Series 1962, No. 5

Issued November 1965

SOIL SURVEY

Dyer County Tennessee

OUR SOIL ★ OUR STRENGTH

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

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Dyer County will serve several groups of readers. It will help crop and livestock farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, lakes, ponds, and other structures; aid managers of forest and woodland; add to the soil scientists' knowledge of soils; and help bankers, prospective buyers, and others in appraising a farm or other tract.

Locating the soils

At the back of this report is an index map and a soil map consisting of many sheets. On the index map are rectangles numbered to correspond to the sheets of the soil map so that the sheet showing any area can be located easily. On each map sheet, the soil boundaries are outlined and there is a symbol for each kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside the area and a pointer shows where it belongs. For example, an area on the map has the symbol Fa. The legend for the set of maps shows that this symbol identifies Falaya silt loam. That soil and all others mapped in the county are described in the section "Descriptions of the Soils."

Finding information

In the "Guide to Mapping Units" at the back of this report, the soils are listed in the alphabetic order of their map symbols. This guide shows where to find a description of each soil and a discussion of its capability unit, woodland group, and wildlife group. It also shows where to find the acreage of each soil, the yields that can be expected, and information about engineering uses of soils.

Farmers and those who work with farmers can learn about the soils on a farm by reading the description of each soil and of its capability unit and other groupings. A convenient way of doing this is to turn to the soil map and list the soil symbols on a farm and then to use the "Guide to Mapping Units" in finding the pages where each soil and its groupings are described.

Foresters and others interested in woodland can refer to the section "Use of the Soils for Woodland." In that section the soils in the county are placed in groups according to their suitability for trees, and the management of each group is discussed.

Game managers, sportsmen, and others concerned with wildlife will find information about the main kinds of wildlife and their food and cover in the section "Management of the Soils for Wildlife."

Engineers and builders will find in the section "Engineering Properties of the Soils" tables that give engineering descriptions of the soils in the county, name soil features that affect engineering practices and structures, and rate the soils according to their suitability for several kinds of engineering work.

Scientists and others who are interested can read about how the soils were formed and how they are classified in the section "Formation and Classification of the 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 Dyer 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 County."

* * * * *

Fieldwork for this survey was completed in 1962. Unless otherwise stated, all statements in the report refer to conditions in the county at the time the survey was in progress. The soil survey was made cooperatively by the U.S. Department of Agriculture and the Tennessee Agricultural Experiment Station. It is part of the technical assistance given by the Soil Conservation Service to the Dyer County Soil Conservation District.

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Issued November 1965

SOIL SURVEY OF DYER COUNTY, TENNESSEE

BY WILLIAM T. BROWN, WILLIAM C. MOFFITT, CHARLES L. MOORE, AND WESLEY C. JACKSON, SOIL CONSERVATION SERVICE

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

DYER COUNTY is on the western edge of Tennessee next to the Mississippi River (fig. 1). The county occupies an area of 345,600 acres. The land area is about 337,280 acres, or 527 square miles.

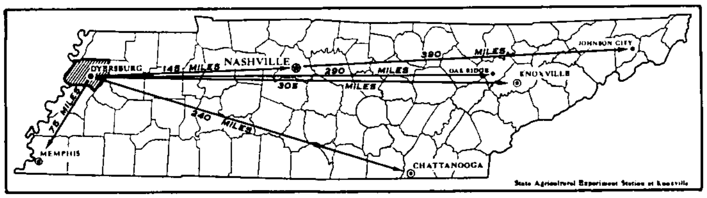

Figure 1.—**Location of Dyer County, Tenn.**

The Mississippi River bottoms, which range from about 250 to 280 feet above sea level, cover the western one-third of the county. Some of the most fertile soils in the State are in this area. Occasional flooding and poor soil drainage, however, are limitations to farming. Fortunately, the floods occur in winter and spring, so the soils ordinarily dry out in time for planting of summer annual crops.

Levees protect some of the bottoms, but much of the area behind the levees is flooded to varying depths (fig. 2) by backwater from the Mississippi River and by overflow from the Obion and Forked Deer Rivers, which flow into the Mississippi.

The soils near the Mississippi River are mostly loams and sandy loams, and they are generally well drained and very productive. The soils in a belt that runs through the center of the bottoms and parallel to the Mississippi are mainly black clays. These soils are poorly drained and slow to dry out, but they nevertheless produce good yields of summer annual crops, such as soybeans. The soils on the outer part of the bottoms are silty and loamy. They range from well drained to poorly drained.

The eastern two-thirds of the county consists, for the most part, of gently rolling hills that are dissected by creeks and rivers. There are some steep hills. The elevation ranges from about 255 feet to about 510 feet. The entire area is covered with several feet of loess, mostly silt.

The soils in this part of the county range from well drained on the hills to poorly drained on the flats. All of the soils are silty and easy to work, but the sloping soils erode easily when cultivated. Many of the soils have a fragipan, or dense compact layer, about 2 feet below the surface. As a whole, the soils in this area produce good yields of a wide range of crops.

General Nature of the County

This section discusses settlement, population, drainage, and climate of Dyer County. Also, it gives information about industry and agriculture in the county. The statistics on agriculture are from reports published by the United States Bureau of the Census.

Settlement

Dyer County was established on October 16, 1823. It was named in honor of Col. Henry Dyer. The county had been part of the Western District of Tennessee.

The first settlement in the area that later became Dyer County was started in 1820 at Key Corner by Henry Rutherford and Oliver Crenshaw. Key Corner, which is now in Lauderdale County, was named by Rutherford, a surveyor who laid out a large number of land grants. Selecting a sycamore near the Forked Deer River about 13 miles southwest of what is now Dyersburg, Rutherford marked the tree with his initials and used it as a starting place for his surveys; hence the name Key Corner. The second settlement, formed soon after the first one, was along the Obion River, and the third between the forks of Forked Deer River.

The pioneers came mostly from middle Tennessee, but some came from North Carolina and Virginia. Many of

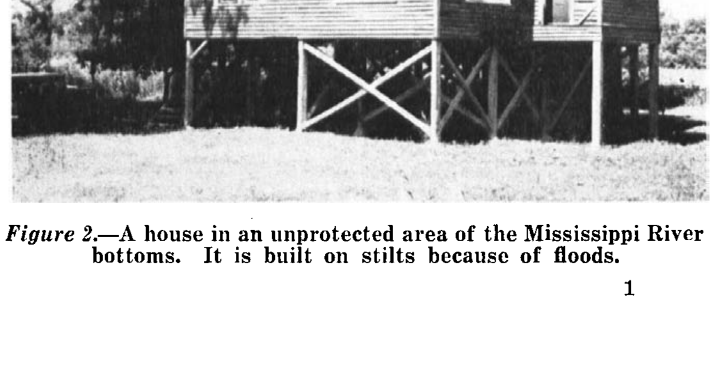

Figure 2.—**A house in an unprotected area of the Mississippi River bottoms. It is built on stilts because of floods.**

the pioneers settled on grants of land provided by the State of North Carolina.

Population

In 1960 the population of Dyer County was 29,537. Dyersburg, the county seat and largest of the three incorporated towns, had a population of 12,499. Newbern had a population of 1,695; and Trimble, which is partly in Dyer County and partly in Obion County, had a population of 581. Unincorporated towns and their estimated population are: Finley, 700; Lenox, 450; Miston, 350; and Tigrett, 300.

A decrease in population was recorded both in 1940 and in 1950. Though the population has decreased, the towns have continued to grow because, along with emigration from the county, there has been some relocation within the county. Most of the people who have left the county or who have moved to the towns lived on the Mississippi River bottoms. Some of these people were displaced because of an increase in the use of farm machinery. Others left in search of a better living.

Industry

Industry has expanded in the county in recent years. There are manufacturing plants in or near Dyersburg, Newbern, and Trimble. Dyersburg and Newbern are trading centers for the surrounding area. Manufacturing and trade, important as they are, have not exceeded agriculture in economic significance.

Agriculture

The 1,874 farms in Dyer County take up 77.8 percent of the land area. Farms 10 to 49 acres in size are the most common. Ninety-nine farms are 500 acres or more in size, and 120 farms are less than 10 acres in size. Most of the farms are of the general type, on which row crops, hay, and pasture are grown.

Cotton has been king of all crops for many years in Dyer County, but soybeans may now be more important economically. The acreage in soybeans is nearly double that in cotton, and the yields per acre of soybeans have increased tremendously in recent years. Corn also is an important crop. Most of it is fed to livestock rather than sold for cash. Vegetable crops, though not extensive in acreage, are important.

Alfalfa and annual lespedeza are the leading hay crops. They generally are fed on the farm, not sold as hay.

Unimproved pastures consist mostly of common lespedeza. The improved pastures consist of tall fescue, white clover, common bermudagrass, and, to a lesser extent, orchardgrass.

Drainage

Dyer County has a complete drainage system. Surface runoff first collects in small streams or branches, then it flows to progressively larger streams and rivers, and finally it flows into the Mississippi River. Lewis, Hunsacker, Pond, Biffle, Reeds, and Doakville Creeks, along with the Obion, Forked Deer, and Mississippi Rivers, form the major part of this drainage system. Also part of this

TABLE 1.—*Temperature and precipitation*

[All data from Newbern, Dyer County, Tenn., elevation 380 feet, latitude 36°07′ N., longitude 89°16′ W.]

Month	Temperature [1]				Precipitation [2]			
	Average daily maximum	Average daily minumum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Average snowfall [3]
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—	
	°F.	°F.	°F.	°F.	Inches	Inches	Inches	Inches
January	49. 5	30. 6	69	11	5. 40	1. 3	10. 2	2. 2
February	52. 3	32. 1	68	17	4. 41	1. 0	7. 3	2. 1
March	61. 1	39. 2	78	24	5. 24	1. 8	7. 9	0. 8
April	71. 3	48. 8	84	35	4. 13	2. 0	6. 2	(4)
May	81. 2	57. 3	92	45	4. 13	1. 0	6. 8	0
June	89. 6	66. 1	99	55	4. 03	1. 1	8. 0	0
July	92. 1	68. 5	100	60	3. 95	1. 4	6. 6	0
August	91. 3	67. 6	100	58	2. 95	0. 4	5. 9	(4)
September	85. 1	59. 8	96	46	3. 15	1. 2	4. 6	0
October	75. 9	49. 4	88	36	2. 93	1. 0	5. 0	0
November	60. 6	38. 4	76	24	4. 13	1. 4	6. 5	0. 4
December	50. 8	32. 4	68	17	4. 33	1. 8	7. 2	1. 0
Year	71. 7	49. 2	[5] 101	[5] 7	48. 78	36. 7	65. 6	6. 5

[1] Twenty-year period of record, during 1931 through 1952. Temperatures were measured in standard instrument shelters of the U.S. Weather Bureau with thermometer 4.5 feet above the ground. On clear, calm nights, shelter-level temperatures are usually about 5 degrees higher than air temperatures near the ground, and may be as much as 12 degrees higher.

[2] Period of record, 1931 through 1960.

[3] Seventeen-year period of record, 1931 through 1952.

[4] Trace.

[5] Average of annual extremes. Period of record, 1931 through 1960.

system are two important tributaries of the Obion and Forked Deer Rivers, Rock Slough and Running Reelfoot Bayou, which are on the Mississippi River bottoms.

Climate [1]

The climate of Dyer County, like that of much of Tennessee and of surrounding areas, is characterized by relatively mild winters, hot summers, and abundant rainfall. Although the county is well inland from large bodies of water, it lies in the path of cold air moving down from Canada and warm, moist air moving up from the Gulf of Mexico. Consequently, extreme and frequent changes in the weather, both from day to day and from season to season, are common.

