IIe–7	31	3A	44
AbB2	Albertville loam, 2 to 6 percent slopes, eroded	10	IIe–7	31	3A	44
AbC	Albertville loam, 6 to 10 percent slopes	10	IIIe–7	33	3A	44
AbC2	Albertville loam, 6 to 10 percent slopes, eroded	10	IIIe–7	33	3A	44
AbD2	Albertville loam, 10 to 15 percent slopes, eroded	10	IVe–7	35	3A	44
AcB3	Albertville silty clay loam, 2 to 6 percent slopes, severely eroded	10	IIIe–7	33	5B	46
AcC3	Albertville silty clay loam, 6 to 10 percent slopes, severely eroded	11	IVe–7	35	5B	46
AcD3	Albertville silty clay loam, 10 to 15 percent slopes, severely eroded	11	VIe–2	36	5B	46
At	Atkins silt loam, local alluvium	11	IVw–2	35	1	42
EnB2	Enders silt loam, 2 to 6 percent slopes, eroded	12	IIe–7	31	4B	45
EnC2	Enders silt loam, 6 to 10 percent slopes, eroded	12	IIIe–7	33	4B	45
ErC3	Enders and Albertville silty clay loams, shallow, 6 to 10 percent slopes, severely eroded.	13	VIe–4	36	7	46
ErD3	Enders and Albertville silty clay loams, shallow, 10 to 15 percent slopes, severely eroded.	13	VIIe–2	37	7	46
EsB2	Enders and Albertville soils, shallow, 2 to 6 percent slopes, eroded	12	IIIe–9	33	4B	45
EsC2	Enders and Albertville soils, shallow, 6 to 10 percent slopes, eroded	13	IVe–9	35	4B	45
EsD	Enders and Albertville soils, shallow, 10 to 15 percent slopes	13	VIe–4	36	4B	45
EsD2	Enders and Albertville soils, shallow, 10 to 15 percent slopes, eroded	13	VIe–4	36	4B	45
EsC3	Enders and Muse soils, 6 to 15 percent slopes, severely eroded	12	IVe–7	35	5B	46
Gu	Gullied land	14	VIIe–1	36	8	46
HaB2	Hanceville loam, 2 to 6 percent slopes, eroded	14	IIe–2	30	4B	45
HaC2	Hanceville loam, 6 to 10 percent slopes, eroded	14	IIIe–2	32	4B	45
HrB	Hartsells fine sandy loam, 2 to 6 percent slopes	15	IIe–2	30	5A	45
HrB2	Hartsells fine sandy loam, 2 to 6 percent slopes, eroded	15	IIe–2	30	5A	45
HrC	Hartsells fine sandy loam, 6 to 10 percent slopes	15	IIIe–2	32	5A	45
HrC2	Hartsells fine sandy loam, 6 to 10 percent slopes, eroded	15	IIIe–2	32	5A	45
HrC3	Hartsells fine sandy loam, 6 to 10 percent slopes, severely eroded	15	IVe–2	35	5A	45
HsB2	Hartsells fine sandy loam, shallow, 2 to 6 percent slopes, eroded	16	IIIe–9	33	5A	45
HsC2	Hartsells fine sandy loam, shallow, 6 to 10 percent slopes, eroded	16	IVe–9	35	5A	45
HsD	Hartsells fine sandy loam, shallow, 10 to 15 percent slopes	16	VIe–4	36	5A	45
HsD2	Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, eroded	16	VIe–4	36	5A	45
HsD3	Hartsells fine sandy loam, shallow, 10 to 15 percent slopes, severely eroded	16	VIIe–2	37	5B	46
JeB2	Jefferson fine sandy loam, 2 to 6 percent slopes, eroded	17	IIe–2	30	5A	45