Dyer County, in the extreme western part of Tennessee, lies in the highly productive Mississippi Valley agricultural region. The county consists of Mississippi bottom lands, which extend several miles eastward from the Mississippi River, and gently rolling plains of the Plateau slope. All of the county, except for some hills in the central part, is at an elevation of less than 400 feet. Though the weather may vary daily within the county, differences in altitude are not great enough to cause significant differences in climate. Therefore, the climate data in table 1, recorded at the Newbern weather station in the eastern part of the county, are representative of the entire county, except that precipitation decreases slightly from east to west. The difference between the total annual precipitation in the eastern part of the county and that in the western part is about 2 inches.

TEMPERATURE.—The average annual temperature at Newbern is 60.4°. Temperature extremes have been 107° and —12° during the period 1931 through 1960. Prolonged periods of very cold or very hot weather are unusual. During the summer, occasional periods of dry and cool weather break up stretches of hot and humid weather, and occasional periods of mild weather occur almost every winter. Winters are mild enough so that fall-sown small grain survives well and provides some winter grazing for livestock. Pasture grasses make substantial growth during winter, since the temperature rises above 40° on many days.

As shown in table 1, the average daily maximum temperature varies from near 50° in winter to the low 90's in summer; and the average daily minimum temperature varies from below freezing in winter to the upper 60's in summer.

The average dates of the last freezing temperature in spring and of the first in fall are March 27 and October 31, respectively, according to Newbern records. The interval between these dates is the growing season. The growing season, or frost-free period, lasts 217 days on the average—long enough to permit planting of cotton, corn, vegetables, and similar crops over a period of a few weeks and still give them time to mature.

The probability of a freezing temperature occurring in spring after any given date, and in fall before any given date, can be determined from figure 3. To determine, for example, the probability of a temperature of 28° or lower occurring in spring after March 29, first, look at the dates on the right-hand side of the figure and determine approximately where March 29 is on the scale; next, follow a rule horizontally from that point (the date) to where the rule intersects the diagonal line marked "28° F., Spring;" then follow the vertical rule from the point of intersection to the percent scale at the bottom of figure 3. For this example, the probability is 25 percent.

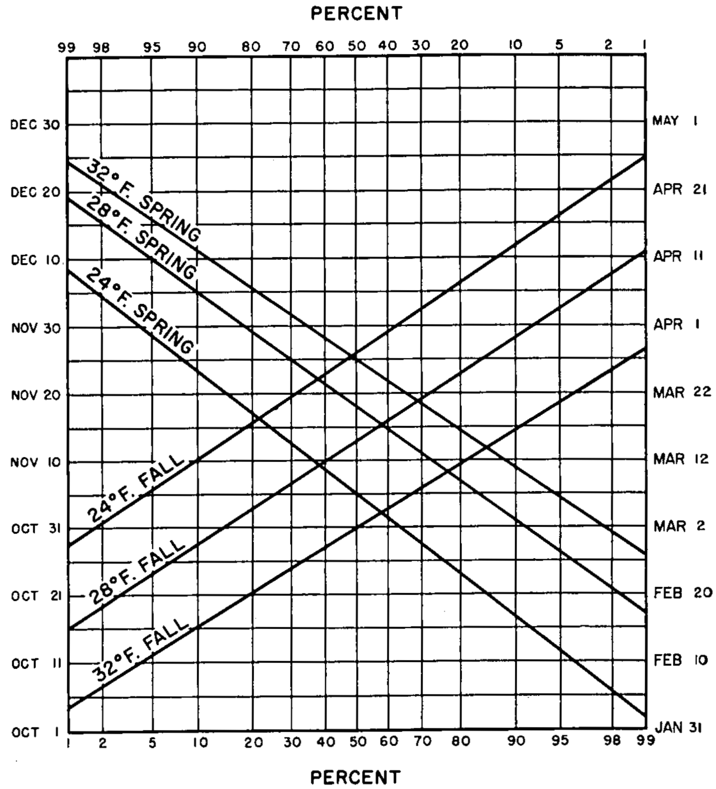

***Figure 3.*—Probability (in percent) of given temperatures occurring in fall before any date (top scale) and in spring after any date (bottom scale) at Newbern, Dyer County, Tenn.**

To determine the probability of a freezing temperature occurring in fall before any given date, follow the same procedure but look for the date on the left side and read the percentage at the top of the figure.

The reaction of cultivated crops to freezing temperatures [2] at plant height is summarized as follows (*5*).[3] A temperature of 28° to 32° F. results in a light freeze and causes little or no damage to most plants. It may not damage plants hardened by drought or by low temperatures on sunny days, but it may kill tomatoes, peppers, and other tender plants. Also, it may destroy the anthers of small grains, as well as the pistils and anthers of strawberries and other flowering plants. Thus, the yield of these plants may be reduced, though the plants themselves are little damaged. A temperature of 24° to 28° F. results in a moderate freeze and causes some damage to most plants. It causes heavy damage to fruit blossoms and to semihardy plants, and it may destroy tender plants. A temperature lower than 24° constitutes a severe freeze and causes heavy damage to all plants.

PRECIPITATION.—Dyer County has an average annual rainfall of approximately 48 inches, which normally is

[1] By MORTON BAILEY, State climatologist, U.S. Weather Bureau, Nashville, Tennessee.

[2] Based in part on data from DR. B. S. PICKETT, Head, Department of Horticulture, Agricultural Experiment Station, University of Tennessee.

[3] Italic numbers in parentheses refer to Literature cited, p. 78.

enough for agriculture and for other aspects of the established economy. Total annual rainfall at Newbern during the period 1931 through 1960 ranged from 32.56 inches in 1941 to 76.71 inches in 1957. Most of the precipitation, as shown in table 1, normally occurs in winter and early in spring, because more low-pressure systems, which cause widespread rains, pass through the county during that time. Precipitation late in spring and early in summer, when local showers and thunderstorms are most frequent, is near the monthly average. Precipitation is lightest late in summer and early in fall, because high-pressure systems are more common at that time of year. Table 1 indicates that 1 year in 10, on the average, will have less than 1 inch of rain during August; also, it indicates that each month has 4.6 inches or more of rainfall 1 year in 10. Thus, though periods of drought occur, there are also periods when rainfall is plentiful during all seasons, as well as periods of excessive rainfall.

The county is subject to heavy local rainstorms that frequently drop more than 4 inches of precipitation. Flash floods resulting from these heavy rains are relatively frequent on the small rivers. Maximum precipitation in a 24-hour period has been more than 5 inches. The highest total monthly precipitation recorded at Newbern during the period 1931 through 1960 is 16.68 inches for January 1937, the month of the great Mississippi Valley flood.

WATER BALANCE.—Figure 4 shows the average water balance at Newbern, Tenn. More specifically, through the use of curves for average monthly precipitation, for potential evapotranspiration, and for actual evapotranspiration, figure 4 shows moisture conditions in the soils at the end of each month during an average year. Computations for figure 4 are by the Thornthwaite method (*14*). The available moisture at field capacity is assumed to be 4 inches per foot of soil.

From January through the first few days in June, figure 4 shows that precipitation exceeds estimated actual evapotranspiration. From early in June through most of October, estimated actual evapotranspiration exceeds precipitation. Near the end of October, 3.59 inches of the original 4 inches of available water has been removed from the soil. Then replacement of moisture lost during the summer begins. This replacement is completed near the end of November, and again precipitation exceeds evapotranspiration. This excess precipitation is lost by the soil through surface or subsurface runoff.

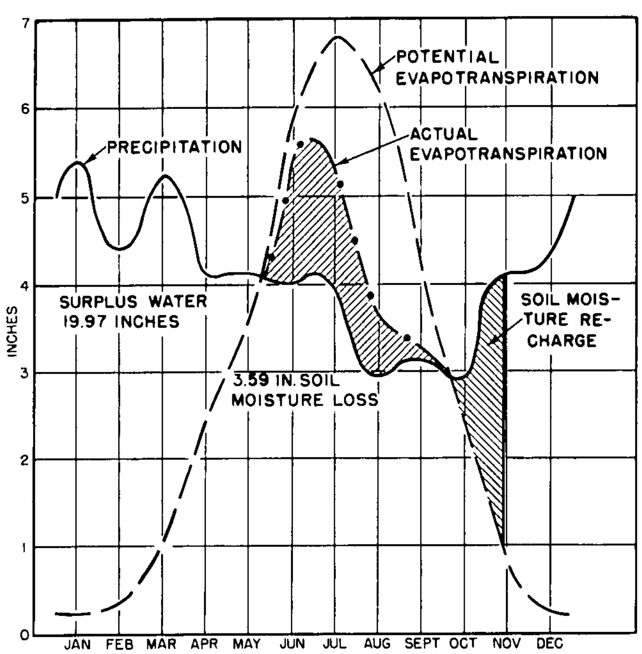

Figure 4.—**Average water balance at Newbern, Dyer County, Tenn., computed from data recorded from 1931 through 1960.**

The average moisture conditions shown in figure 4 are for the end of each month, but there are shorter periods of variation that are not shown. For example, usually the soil is dry enough to cultivate during a few days between rains early in spring, when precipitation exceeds evapotranspiration. Moisture conditions vary considerably from year to year, because of variation in rainfall, temperature, and other factors.

The rate of plant growth is affected greatly by the amount of available moisture in the soil. The vertical distance between the actual and the potential evapotranspiration curves indicates the amount of moisture needed to maintain maximum plant growth. The moisture deficit results because the precipitation during summer is not enough to replace moisture lost by evaporation or to meet the needs of actively growing plants.

SEVERE STORMS.—Severe storms are infrequent in Dyer County. Only nine tornadoes were reported in the county between 1916 and 1961. The county suffered heavy loss of life and property during the March 1952 tornadoes. Hailstorms occur about twice a year in any one place. The county is too far inland to be damaged by tropical storms.

HUMIDITY, WIND, AND CLOUDS.—The average annual relative humidity is about 70 percent. The highest daily averages occur in winter, and the lowest in spring. Relative humidity throughout the day usually varies inversely as the temperature and is, therefore, highest early in the morning and lowest early in the afternoon.

The prevailing winds during the year are variable but are from the south about 13 percent of the time. The mean windspeed ranges from about 12 miles per hour from January through March to about 7 miles per hour in August. The average windspeed is about 10 miles per hour. Windspeed is usually lowest early in the morning and highest early in the afternoon.

Clouds cover less than six-tenths of the sky, on the average, between sunrise and sunset. Annually, the part of the sky that is covered ranges from about seven-tenths in January to about four-tenths in October. There are fewer clouds during the growing season; thus there is abundant sunshine.

How This Soil Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Dyer County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

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

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important distinguishing characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Grenada and Sharkey, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that go with their behavior in the natural, untouched landscape. Soils of one series can, however, differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Sharkey clay and Sharkey silty clay loam are two soil types in the Sharkey series. The difference in texture of their surface layers is apparent from their names.

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

The areas shown on a soil map are called mapping units. Mapping units differ from the soil classification units for which they are named in that they can include small areas of other kinds of soils. Four kinds of mapping units were defined for this survey.

One kind is mainly one soil type, although any mapping unit can contain inclusions of other kinds of soil. As already stated, a soil type is a subdivision of a soil series, based chiefly on the texture of the surface layer. If no need exists to divide a soil type into phases, which are discussed later, its name becomes that of the mapping unit. An example is Falaya silt loam.

Another kind of mapping unit is named for a soil phase, which is a subdivision of a soil type based on external features that are particularly important in use or management of the soil, such as slope, degree of erosion, or stoniness. An example is Loring silt loam, 2 to 5 percent slopes.

Another kind of mapping unit is the complex. A complex consists of soils of two or more kinds that occur in such an intricate pattern and in individual areas so small in size that they cannot be shown separately on the soil map. A complex has a definite pattern and proportion of the dominant soils. The dominant soils in a complex are in each of the delineated areas. The name of a complex contains names of the dominant soil series connected by hyphens. An example is the Forestdale-Crevasse complex.

Also, the map for this survey shows areas that are so wet, so shallow, so frequently worked by wind or water, or so disturbed by man that they are not identifiable as soils. These areas are given descriptive names, such as Swamp, Gullied land, or Made land. This kind of mapping unit is called a land type.

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

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in soil survey reports. On basis of the yield and practice tables and other data, the soil scientists set up trial groups, and test them by further study and by consultation with farmers, agronomists, engineers, and others. Then, the scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of soils and their behavior under present methods of use and management.

General Soil Map

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

The soils within any one association are likely to differ from each other in some or in many properties, for example, slope, depth, or natural drainage. Thus, the general soil map shows, not the kind of soil at any particular place, but patterns consisting of several different kinds of soil.

Each soil association is named for the major soil series in it, but, as already noted, soils of other series may also be present. The major soil or soils of one association may also be present in other associations, but in a different pattern.

The general soil map is useful to people who want a general idea of the soils, who want to compare different parts of the county, or who want to locate large areas suitable for a certain kind of farming or other land use.

Described in the pages following, and shown on the colored map at the back of this report, are the nine soil associations in Dyer County.

1. *Commerce-Robinsonville-Bowdre association*

Loamy soils on first bottoms of the Mississippi River

This association is a part of the broad, nearly flat flood plain of the Mississippi River. It extends about 1 mile inland from the meandering river. It includes the three large islands in the river and a large area west of the river. The highest part of the association is a young natural levee about a half mile wide, next to the river channel. This levee has been built up by silt and sand dropped when the Mississippi has overflowed its banks. From the top of the levee, the surface slopes very gently away from the river. The difference in elevation between the highest point along the river and the lowest point farther inland is about 10 feet.

The entire area is flooded every few years, and the flats are flooded nearly every year. About one-fourth to one-half mile east of the Mississippi River is a small levee, 12 to 15 feet high, that protects most of this area from minor floods but is not effective during major floods.

The soils consist of sediments deposited by the Mississippi River. The coarser textured and better drained soils are in the higher areas next to the river. As the distance from the river increases, the soils are progressively more clayey and more poorly drained.

Robinsonville and Commerce soils together make up about 70 percent of the association. Robinsonville soils are well drained or nearly well drained and are loamy or sandy to a depth of 3 feet or more. Commerce soils are less well drained than Robinsonville soils. They are mottled gray and brown below a depth of about 15 inches. Bowdre soils are in the low areas. They have a dark-colored, clayey surface layer. Along the river channel, in deposits of very sandy sediment, are a few areas of Crevasse soils. Sharkey and Tunica soils are scattered along the eastern half of the association. These are dark-colored, clayey soils that have formed in low places where water stands.

Nearly all of this association has been cleared. The small tracts of woodland that remain are in the wettest places. Practically all of the acreage is cultivated every year. Soybeans, cotton, and corn are the main crops. Some wheat is grown on the higher areas next to the river. Pecans are a good source of income on most farms. The average-sized farm is about 300 acres, but a few farms are as much as 2,000 acres in size. Most farms are operated by tenants; few landowners live in this area.

The soils in this association are among the most fertile in the State. They can produce high yields of many crops. Flooding and standing water, the main limitations, sometimes force farmers to plant late in the season but seldom late enough to affect yields. The spreading of johnsongrass by floodwaters is a serious problem.

2. *Sharkey-Bowdre-Tunica association*

Black clays on low, broad flats of the Mississippi River bottoms

This association consists of some of the lowest parts of the Mississippi River bottoms. It is made up of low, broad flats from which water drains away slowly. Some of these flats appear to be former river channels that have been filled in with silt and clay. There are many swampy areas and a few oxbow (U-shaped) lakes, which appear to be segments of former river bends. The lowest parts are wooded and are under a few inches of standing water nearly all winter and spring. These parts are heavily infested with mosquitoes and gnats. Water seeps and drains away from all but the lowest areas late in spring or early in summer, and summer annual crops can then be planted.

Along the western edge of this association, about a mile and a half east of and parallel to the Mississippi River, is a 30-foot levee that protects the area from Mississippi River floodwaters but not from Obion River floodwaters.

The soils in this association formed in clay sediments deposited by still water or by slowly moving water. Sharkey soils make up about one-third of the association. They are on the lowest parts and are poorly drained. They consist of black or dark-gray, very sticky clay that extends to a depth of 30 inches or more. Bowdre and Tunica soils are much like Sharkey soils, but their clay layer is not so thick and they are a little better drained. Bowdre soils have 8 to 20 inches of clay over coarser textured material, and Tunica soils have 20 to 30 inches.

About one-third of this association is still wooded, mostly with hardwoods but also with many cypress trees in the swampy areas. The main crop is soybeans. Some cotton is grown, but most fields dry too late for cotton planting. Little corn or small grain is grown. Farms range from about 100 acres to 2,000 acres or more in size. Probably because of floods, few people live within this association. Most farms are operated by tenants. Few, if any, landowners live in the area. About 2,000 acres owned by the Tennessee Game and Fish Commission is used as a waterfowl refuge.

The soils in this association have a moderate agricultural potential. Flooding and standing water are the main limitations. The lowest parts—about 10 percent of the acreage—are swampy and too wet for crops. The rest can be used for soybeans and other summer crops. Only the higher parts dry early enough to be planted to cotton or corn. Though clayey and hard to work, the soils are naturally fertile and produce medium to high yields of the adapted crops. They are productive of pasture but are too wet for winter or spring grazing. Besides, floodwaters wash away fences and make expensive repairs necessary. Trees grow well in the swampy areas, which are also suitable for wildlife and hunting.

3. *Alligator-Forestdale-Dundee association*

Silty or clayey soils on low flats and loamy soils on high bottoms of the Mississippi River

This association consists of the older, higher part of the Mississippi River bottoms. It includes broad, nearly level to gently sloping swells that are broken by low, broad, wet or swampy flats. The swells and flats run parallel to the Mississippi River. The swells, which can be called low terraces or high bottoms, are as much as 2 miles wide and are 5 to 10 feet higher than the low flats. The flats, which meander through the area much as river channels do, are not so wide as the swells.

The flats are flooded nearly every year by the Mississippi River and by backwater from the Obion and Forked Deer Rivers. Most of the swells are covered with water only during major floods, which occur probably no more often than every 10 years. Water ordinarily seeps or drains away from most places by late spring or early summer, but some of the lowest places on the flats hold water all year.

The soils on the low flats formed from silt or clay that settled out of standing or slow-moving water. These are mainly Alligator and Forestdale soils, which together make up about two-thirds of the association. These soils are poorly drained or nearly poorly drained, and they have a subsoil of gray, acid clay. Alligator soils have a clay surface layer, and Forestdale soils have a silty surface layer.

The soils on the swells, or high bottoms, probably formed from silt and sand and a small amount of clay, all of which were deposited by relatively fast-moving water. At one time these soils were probably on first bottoms of the Mississippi River. Bosket, Dubbs, and Dundee are the main soils in these areas. These soils are loamy and friable to a depth of several feet. Bosket soils are well drained, Dundee soils are somewhat poorly drained, and Dubbs soils are moderately well drained. In some areas, Forestdale soils are intermingled with these better drained soils.

Small areas or strips of the very sandy Crevasse soils are on the gentle slopes leading from the low flats up to the swells. These sandy strips were probably the banks of former river channels.

Practically all of the higher part of this association and much of the lower part have been cleared. About 20 percent of the acreage is wooded. The wooded tracts are mostly large and make up the lowest and wettest parts of the association.

The main crop on the low flats is soybeans. Many fields in these areas do not dry early enough to be planted to cotton and corn and consequently, only short-season summer crops can be grown. In contrast, many crops, including cotton, corn, soybeans, small grain, hay, and pasture, are grown on the high bottoms. Most farms are between 200 and 300 acres in size, and most are operated by tenants. Many fields are 100 acres or more in size, and rows of cotton or corn commonly are as much as a mile long. This association is more thickly populated than any other area on the Mississippi River bottoms. It includes the towns of Bogota and Richwood.

This association is a highly productive agricultural area, though wetness is a problem on the low flats. The area is well suited to grain farming because of gentle slopes, large fields, and productive soils. Nearly all of the acreage can produce high yields of pasture. The few areas that are too wet for either crops or pasture are productive of timber.

4. *Adler-Morganfield-Wakeland association*

Silty soils on bottoms below the Mississippi River bluffs

This association is a broad, flat area below the Mississippi River bluffs (fig. 5). It slopes very gently away from the base of the bluffs for nearly 2 miles westward to the Mississippi River bottoms. There are large level fields throughout the area. Some of the fields are bordered by straight, dug channels that carry the surging, silt-loaded water from the bluffs to the low, wooded places on the Mississippi River bottoms. The silt is deposited on the low areas, and thus swampy areas are converted gradually into good farmland.

The soils in this association formed from silt that washed from the bluffs or hills onto the outer part of the Mississippi River bottoms. The silt is about 10 feet thick at the base of the bluffs. It becomes progressively thinner as the distance from the bluff increases. It is about 18 inches thick 2 miles from the bluffs.

***Figure 5.*—View of the Adler-Morganfield-Wakeland association from the loess bluff. The large, level fields in the center consist of Adler silt loam and Morganfield silt loam.**

Morganfield and Adler soils are near the bluffs, on the thicker silt deposits. These soils are silty to a depth of 3 feet or more. Morganfield soils are well drained. Adler soils have mixed brown and gray colors below a depth of 18 inches. Birds and Wakeland soils are farther away from the bluffs, on the thinner silt deposits. Birds soils are poorly drained. Wakeland soils are not so poorly drained as Birds soils.

Nearly all of this association is cultivated every year. The most important crops are vegetables. Lima beans, spinach, mustard greens, turnip greens, kale, English peas, and some cotton, corn, and soybeans are grown on the soils that have good drainage. The main crop on the wet soils is soybeans. The average size of farms is about 100 acres. Most farms are owner operated.

This association has high agricultural potential. The soils have high natural fertility and a very high available water capacity. They are suitable for growing of row crops every year.

5. *Memphis association*

Silty soils on steep hills that adjoin the Mississippi River bottoms

This association is an area of hills and ridges that rise abruptly from the Mississippi River bottoms to a height of about 200 feet. The ridgetops are narrow and winding, and long, crooked drains form deep, narrow hollows. Level strips in the hollows are seldom more than 200 feet wide. The long, steep hillsides are most conspicuous. They have a slope range of 20 to 50 percent.

Memphis soils, which make up about 80 percent of this association, are on the ridgetops and hillsides. They have a brown, silty surface layer and a dark-brown, silty subsoil. They formed in windblown silt deposits 3 to 90 feet thick. Adler soils are on the narrow level strips in the hollow. They formed in recent sediments that washed from nearby slopes. They are occasionally waterlogged, because of a high water table and seepage. Adler soils are silty to a depth of several feet. They have a brown surface layer and are mottled gray and brown below a depth of about 18 inches.

About 70 percent of this association is wooded. Practically all the cleared land is in small farms and estates on the ridgetops and in the hollows. An average farm is between 75 and 100 acres in size; it has small patches of cleared land on ridgetops and wooded areas on hillsides.