JeC2	Jefferson fine sandy loam, 6 to 10 percent slopes, eroded	16	IIIe–2	32	5A	45
JeD2	Jefferson fine sandy loam, 10 to 15 percent slopes, eroded	17	IVe–2	35	5A	45
Jo	Johnsburg loam	17	IIIw–3	34	2B	44
LeB	Leadvale loam, 2 to 6 percent slopes	18	IIe–5	31	3B	44
LeB2	Leadvale loam, 2 to 6 percent slopes, eroded	18	IIe–5	31	3B	44
LkB	Linker fine sandy loam, 2 to 6 percent slopes	19	IIe–2	30	5A	45
LkB2	Linker fine sandy loam, 2 to 6 percent slopes, eroded	19	IIe–2	30	5A	45
LkC	Linker fine sandy loam, 6 to 10 percent slopes	19	IIIe–2	32	5A	45
LkC2	Linker fine sandy loam, 6 to 10 percent slopes, eroded	19	IIIe–2	32	5A	45
LkC3	Linker fine sandy loam, 6 to 10 percent slopes, severely eroded	19	IVe–2	35	7	46
LkD	Linker fine sandy loam, 10 to 15 percent slopes	20	IVe–2	35	5A	45
LkD2	Linker fine sandy loam, 10 to 15 percent slopes, eroded	20	IVe–2	35	5A	45
LkD3	Linker fine sandy loam, 10 to 15 percent slopes, severely eroded	20	VIe–2	36	7	46
Ma	Made land	20	VIIe–1	36	8	46
Md	Mine pits and dumps	20	VIIe–1	36	8	46
MoA	Monongahela fine sandy loam, 0 to 2 percent slopes	21	IIw–2	32	3B	44
MoB	Monongahela fine sandy loam, 2 to 6 percent slopes	20	IIe–5	31	3B	44
MsB2	Muse shaly silt loam, 2 to 6 percent slopes, eroded	22	IIe–7	31	3A	44
MsC2	Muse shaly silt loam, 6 to 10 percent slopes, eroded	22	IIIe–7	33	3A	44
MsD2	Muse shaly silt loam, 10 to 15 percent slopes, eroded	21	IVe–7	35	3A	44
MuD	Muskingum stony fine sandy loam, 10 to 15 percent slopes	22	VIe–4	36	4A	45
MuE	Muskingum stony fine sandy loam, 15 to 45 percent slopes	22	VIIe–2	37	4A	45
Ph	Philo loam	23	IIIw–2	34	2A	42
Pm	Philo and Stendal soils, local alluvium	23	IIIw–2	34	2A	42
Po	Pope fine sandy loam	24	IIw–1	32	2A	42
PsB2	Pottsville shaly silt loam, 2 to 10 percent slopes, eroded	25	IVe–9	35	6	46
PsD	Pottsville shaly silt loam, 10 to 15 percent slopes	25	VIe–4	36	6	46
PsF	Pottsville shaly silt loam, 15 to 45 percent slopes	24	VIIe–2	37	6	46
PtE2	Pottsville shaly silty clay loam, 10 to 25 percent slopes, eroded	25	VIIe–2	37	7	46
Pu	Purdy silt loam	25	IVw–2	35	2B	44
Rk	Rockland, limestone	26	VIIe–1	36	9	46
Ro	Rockland, sandstone	26	VIIe–1	36	8	46
Sa	Sandy alluvial land	26	VIIe–1	36	8	46
SeA	Sequatchie silt loam, 0 to 2 percent slopes	26	I–2	30	3A	44
SeB	Sequatchie silt loam, 2 to 6 percent slopes	27	IIe–2	30	3A	44
TsA	Tilsit loam, 0 to 2 percent slopes	28	IIw–2	32	5A	45
TtB	Tilsit fine sandy loam, 2 to 6 percent slopes	27	IIe–5	31	4B	45
TtB2	Tilsit fine sandy loam, 2 to 6 percent slopes, eroded	27	IIe–5	31	4B	45
Ty	Tyler silt loam	28	IIIw–3	34	2B	44