Except for the small areas on ridgetops and in hollows, this association is unfavorable for agriculture. The soils on the steep hillsides are fertile, but erosion in the form of landslides and gullying is a tremendous problem when the soils are cleared and cultivated. This association is favorable for forest and for wildlife, but it has serious limitations for residential or industrial development, because the soils are likely to slip and slide when cuts are made in the hillsides. It is too hilly for recreational uses other than hunting, camping, and hiking.

6. *Routon-Calloway association*

Gray, silty soils on low, flat margins of the uplands

This association consists of low, broad flats and some shallow, saucerlike depressions. A few ridges and round knolls rise 3 to 5 feet above the surrounding flats. This association is bordered on one side by rolling uplands, which rise several feet above the flats. On the opposite side, short sloping hillsides and sharp vertical banks decline abruptly to the first bottoms, which are 3 to 15 feet lower than the flats.

There are six areas of this association, and these are scattered along the outer edge of the bottoms of the Obion and Forked Deer Rivers. Practically all of this association was under water during the floods of 1927 and 1937. About two-thirds of it is flooded every 5 or 6 years; some areas are flooded more often.

The soils in this association formed in silty deposits dropped by westerly winds that whipped across the Mississippi River bottoms, and they are underlain by sediments from the Obion and Forked Deer Rivers. The upper part of the soils is friable silt loam, and the subsoil, at a depth of 18 to 24 inches, is generally hard, compact silty clay loam. These soils range from mildly alkaline, in depressions, to strongly acid, on low ridges.

Routon soils are in depressions and on flats and cover about 50 percent of this association. They have a surface layer of gray, very friable silt loam and, at a depth of about 18 inches, a subsoil of gray, hard, compact silty clay loam. Calloway soils are on the waist-high knolls and ridges. They have a surface layer of grayish-brown, very friable silt loam. Their subsoil is yellowish-brown, friable silt loam. It includes a hard, compact layer of silty clay loam that begins at a depth of 18 to 24 inches. Dekoven soils are in some depressions. These black, alkaline soils have a surface layer of silt loam and a subsoil of silty clay loam.

Nearly all of this association has been cleared. A few woodlots, some as much as 50 acres in size, remain in the wettest areas. The main crop is soybeans, but a few areas are in cotton, corn, and pasture. The average size of farms is about 125 acres. Most farms are operated by owners or by cash tenants. Many farms extend into the rolling uplands. Only a few people live in this association. The largest settlement is South Dyersburg, which borders the city of Dyersburg. Only a few sites are safe from flooding and suitable for building, and some of these are surrounded by water during floods.

The poorly drained soils have a tight subsoil and are subject to flooding. These soils produce good yields only of shallow-rooted plants, such as soybeans, sorghum, annual lespedeza, and pastures. The better drained soils, on knolls and low ridges, produce good yields of cotton and corn.

7. *Loring-Memphis-Grenada association*

Silty soils on rolling uplands

This association takes up the eastern third of Dyer County. It is an area of gently rolling hills interrupted here and there by broad flats. Small drainageways bend and wind through the area and give it irregular, choppy topography. The nearly level tops of the low-lying hills are fairly wide; many form 20-acre fields. The short hillsides have a slope range of 5 to 20 percent. Upland flats, 10 to 20 acres in size, separate the rolling hills in many places.

The soils in this association developed in silty deposits more than 20 feet thick that were dropped by winds blowing across the Mississippi River bottoms. The surface layer of these soils is brown, very friable silt loam, except where erosion has exposed the subsoil. The subsoil is dark-brown or yellowish-brown silt loam or silty clay loam. In some places the subsoil has a hard, compact layer or fragipan in the lower part.

Loring soils, which are well drained or nearly well drained, predominate in this association. They have a brown, silty surface layer. Their subsoil is dark-brown silty clay loam. A weak fragipan begins about 30 inches below the surface. Loring soils are on ridgetops and hillsides. Memphis soils, which are well drained, have a brown, silty surface layer. Their subsoil is dark-brown silty clay loam. These soils are on broader ridgetops and steeper hillsides. Grenada soils, which are medium in drainage, have a surface layer of brown silt loam and a subsoil of yellowish-brown silt loam. A fragipan begins 12 to 24 inches below the surface. Grenada soils are commonly on nearly flat ridgetops and sloping hillsides. Falaya and Collins soils consist of grayish-brown and brown silt loam. They cover small areas on narrow bottoms. Calloway and Routon soils are poorly drained. These gray soils are on most of the upland flats.

Nearly all of this association has been cleared. A few small woodlots remain on some of the steeper slopes. About a third of the acreage is in pasture or hay, and the rest is in row crops. Cotton, corn, and soybeans are the main crops. There are many well-kept farmsteads. The farms are of the general type, are about 125 acres in size, and are mostly owner operated. This association is the most thickly populated part of the county. It includes the towns of Dyersburg, Newbern, and Trimble and has many sites favorable for residential and industrial development.

Most of the soils in this association are suited to row crops. The more strongly sloping, more severely eroded hillsides are best suited to pasture or hay. A few areas are so steep or so eroded that their use is limited to tree production. Nearly all farms in this association have soils that are well suited to row crops grown in rotation with hay and pasture and, consequently, are well suited to general farming. Under good management, high yields can be produced.

Since there are only a few streams in this association, most of the water comes from ponds (fig. 6) and wells.

Figure 6.—**A pond in the Loring-Memphis-Grenada association. Ponds furnish most of the water for livestock in this association.**

8. *Falaya-Waverly association*

Silty soils on first bottoms of small streams

Long, wide, flat first bottoms along streams that meander through the rolling uplands make up this association. These areas are about a mile wide near the mouth of the streams but are narrow near the head of the streams, in the rolling uplands. Crooked, winding old channels that once drained these areas remain in only a few places. They have been replaced by newer drainage ditches that curve smoothly through the bottoms. Narrow strips along the drainage ditches are the highest, best drained parts of this association. The bottoms are flooded every few years, and there are a few depressions from which the water drains away slowly.

Young, silty soils cover nearly all of this association. They consist mostly of medium acid and strongly acid sediments that washed from the surrounding rolling uplands. Falaya soils, which cover about 60 percent of the association, have a surface layer of grayish-brown silt loam and have many gray mottles in the subsoil. Waverly soils are gray, poorly drained, and silty. They are in the low places from which water drains away slowly. In some depressions are the alkaline Dekoven soils, which are black and have a silt loam surface layer over a silty clay loam subsoil. The brown, silty Collins soils are mostly on the better drained strips near the ditchbanks.

Nearly all of this association is cultivated each year. The soils are fertile and can produce high yields of suitable crops. Cotton is grown on the better drained sites, corn in areas of medium drainage, and soybeans and pasture in wet areas. A few very wet areas are wooded. Most of the farmland in this association is part of the farms that extend down from the rolling uplands. Farms that lie entirely within this association are about 150 acres in size and are mostly owner operated.

Flooding and standing water are the main limitations. Floods are not a serious threat to summer crops, since most floods occur during winter. If drainage channels are provided, water normally drains away before planting season.

9. *Waverly-Swamp association*

Very wet, silty soils on swampy first bottoms

Very crooked, winding streams meander through this soil association, which consists of low, flat, swampy areas. Long, narrow, crooked lakes that appear to be segments of old stream channels are scattered throughout these areas. Many low, swampy depressions that hold water nearly all year are conspicuous because of the cypress trees that grow there. In places, levees have been built to hold water and thereby create swampy conditions suitable for some kinds of wildlife.

This association is in strips about 15 miles long and 1 mile wide. These strips are in the middle of the bottoms of the Obion and Forked Deer Rivers. Several floods cover the areas every year, some late in spring and even early in summer.

Gray, poorly drained, silty soils make up the parts of this association that are not covered by water. They consist of sediments that washed from uplands covering most of west Tennessee and part of west Kentucky. The poorly drained Waverly soils are predominant in these areas. They consist mostly of silt loam, but in a few areas they consist of silty clay loam and fine sandy loam. Swamp consists of areas of Waverly soils that are flooded most of the time.

This association is nearly all wooded. The trees are mostly bottom-land oaks, but cypress grows in the swampy areas. A few small cleared areas are occasionally planted to soybeans, which are seldom harvested. No homes are in this association, but there are a few hunting cabins. Levees have been built on part of this association. They hold water and provide sites for duck hunting. This association is well suited to wildlife. The flooding and standing water, along with a plentiful supply of food and cover, make these areas especially attractive to waterfowl. The Tennessee Game and Fish Commission owns several large tracts on which waterfowl refuges are being developed. Landholdings are fairly large; they average about 400 acres in size.

Flooding and standing water are very serious limitations to agriculture. Flooding is so severe that raising cultivated crops or keeping pasture stands is almost impossible. Trees grow well on nearly all of this association, but in places many oaks are killed by floods and sediment deposits. The swampy areas are limited to the production of cypress trees.

Descriptions of the Soils

The soils in Dyer County are described in alphabetical order in this section. In parentheses following the name of each soil is the symbol that identifies the soil on the detailed soil map. The descriptions give the characteristics of each soil that distinguish it from all other soils.

A profile is described that is representative of all the soils of each series. A profile description is a record of what the soil scientist sees when he examines a soil.

Use and suitability for agriculture are discussed briefly, but these topics are covered more thoroughly in the section "Use of the Soils for Crops and Pasture."

The soil map at the back of this report shows the location and distribution of the individual soils. Table 2 gives the approximate acreage and proportionate extent of the soils. The Glossary defines many of the technical terms used in this section.

Adler silt loam (Ad).—This is a deep, silty soil. It consists of 3 to 5 feet of sediment that was washed from near-

TABLE 2.—*Approximate acreage and proportionate extent of soils*

Soil	Acres	Percent	Soil	Acres	Percent
Adler silt loam	6, 708	2. 0	Loring silt loam, 8 to 12 percent slopes, severely eroded	11, 869	3. 5
Alligator clay	15, 445	4. 6	Loring silt loam, 12 to 20 percent slopes, severely eroded	3, 916	1. 2
Alligator-Crevasse complex	11, 286	3. 3	Loring-Gullied land complex, 12 to 20 percent slopes	444	. 1
Birds silt loam	2, 472	. 7	Made land	246	. 1
Bosket sandy loam	501	. 1	Memphis silt loam, 2 to 5 percent slopes	6, 711	2. 0
Bosket silt loam	1, 394	. 4	Memphis silt loam, 2 to 5 percent slopes, severely eroded	2, 128	. 6
Bowdre clay	4, 134	1. 2	Memphis silt loam, 5 to 8 percent slopes	256	. 1
Bowdre clay, coarse subsoil	7, 779	2. 3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	6, 813	2. 0
Calloway silt loam	11, 066	3. 3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	1, 123	. 3
Collins silt loam	7, 957	2. 4	Memphis silt loam, 12 to 20 percent slopes, severely eroded	1, 703	. 5
Commerce loam	7, 373	2. 2	Memphis silt loam, 20 to 30 percent slopes	373	. 1
Commerce silty clay loam	7, 296	2. 2	Memphis silt loam, 20 to 30 percent slopes, severely eroded	4, 969	1. 5
Crevasse loamy sand	729	. 2	Memphis silt loam, 30 to 50 percent slopes	4, 552	1. 3
Crevasse sandy loam	1, 073	. 3	Memphis-Gullied land complex, 20 to 30 percent slopes	1, 906	. 6
Dekoven silt loam	1, 338	. 4	Morganfield silt loam	1, 302	. 4
Dekoven silt loam, overwash	4, 197	1. 2	Robinsonville fine sandy loam	2, 197	. 7
Dubbs silt loam	455	. 1	Robinsonville loam	4, 328	1. 3
Dundee clay loam	1, 067	. 3	Routon silt loam	14, 511	4. 3
Dundee loam	7, 325	2. 2	Sharkey clay	16, 455	4. 9
Dundee silt loam	1, 192	. 4	Sharkey silty clay loam	2, 804	. 8
Falaya silt loam	29, 218	8. 7	Swamp	8, 067	2. 4
Forestdale silt loam	8, 128	2. 4	Tunica clay	6, 269	1. 9
Forestdale-Crevasse complex	4, 593	1. 4	Wakeland silt loam	4, 533	1. 3
Gravel pits	105	(1)	Waverly silt loam	16, 779	5. 0
Grenada silt loam, 2 to 5 percent slopes	6, 131	1. 8	Waverly silt loam, low	19, 258	5. 7
Grenada silt loam, 2 to 5 percent slopes, severely eroded	2, 028	. 6	Total	337, 280	100. 0
Grenada silt loam, 5 to 8 percent slopes, severely eroded	10, 202	3. 0			
Grenada silt loam, 8 to 12 percent slopes, severely eroded	2, 271	. 7			
Gullied land	2, 868	. 9			
Levees and borrow pits	2, 112	. 6			
Loring silt loam, 2 to 5 percent slopes	12, 982	3. 8			
Loring silt loam, 2 to 5 percent slopes, severely eroded	3, 348	1. 0			
Loring silt loam, 5 to 8 percent slopes, severely eroded	8, 995	2. 7			

[1] Less than 0.05 percent.

by steep loess hills and deposited on the outer edge of the nearly flat first bottoms of the Mississippi River. Some areas are along small streams that meander through the steep loess hills. Adler silt loam is moderately well drained, but a few gray mottles below a depth of 18 inches indicate that the subsoil is occasionally waterlogged. The main layers of a typical profile are—

0 to 18 inches, brown, very friable silt loam.
18 to 45 inches, brown, very friable silt loam with a few gray mottles.

Adler silt loam is adjacent to Morganfield and Wakeland soils, and it is much like Collins silt loam. It is not so well drained as Morganfield soils, but it is better drained than Wakeland soils. It is not so acid as Collins silt loam.

This soil is one of the most fertile in the State. It is high in phosphorus and potassium. It is neutral and does not require lime. Plants nearly always have a good supply of moisture because the available water capacity is very high. Roots, water, and air easily penetrate this soil, which is easy to work and to keep in good tilth.

Most of it is used to grow vegetables, but this soil can produce high yields of all crops commonly grown in the county. Because it is nearly level, it is well suited to the production of a row crop every year. (Capability unit I-1; woodland group 1; wildlife group 1)

Alligator clay (Ag).—This is a poorly drained soil of the Mississippi River bottoms. It developed in beds of clay 30 inches or more in thickness. It has a rather dark-colored surface layer, 8 to 12 inches thick, over a lighter gray subsoil. Below a depth of 48 inches the texture ranges from sand to clay.

This soil is part of an area known as "gumbo." It is in tracts of 25 to 1,000 acres. The main layers of a typical profile are—

0 to 8 inches, dark grayish-brown clay; sticky and plastic when wet, hard when dry.
8 to 48 inches, gray clay mottled with shades of yellow and olive; very sticky and plastic when wet, very hard when dry.

Alligator clay is adjacent to Sharkey clay and Dundee clay loam. It has a lighter colored, more acid subsoil than Sharkey clay. It is more poorly drained than Dundee clay loam and contains more clay.

Alligator clay is droughty in the summer and is flooded every winter. Floodwaters keep the surface layer fairly well supplied with lime, but the subsoil is strongly acid. Natural fertility is fairly low, and crops respond only fairly well to fertilizers. Roots grow slowly, and water and air move slowly through the soil. This soil stays in poor tilth and is hard to work. It breaks into clods that slack or crumble when they get wet. Because of the high

Figure 7.—**An open ditch on Alligator clay. This ditch removes the surface water. Tile drainage is not effective, because the plastic clay subsoil is slowly permeable.**

clay content, the soil swells when wet and shrinks when dry. Cracks 1 to 2 inches wide and 2 to 3 feet deep form when the soil dries.

Soybeans or other crops that can be planted late, and tall fescue or other pasture plants that can stand wetness, are suited to this soil. Yields are medium or low. Removal of surface water is essential if crops are to be grown. Tile drainage is not effective, because water moves very slowly through the very plastic clay subsoil (fig. 7). Chemical preemergence sprays generally are not effective in controlling weeds, because the soil tends to be cloddy. (Capability unit IIIw–2; woodland group 2; wildlife group 5)

Alligator-Crevasse complex (At).—This complex makes up a big part of an area known as "sand blow land." It is in tracts ranging from 25 to 1,500 acres in size. Alligator clay is dominant in each tract. It is a poorly drained, gray soil that consists of sticky clay to a depth of 30 inches or more. The clay was deposited by ponded water from the Mississippi River. About a third of each tract is made up of small sand mounds, which are the Crevasse soils. These soils consist of loamy sand or sand in layers 2 to 6 feet thick. See the descriptions of Alligator clay and of Crevasse loamy sand for a typical profile of these soils.

These areas are among the first to be covered by water during floods. Practically all of the acreage is flooded every winter or spring. Root growth and the movement of water and air are slow in the Alligator soil. Water moves very rapidly through the Crevasse soils. Because of the shallow root zone of Alligator clay and the lack of moisture in the Crevasse soils, this complex is droughty in summer. The soils are slightly acid to strongly acid, and they have low natural fertility. Crops respond only fairly well to lime and fertilizer.

Its high clay content causes Alligator clay to swell when wet and shrink when dry. Consequently, when the soil is dry, cracks 1 to 2 inches wide extend 2 to 3 feet down into the soil. Alligator clay breaks into clods that crumble when they get wet. Since this soil is either too wet or too dry, it is always difficult to work. Little can be done to improve the poor tilth.

Flooding, poor drainage, and the vast differences between the two soils making up this complex limit the selection of crops. Crops that grow fairly well are summer annuals that can be planted late, as soybeans and sorghum, or tall fescue and other pasture plants that tolerate wetness in winter. Because of the cloddy nature of Alligator clay, chemical preemergence sprays generally are not effective in controlling weeds. (Capability unit IIIw–2; woodland group 2; wildlife group: Crevasse, 4 and Alligator, 5)

Birds silt loam (Bd).—This poorly drained soil consists of 2 to 4 feet of silty material that was washed from nearby steep loess hills and deposited on the outer edge of the first bottoms of the Mississippi River. A few areas are along small streams that meander through the steep loess hills. The top 3 feet of this soil is gray, very friable silt loam. Below this, the material is variable but is generally dark-gray silty clay loam or loam. The main layers of a typical profile are—

0 to 7 inches, dark-gray, very friable silt loam.
7 to 36 inches, gray, very friable silt loam with a few yellowish-brown mottles.

Birds silt loam is commonly adjacent to Wakeland and Dekoven soils. It is more poorly drained than Wakeland soils, and it is lighter colored and has less clay than Dekoven soils.

This soil is neutral and does not require lime. It has moderately high natural fertility; it is medium to high in phosphorus and potassium. Because of its position in low flat areas, this soil is very wet in winter and early in spring. The water table remains about a foot below the surface during winter and spring, except during flood periods. In spring, excess water drains away and the soil is easy to work and to keep in good tilth. Plants have a good supply of moisture, because the available water capacity is very high.

Soybeans, sorghum, or similar short-lived summer crops that can be planted late are suited to this soil. Soybeans are the principal crop. Pasture plants that can stand wetness in winter and spring also grow well. (Capability unit IIIw–3; woodland group 4; wildlife group 6)

Bosket sandy loam (Bo).—This is a deep, well-drained, level soil on slight rises, or second bottoms, along the Mississippi River. It developed in sediment laid down by the river. It is in tracts of 5 to 50 acres. The main layers of a typical profile are—

0 to 18 inches, brown, very friable sandy loam.
18 to 42 inches, brown, friable silt loam or silty clay loam.
42 to 72 inches, brown, very friable loam or sandy loam (commonly loamy sand below a depth of 60 inches).

In some places the subsoil is clay loam. In spots about half an acre in size, about 18 inches of neutral sandy loam overwash covers this soil.

Bosket sandy loam is commonly adjacent to Bosket silt loam and to Dubbs silt loam. It is similar to Dubbs silt loam but is sandier and better drained.

Roots, water, and air easily penetrate this soil, which is easy to work and to keep in good tilth. This soil is strongly acid to slightly acid and has moderate natural fertility. Crops respond extremely well to lime and fertilizer. The available water capacity is high, so plants generally have a good supply of moisture.

The soil is used to grow row crops. If it is limed and fertilized, it can produce high yields of all the commonly grown crops. It is well suited to the production of a row crop every year. (Capability unit I–1; woodland group 1; wildlife group 1)

Bosket silt loam (Bs).—This is a deep, well-drained soil that developed in silty sediment deposited by fairly slow-moving water. It is mostly on slight rises on the Mississippi River bottoms, where floodwaters from the Obion and Forked Deer Rivers mix with floodwaters from the Mississippi River. A few areas form narrow strips along former channels of the Mississippi River. The tracts are up to 400 acres in size. The main layers of a typical profile are—

0 to 8 inches, brown, very friable silt loam.
8 to 42 inches, brown, friable silty clay loam or silt loam.
42 to 72 inches, brown, friable silt loam to sandy loam (commonly loamy sand below a depth of 60 to 72 inches).

The surface layer ranges from 6 to 18 inches in thickness. The subsoil is usually underlain by sandy material.

Bosket silt loam normally is adjacent to Bosket sandy loam and to Dubbs and Dundee soils. It has less sand than Bosket sandy loam and is better drained than Dubbs and Dundee soils.

Roots, water, and air easily penetrate this soil, which is easy to work and to keep in good tilth. Plants generally have a good supply of moisture, because the available water capacity is very high. Bosket silt loam is strongly acid to slightly acid and has moderate natural fertility. Crops respond extremely well to lime and fertilizer.

Practically all of this soil is used to grow row crops. If it is limed and fertilized, it can produce high yields of all the commonly grown crops. It is well suited to the production of a row crop every year. (Capability unit I-1; woodland group 1; wildlife group 1)

Bowdre clay (Bt).—This soil is in broad, flat tracts 20 to 400 acres in size on the Mississippi River bottoms. It consists of 8 to 20 inches of nearly black clay that is underlain by lighter colored, friable, silty or loamy material. The clay layer was deposited by ponded water from the Mississippi River. The main layers of a typical profile are—

0 to 18 inches, dark-colored or nearly black clay; sticky and plastic when wet.
18 to 48 inches, brown, friable silt loam, loam, or sandy loam (or layers of all three) with some gray mottles.

The material below the clay layer is variable in texture. In most areas it is silt loam or loam, but it may be any texture except sand, loamy sand, or clay.

Bowdre clay is next to Tunica clay and Commerce silty clay loam. It is a little better drained and in thinner beds of clay than the Tunica soil, and it has more clay in the surface layer than the Commerce soil.

Bowdre clay is flooded every 5 to 10 years in winter and spring. Some areas are flooded more often. The soil is wet and sticky in winter and spring, even when it is not flooded, but it is fairly easy to work after the excess water has drained away. Because of the high clay content, it swells when wet and shrinks when dry. A network of cracks about an inch wide (fig. 8) forms as the soil dries. The cracks extend down through the clay layer.

Bowdre clay is a fertile soil. It is neutral and does not need lime. It is well supplied with phosphorus and potassium. Crops respond well to nitrogen. The available water capacity is high, so plants generally have a good supply of moisture. The clay texture slightly restricts root growth and slows drainage.

This soil is used for soybeans, cotton, hay, and pasture. A few small areas are wooded. This soil can produce good yields of many crops, including soybeans and cotton, but only fair yields of corn. Alfalfa grows well where flooding is not a hazard. (Capability unit IIIw-2; woodland group 2; wildlife group 5)

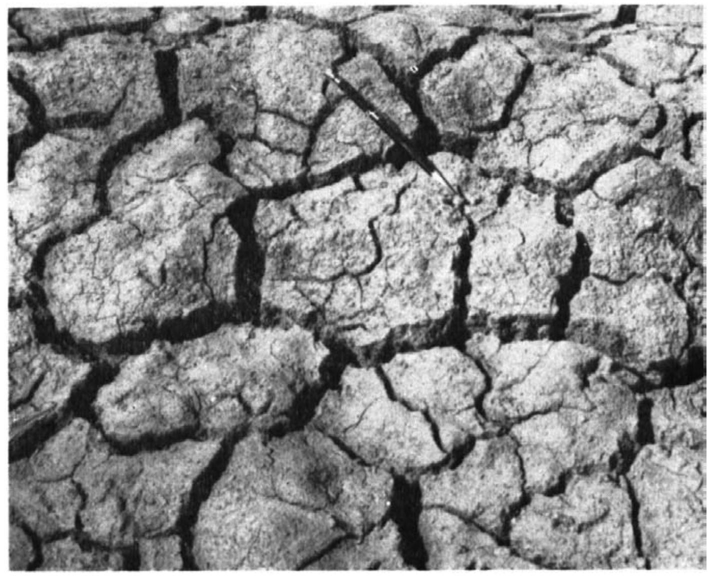

Figure 8.—**Cracks in Bowdre clay, a soil that is sticky and plastic when wet. A network of cracks about an inch wide forms as the soil dries.**

Bowdre clay, coarse subsoil (Bw).—This soil consists of 8 to 20 inches of nearly black clay underlain by about 5 feet of loamy sand or sand. It is in broad, flat depressions that once were channels of the Mississippi River and now form some of the lowest parts of Dyer County. The tracts are as much as 1,000 acres in size. The clayey surface layer was deposited by ponded water from the Mississippi River, and the loamy sand or sand probably was the bed of the Mississippi River at one time. The main layers of a typical profile are—

0 to 12 inches, very dark gray clay; very sticky and very plastic when wet, hard when dry.
12 to 72 inches, dark grayish-brown loamy sand or sand; loose.

This soil is next to Sharkey and Tunica soils. It is in thinner beds of clay than Sharkey and Tunica soils and has a coarser subsoil.

This soil is flooded every winter and spring; it is among the first to be covered by water. Because of its sandy subsoil, it is droughty in summer. The clay surface layer swells when wet and shrinks when dry. A network of cracks 2 inches wide extends down through the clay layer when the soil is dry.

This soil is neutral. It has a highly fertile surface layer, but its very sandy subsoil is infertile and droughty.

Practically all of this soil is wooded. It is too droughty to produce good yields of most crops. It is poorly suited to cotton and corn and produces only fair to low yields of soybeans and tall fescue. (Capability unit IIIw-2; woodland group 2; wildlife group 5)

Calloway silt loam (Ca).—This is a nearly level silty soil that has a dense, compact layer, or fragipan, about 20 inches below the surface. The many gray mottles in its subsoil show that it is saturated during much of winter and spring. This soil developed in loess that is 20 to 50 feet thick. It is in 5- to 50-acre tracts on upland flats in an area known as "buckshot land," which is in the eastern part of the county. The main layers of a typical profile are—

0 to 6 inches, dark grayish-brown, very friable silt loam; few concretions ("buckshot").
6 to 20 inches, yellowish-brown, friable silt loam with few to many gray mottles; few concretions.
20 to 44 inches, mottled gray and yellowish-brown, compact, brittle silt loam or silty clay loam; many concretions. (This layer is the fragipan.)
44 to 72 inches, gray, friable silt loam with many yellowish-brown mottles.

The surface layer ranges from about 4 to 8 inches in thickness. The depth to the fragipan is 16 to 24 inches.

Calloway silt loam is commonly adjacent to Routon and Grenada soils. It is better drained and more acid than Routon soils, but it is more poorly drained than Grenada soils.

This soil is excessively wet in winter and spring and somewhat droughty in summer. The uppermost 20 inches is fairly well aerated and is easily penetrated by roots, water, and air, but the fragipan stops most roots and causes water to drain slowly through the subsoil. The upper part is strongly acid, except in a few areas where the uppermost 36 inches is slightly acid. The part below a depth of 36 inches commonly has a pH value of 6.5 to 7.3. This soil is low in natural fertility, but crops respond well to lime and fertilizer. After this soil dries out in spring, it is easy to work.

If lime and fertilizer are applied and surface water is removed, this soil can produce good yields of many crops. It can be used for row crops every year. Alfalfa and other deep-rooted, long-lived plants are poorly suited. (Capability unit IIIw-1; woodland group 10; wildlife group 7)

Collins silt loam (Cl).—This deep, moderately well drained soil consists of silt loam sediment that washed from nearby loess uplands. It is on the first bottoms of rivers and streams in the eastern half of the county. The main layers of a typical profile are—

0 to 18 inches, brown, very friable silt loam.
18 to 30 inches, brown, very friable silt loam with gray mottles.
30 to 72 inches, gray, friable silt loam with yellowish-brown mottles.

In places, this soil is underlain by black, neutral silty clay loam at a depth of about 2 feet.

Collins silt loam is commonly adjacent to Falaya soils, but it is better drained than Falaya soils. It is much like Adler silt loam but is more acid.

This soil is medium acid or strongly acid, and it has moderately high natural fertility. Crops respond extremely well to lime and fertilizer. The available water capacity is very high, so plants have a good supply of moisture. The water table is about 24 inches below the surface during winter and early in spring. It is the cause of the gray mottles in the subsoil. Some areas are flooded in winter and spring, but the water drains away in a few hours and does not interfere seriously with crop production. This soil is very easy to keep in good tilth.

If adequately limed and fertilized, this soil can produce high yields of nearly all the commonly grown crops. It is one of the most productive soils in the county and is well suited to annual cultivation. (Capability unit I-1; woodland group 1; wildlife group 1)

Commerce loam (Cm).—This is a fertile, loamy soil. Though it is drained well enough to be productive of nearly all the commonly grown crops, gray mottles below a depth of about 12 to 18 inches show that the subsoil is waterlogged for a few weeks each year. The waterlogging is caused by the water table, which rises to within a foot or two of the surface during periods of heavy rainfall in winter and spring. Most areas of Commerce loam are in the western part of the Mississippi River bottoms, where the loamy sediment is several feet thick. The main layers of a typical profile are—

0 to 8 inches, very dark grayish-brown, very friable loam.
8 to 24 inches, brown, very friable loam with few gray mottles in upper half and many gray mottles in lower half.
24 to 42 inches, brown, very friable loam, silt loam, or sandy loam with many gray mottles.

The texture is variable below the surface layer. In a few places it is loamy sand, but in most places it is loam, silt loam, sandy loam, or silty clay loam.

Commerce loam is similar to Robinsonville soils, but it is not so well drained as Robinsonville soils.

This soil is flooded nearly every year for about 2 or 3 weeks in winter and spring. The water table remains about 2 feet below the surface in winter and early in spring. When the excess water drains away, this soil is easy to work. Roots, water, and air easily penetrate the soil. Plants have a good supply of moisture because the available water capacity is very high. This soil is neutral, and it has high natural fertility. It does not need lime, and it is well supplied with phosphorus and potassium.

Commerce loam is highly productive of many crops, including row crops, pecans, hay, and pasture plants. It can be row cropped every year. Floods occasionally delay planting in spring and kill alfalfa stands. (Capability unit IIw-1; woodland group 1; wildlife group 1)

Commerce silty clay loam (Co).—This deep, nearly well drained soil consists of sediment laid down by slowly moving water from the Mississippi River. The uppermost 12 to 30 inches is dark-colored, friable silty clay loam. This is underlain by friable silt loam, loam, or sandy loam. Commerce silty clay loam is in 25- to 300-acre tracts in the western part of the first bottoms of the Mississippi River. The main layers of a typical profile are—

0 to 24 inches, very dark grayish-brown, friable silty clay loam with few gray mottles below a depth of 12 inches.
24 to 72 inches, grayish-brown, friable silt loam, loam, or sandy loam with many gray mottles.

In a few places the material below a depth of 18 to 24 inches is loamy sand.

Commerce silty clay loam lies next to Bowdre clay. Its surface layer is not so clayey as that of Bowdre clay.

Floodwaters cover this soil 2 or 3 weeks during winter and spring about once every 5 years. A few areas are flooded nearly every year. The water table is about 2 feet below the surface in winter and spring. After the excess water drains away, this soil is easy to work. Plants have a good supply of moisture because the available water capacity is very high. This soil is neutral and highly fertile. It does not need lime, and it is well supplied with phosphorus and potassium. Crops respond well to nitrogen.

If excess water is removed, this soil can produce high yields of many crops. Row crops, pecans, and pasture plants are grown (fig. 9). Drainage ditches are effective in removing the water. Floods occasionally delay planting and kill alfalfa stands. (Capability unit IIw–1; woodland group 1; wildlife group 1)

Crevasse loamy sand (Cr).—Very swift water, gushing through breaks in levees or spilling over riverbanks, deposited the beds of sand in which this soil formed. The uppermost 2 to 6 feet consists of layers of loamy sand and sand. The underlying sediment ranges from loam to clay in texture. There are only a few areas of Crevasse loamy sand. They are 20 to 100 acres in size and are along the Mississippi River. The main layers of a typical profile are—

0 to 12 inches, dark grayish-brown, very friable loamy sand.
12 to 36 inches, light-colored, loose, loamy sand and sand.
36 to 72 inches, dark grayish-brown silty clay loam.

Crevasse loamy sand is next to Robinsonville soils. It has much more sand in its uppermost 3 feet than Robinsonville soils.

The high sand content of this soil makes it droughty. Because of the low available water capacity, the supply of moisture for plants lasts only a few days after each rain. This soil is flooded every 5 to 10 years for 2 or 3 weeks in winter and spring. It does not need lime, for it is nearly neutral. Because it is so droughty, crops do not respond to fertilizers.

Pasture and small grain are the crops best suited to this soil. Yields are low. (Capability unit IIIs–1; woodland group 3; wildlife group 4)

Crevasse sandy loam (Cs).—This soil has a surface layer of friable sandy loam and a subsoil of nearly pure sand through which water moves very rapidly. It is in 10- to 100-acre tracts on slight rises or knolls scattered over the Mississippi River bottoms. Some narrow strips appear to be former banks of the river. Most areas are flooded every 5 to 10 years. The main layers of a typical profile are—

0 to 12 inches, dark grayish-brown, very friable sandy loam.
12 to 72 inches, loose loamy sand or sand.

The thickness of this sandy soil ranges from 2 to about 10 feet. It is commonly underlain by black or gray, sticky clay. In some spots about a tenth of an acre in size, the surface layer is nearly pure sand. These areas are locally called "hot spots." The areas close to the Mississippi River are nearly neutral and do not need lime; those farther from the river are strongly acid. Crops respond only fairly well to fertilizer. Small applications of fertilizer are advisable because the soil is so dry that large amounts cannot be utilized.

Figure 9.—**Wheat, and soybeans in left foreground, on Commerce silty clay loam. Floods in winter and spring occasionally damage small grains growing on this nearly level, fertile soil and delay planting of summer annual crops.**

Soybeans, cotton, and pasture plants are grown. Because this soil holds so little water, yields are medium or low. The highest yielding crops are early ones that grow mostly in spring when moisture is plentiful. (Capability unit IIIs–1; woodland group 3; wildlife group 4)

Dekoven silt loam (Dk).—This nearly black, silty soil is in 10- to 200-acre tracts on low flats along streams in the eastern half of the county. It is in sediment that was washed from the surrounding loess hills and deposited by ponded water. Some areas probably have some loess deposits. The main layers of a typical soil profile are—

0 to 8 inches, nearly black, friable silt loam; slightly sticky when wet.
8 to 36 inches, black, friable silty clay loam; sticky when wet.
36 to 72 inches, gray, friable silty clay loam or silt loam.

Dekoven silt loam is ordinarily adjacent to Birds, Waverly, and Routon soils. It is darker colored and more clayey than Birds and Waverly soils.

This soil is on broad, low flats where water collects. The water table is near the surface, and in some places, water may stand on the surface during winter and early in spring. After the excess water has drained away, this soil is easy to work. It is easily penetrated by roots. Plants have a good supply of water because of the very high available water capacity. This soil has high natural fertility. It is well supplied with phosphorus and potassium, and it does not require lime. Crops respond well to nitrogen.

Row crops and pasture are the main crops. This soil can produce high yields of many crops if surface drainage is provided. Alfalfa and other deep-rooted, long-lived plants are poorly suited. (Capability unit IIw–1; woodland group 4; wildlife group 6)

Dekoven silt loam, overwash (Do).—The surface layer of this soil consists of grayish-brown, very friable silt loam recently washed from the surrounding loess uplands. It is 7 to 15 inches thick. Beneath this overwash is a 2-foot layer of black, friable silty clay loam, which consists of sediment that was washed from the surrounding uplands and deposited by ponded water. This soil is in 10- to 150-acre tracts along streams in the eastern half of the county. The main layers of a typical profile are—

0 to 12 inches, grayish-brown, very friable silt loam.
12 to 36 inches, black, friable silty clay loam; sticky when wet.
36 to 72 inches, gray, friable silty clay loam or silt loam.

This soil is next to Birds, Waverly, and Routon soils. It is darker colored and more clayey than Birds and Waverly soils.

During winter and early in spring this soil has a water table within a foot of the surface and is sometimes flooded. It is easy to work after the excess water has drained away. Roots penetrate this soil easily, but the movement of water and air is somewhat restricted. Plants have a good supply of water because the available water capacity is very high. This soil is high in natural fertility. It is neutral or slightly acid and generally does not require lime. Crops respond only slightly to any fertilizer other than nitrogen.

This soil is used mostly to grow row crops and pasture. If adequate surface drainage is provided, it can produce high yields of many crops and can be cultivated annually. Alfalfa and other deep-rooted, long-lived legumes are poorly suited. (Capability unit IIw–1; woodland group 4; wildlife group 6)

Dubbs silt loam (Ds).—This is a deep, loamy soil on slight rises, or second bottoms, along the Mississippi River. It is level or nearly level; the slope range is 0 to 2 percent. This soil is nearly well drained, but a few gray mottles below a depth of 18 inches indicate that the water table rises to this level during periods of heavy rainfall. Most areas are not likely to be flooded, except during exceptionally high water. If they are flooded, the water stands only a few days. The main layers of a typical profile are—

- 0 to 14 inches, brown, very friable silt loam.
- 14 to 36 inches, dark yellowish-brown, friable silty clay loam with gray mottles.
- 36 to 72 inches, yellowish-brown, friable sandy loam.

In some places the material below a depth of 3 feet is loamy sand.

Dubbs silt loam is in 20- to 50-acre tracts alongside Dundee and Bosket soils. It is better drained than Dundee soils but not so well drained as Bosket soils.

This soil is easy to work and is easily penetrated by roots, water, and air. Plants ordinarly have a good supply of moisture because of the very high available water capacity. This soil is moderate in natural fertility. It is medium acid to strongly acid. Crops respond extremely well to lime and fertilizer.

Dubbs silt loam is used for row crops. If lime and fertilizer are applied, it can produce high yields of all the commonly grown crops. It is well suited to the production of a row crop every year. (Capability unit I–1; woodland group 1; wildlife group 1)

Dundee clay loam (Dt).—This is a somewhat poorly drained soil on the Mississippi River bottoms. It is in large, level areas that are slightly higher than the rest of the flood plain. Nevertheless, it is flooded for a few days in winter or early in spring about every 5 years. Dundee clay loam developed in sediment laid down by the Mississippi River. This sediment consists of about equal amounts of clay, silt, and fine sand. The main layers of a typical profile are—

- 0 to 12 inches, very dark grayish-brown clay loam; friable when moist, slightly sticky when wet, hard when dry.
- 12 to 42 inches, yellowish-brown clay loam; many gray mottles, especially below a depth of 18 inches; friable when moist, slightly sticky when wet, hard when dry.
- 42 to 72 inches, mottled yellowish-brown and gray, very friable loam, sandy loam, or clay loam.

The surface layer is silty clay loam in places.

Dundee clay loam is in 10- to 75-acre tracts alongside Alligator clay. It is better drained than Alligator clay and less clayey.

The water table is 1 to 2 feet below the surface during winter and early in spring. Most areas are flooded about once every 5 years, and some are flooded nearly every winter. After the excess water drains away in spring, the soil is moist and easy to work. When dry, it is rather hard. Roots, water, and air penetrate this soil. Plants generally have a good supply of moisture because the available water capacity is high. This soil is medium acid or strongly acid and has moderate natural fertility. Crops respond well to lime and fertilizer.

Most of this soil is used for row crops and pasture. A few areas are wooded. If it is limed, fertilized, and otherwise well managed, this soil can produce good yields of many crops and can be cultivated annually. To produce high yields of a wide range of crops and to reduce the risk of losing a crop, ditches or a tile drainage system to remove excess water should be provided. Yields of some crops, soybeans for example, are high without improved drainage. Yields of long-lived, deep-rooted crops like alfalfa, are poor, even with improved drainage. (Capability unit IIw–1; woodland group 4; wildlife group 1)

Dundee loam (Du).—This is a level soil that developed in loamy sediment deposited by the Mississippi River. It is in 10- to 150-acre fields on slight rises, or bottoms, along the Mississippi River. During much of winter and early in spring, the water table keeps the subsoil saturated for several weeks. Consequently, the subsoil has many gray mottles. Water moves readily through this soil. There are no impervious layers. The main layers of a typical profile are—

- 0 to 12 inches, very dark grayish-brown, very friable loam.
- 12 to 36 inches, yellowish-brown, friable clay loam with many gray mottles.
- 36 to 72 inches, mottled yellowish-brown and gray, very friable loam or sandy loam.

Dundee loam is adjacent to Forestdale, Dubbs, and Bosket soils. It is better drained than Forestdale soils but less well drained than Dubbs and Bosket soils.

Most areas are flooded in winter and spring every 5 to 10 years. The water table is 1 to 2 feet below the surface during much of winter and early in spring. After the excess water drains away in spring, the soil is easy to work and is easily penetrated by roots, water, and air. Plants have a good supply of water because the available water capacity is very high. This soil is medium acid or strongly acid and has moderate natural fertility. Crops respond well to lime and fertilizer.

Row crops, mainly soybeans and cotton, and silage crops are grown on this soil, which can produce good yields of many crops if it is limed, fertilized, and otherwise well managed. This soil can produce good yields of some crops, soybeans and tall fescue, for example, without improved drainage. On the other hand, even with improved drainage, it is too wet for alfalfa and other long-lived, deep-rooted crops. To get high yields of a wide range of crops and to reduce the risk of losing a crop, ditches or a tile drainage system to remove excess water should be provided. (Capability unit IIw–1; woodland group 4; wildlife group 1)

Dundee silt loam (Dv).—This is a practically level, somewhat poorly drained soil. It is in 10- to 150-acre fields on the outer part of the Mississippi River bottoms. The water table rises to within a foot or two of the surface during rainy weather in winter and early in spring. Consequently, the subsoil has some gray color. Water moves readily through this soil. There are no impervious layers. The main layers of a typical profile are—

- 0 to 12 inches, dark grayish-brown, very friable silt loam.
- 12 to 42 inches, mottled yellowish-brown and gray, friable silty clay loam; few gray mottles to a depth of 18 inches and many below 18 inches.
- 42 to 72 inches, mottled yellowish-brown and gray, very friable loam or sandy loam.

In a few places loamy sand is at a depth below 3 feet, and in some small spots it is under the plow layer.

This soil, for the most part, is flooded for a few days in winter and early in spring about every 5 years, although it is on some of the higher parts of the bottoms. A few areas are flooded more often.

The water table is 1 to 2 feet below the surface during winter and early in spring. After the excess water drains away in spring, this soil is easy to work and is easily penetrated by roots, water, and air. It has a very high available water capacity and thus provides plants with a good supply of moisture. It is moderate in natural fertility. It is predominantly medium acid or strongly acid, but in places the surface layer is only slightly acid. Crops respond well to lime and fertilizer.

Dundee silt loam is used mostly to grow row crops. It can produce good yields of many crops if it is limed and fertilized. Drainage ditches are needed to remove the excess water from some fields. This soil is suited to the production of a row crop every year. Long-lived, deep-rooted crops, such as alfalfa, do not grow well because of wetness. (Capability unit IIw–1; woodland group 4; wildlife group 1)

Falaya silt loam (Fa).—This is a flat, somewhat poorly drained soil. It is in 10- to 400-acre tracts on the first bottoms along the rivers and streams in the eastern half of the county. It consists of sediment that washed from silty upland soils, such as the Memphis and Grenada soils. This sediment is several feet thick and is friable silt loam throughout. The main layers of a typical profile are—

0 to 8 inches, brown, very friable silt loam.
8 to 18 inches, mottled dark grayish-brown and gray, friable silt loam.
18 to 72 inches, mottled gray and grayish-brown, friable silt loam.

In a few places a layer of black silty clay loam begins about 2 feet below the surface. This layer is a Dekoven soil buried by recent sediment.

Falaya silt loam is normally adjacent to areas of Collins and Waverly soils. It is not so well drained as Collins soils, but it is better drained and less gray than Waverly soils.

This soil is wet during winter and early in spring, when the water table is often within a foot of the surface. Floods cover most of the acreage once every winter or spring, but the floodwater seldom remains more than a few hours. This soil is easy to work when it dries out in spring. The lowest areas, however, are wet until fairly late in spring in about 1 year in 5. Plants have a good supply of moisture because the available water capacity is very high and the root zone is deep. This soil is medium acid or strongly acid, and it is moderately high in natural fertility. Crops respond extremely well to lime and fertilizer.

Falaya silt loam is used to grow cotton, corn, soybeans, and pasture plants. If it is limed and fertilized, it can produce good yields of many crops, but drainage systems are normally needed to remove the excess water. (Capability unit IIw–1; woodland group 9; wildlife group 6)

Forestdale silt loam (Fd).—This is a flat, poorly drained, gray soil in 10- to 1,000-acre tracts on the Mississippi River bottoms. The main layers of a typical profile are—

0 to 8 inches, dark-gray, friable silt loam.
8 to 48 inches, gray silty clay loam or silty clay mottled with shades of olive and brown; sticky when wet, hard when dry.
48 to 72 inches, brown, friable loam or sandy loam with many gray mottles.

In some places the material below a depth of 60 to 72 inches is loamy sand or sand.

Forestdale silt loam is next to Alligator and Dundee soils. It is less clayey than Alligator soils and is more poorly drained than Dundee soils.

Most of this soil is flooded for several days every 3 or 4 years during winter; some areas are flooded every winter. The water table is seldom more than a foot below the surface during winter and early in spring. When the excess water drains away in spring, the surface layer is easy to work. The gray, poorly aerated, dense subsoil restricts the root zone. The available water capacity is high, but because the root zone is shallow this soil is somewhat droughty in summer. This soil is strongly acid to slightly acid, and it is low in natural fertility. Crops respond only fairly well to lime and fertilizer.

Row crops, pasture plants, and trees are grown on this soil. Best suited are summer annual crops, such as soybeans, and pasture plants that can stand wetness in winter, such as tall fescue. Ditches to remove excess water (fig. 10) are essential for high yields. (Capability unit IIIw–3; woodland group 4; wildlife group 7)

Forestdale-Crevasse complex (Fo).—"Sand blow land," as the areas of this complex are commonly known, is in the eastern part of the Mississippi River bottoms. The tracts are 20 to 1,000 acres in size. About three-fourths of each tract consists of gray, poorly drained Forestdale silt loam, and the rest is made up of small mounds or ridges of Crevasse loamy sand, less than an acre in size. Crevasse loamy sand consists of 2 to 6 feet of loamy sand and sand over gray clay. See the descriptions of Forestdale silt loam and of Crevasse loamy sand for a typical profile of these soils.

Nearly all areas of this complex are flooded for several days in winter every 3 or 4 years; some areas are flooded every year. The water table remains about a foot below the surface in winter and spring. The Forestdale soil is easy to work after it dries out, but it has a gray, poorly drained, poorly aerated, tight subsoil that restricts root growth and movement of water and air.

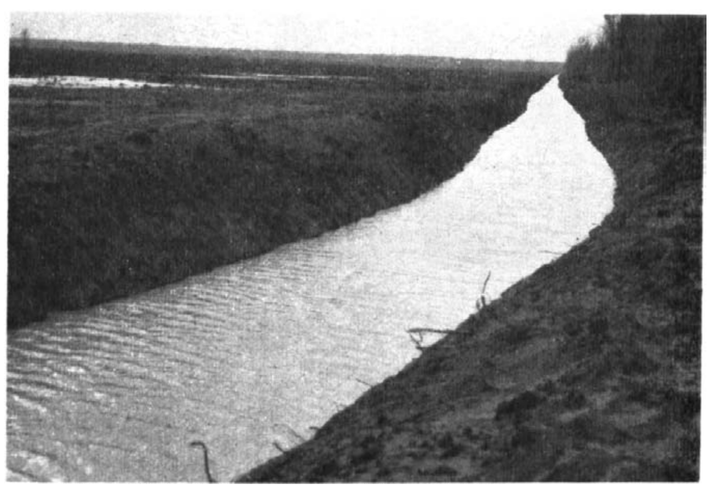

Figure 10.—**Drainage ditch in Forestdale silt loam. Yields are increased and the selection of crops is broadened by removing the excess water from this poorly drained soil.**

This complex is droughty at times because the Crevasse soil holds very little water and the Forestdale soil has a shallow root zone. The soils are medium acid or slightly acid and low in natural fertility. Crops respond only fairly well to lime and fertilizer.

Flooding, poor drainage, and the vast differences between the two soils impose limitations regarding use. Yields of soybeans, sorghum, or other summer annuals that can be planted late are medium or low. Yields of row crops are low because these crops grow poorly on these soils and those in the sandy spots commonly "burn up" in summer. Tall fescue, white clover, and other pasture plants that can stand wetness in winter grow well. (Capability unit IIIw-3; woodland group 4; wildlife group: Crevasse, 4 and Forestdale, 7)

Gravel pits (Ga).—This mapping unit consists of holes 30 to 50 feet deep in areas of 5 to 60 acres on the steep loess hills near the Obion River and Mississippi River bottoms. The soil material was removed from these areas in order to reach the gravel, which is used for construction. The pits are almost surrounded by nearly vertical sides of brown, friable silt loam or silt. At the bottom of these pits is a mixture of gravel, sand, and clay. Some pits hold water.

Gravel pits are expensive to reclaim because extensive earth moving is required to fill the holes. (Woodland group 11; not placed in a capability class or in a wildlife group)

Grenada silt loam, 2 to 5 percent slopes (GrB).—This is a silty, moderately well drained soil that developed in 20 to 50 feet of loess. It is in 5- to 40-acre tracts scattered on the gently sloping uplands in the eastern half of the county. It has a fragipan that begins about 24 inches below the surface. The main layers of a typical profile are—

0 to 6 inches, brown, very friable silt loam.
6 to 24 inches, yellowish-brown, friable silt loam with a few gray mottles below a depth of 18 inches.
24 to 44 inches, mottled gray and brown, compact, brittle silty clay loam or silt loam. (This layer is the fragipan.)
44 to 72 inches, yellowish-brown, friable silt loam.

This soil is next to Calloway and Loring soils. It is better drained than Calloway soils but less well drained than Loring soils.

The uppermost 24 inches is silty and friable and is easily penetrated by roots, water, and air. The fragipan stops most roots at a depth of about 24 inches. It also slows the movement of water; thus, the soil is waterlogged during rainy seasons. This soil is slightly droughty in summer. It is easy to work. It is strongly acid or medium acid and moderately low in natural fertility. Crops respond well to lime and fertilizer.

Yields of corn are low in the drier years, and alfalfa becomes infested with weeds and dies after about 2 years. Yields of the other common crops are good. (Capability unit IIe-2; woodland group 8; wildlife group 3)

Grenada silt loam, 2 to 5 percent slopes, severely eroded (GrB3).—This is a silty soil that developed in 20 to 50 feet of loess. It is in 5- to 40-acre tracts scattered on uplands in the eastern half of the county. Erosion has removed nearly all of the original surface layer, and the present plow layer is mostly former subsoil material. This soil has a fragipan that begins 16 to 20 inches below the surface. The main layers of a typical profile are—

0 to 6 inches, brown or yellowish-brown, friable silt loam.
6 to 18 inches, yellowish-brown, friable silt loam with a few gray mottles below a depth of 14 inches.
18 to 42 inches, mottled gray and yellowish-brown, compact, brittle silty clay loam or silt loam. (This layer is the fragipan.)
42 to 72 inches, yellowish-brown, friable silt loam.

This soil is next to Loring and Calloway soils. It is less well drained than Loring soils, but it is better drained than Calloway soils.

Roots, water, and air penetrate the uppermost 16 to 20 inches of this soil, which is easy to work and to keep in good tilth. The fragipan restricts root growth and causes water to drain slowly through the subsoil. At times it causes waterlogging of the upper part of the soil, and consequently runoff is high during rainy seasons. This soil, because of the fairly shallow root zone and high runoff, is somewhat droughty in summer. It is strongly acid or medium acid and has moderately low natural fertility. Crops respond well or fairly well to lime and fertilizer.

Row crops, hay, and pasture are grown on this soil. Yields of cotton, soybeans, and small grain are good, but yields of corn are only fair. A suitable cropping system consists of a row crop after 2 years of hay or pasture. Hay and pasture plants, except alfalfa, grow well if lime and fertilizer are applied. (Capability unit IIIe-2; woodland group 8; wildlife group 3)

Grenada silt loam, 5 to 8 percent slopes, severely eroded (GrC3).—This silty, moderately well drained soil developed in loess that is 20 to 50 feet thick. It is in 5- to 50-acre tracts scattered on short, sloping hillsides in the eastern part of the county. Erosion has removed practically all of the original surface layer, and the present plow layer consists mostly of former subsoil material. The upper part of the subsoil is yellowish-brown, friable silt loam about 6 inches thick. A fragipan begins at a depth of 12 to 20 inches. The main layers of a typical profile are—

0 to 6 inches, brown or yellowish-brown, friable silt loam.
6 to 14 inches, yellowish-brown, friable silt loam with a few gray mottles.
14 to 38 inches, mottled gray and brown, compact, brittle silty clay loam or silt loam. (This layer is the fragipan.)
38 to 72 inches, yellowish-brown, friable silt loam.

In some fields are small spots from which all or nearly all of the material above the fragipan has been washed away.

This soil, which is on the hillsides, is next to Loring soils, which are on the ridgetops.

The fragipan restricts most roots to the uppermost 12 to 20 inches. Furthermore, it causes water to drain slowly through the subsoil. Because of the slow movement of water, the upper part of the soil is waterlogged at times, and surface runoff is high during rainy seasons. Because of the fairly shallow root zone and high runoff, this soil is somewhat droughty in summer. It is strongly acid or medium acid and has moderately low natural fertility. Crops respond fairly well to lime and fertilizer. This soil is friable and easy to work, but erosion is hard to control.

Row crops, hay, and pasture are grown on this soil, which can produce good yields of cotton, soybeans, and small grain, but only fair yields of corn. This soil is suited to only occasional cultivation. If lime and fertilizer are applied, most hay and pasture crops grow well. Alfalfa is not suited, for it becomes infested with weeds and ordinarily dies after a year or two. (Capability unit IVe–2; woodland group 8; wildlife group 3)

Grenada silt loam, 8 to 12 percent slopes, severely eroded (GrD3).—This soil developed in loess that is 20 to 50 feet thick. It is in 5- to 60-acre tracts on sloping hillsides in the eastern half of the county. Erosion has removed practically all of the original surface layer. A fragipan begins 12 to 20 inches below the surface. It is immediately below the plow layer in spots, and it is exposed in a few small gullies. The main layers of a typical profile are—

0 to 6 inches, brown or yellowish-brown, friable silt loam.
6 to 14 inches, yellowish-brown, friable silt loam with some gray mottles.
14 to 38 inches, mottled gray and brown, compact, brittle silty clay loam or silt loam. (This layer is the fragipan.)
38 to 72 inches, yellowish-brown, friable silt loam.

This soil is alongside Loring soils, which are on the ridgetops.

The plow layer is friable and easy to work. The 12 to 20 inches above the fragipan are easily penetrated by roots, water, and air. The fragipan stops most roots and slows the movement of water. Because of the slow movement of water, the upper part of the soil is waterlogged at times, and runoff is high during rainy seasons. Because of the fairly shallow root zone and high runoff, this soil is somewhat droughty in summer. It is strongly acid or medium acid and has moderately low natural fertility. Crops respond fairly well to lime and fertilizer.

Row crops, hay, and pasture are grown on this soil. If lime and fertilizer are applied, most hay and pasture plants grow well. Row crops are poorly suited because the soil washes easily. Alfalfa is poorly suited because of the fragipan. (Capability unit VIe–2; woodland group 8; wildlife group 3)

Gullied land (Gu).—This mapping unit is mostly on steep hillsides. The slope range is 7 to 50 percent. Erosion has removed all or nearly all of the soil and has cut deeply into the underlying material (fig. 11). In some areas, gullies form an intricate pattern of narrow drainageways 6 to 15 feet deep and cover almost all of the acreage. Other areas are dotted with 15- to 30-foot holes that have nearly vertical, caving sides.

Gullied land consists mostly of brown or yellowish-brown, friable silt loam that is strongly acid to neutral. In a few areas it is mottled gray and brown, compact silt loam, and in a few other areas it consists of Coastal Plain deposits that are a mixture of gray clay and sand.

Some areas of gullied land can be reclaimed at modest cost and used as pasture. Other areas can be reclaimed only at high cost. Trees are best for areas that have not been reclaimed, but trees alone will not stabilize the deep caving gullies. (Capability unit VIIe–2; woodland group 11; wildlife group 9)

Levees and borrow pits (Lb).—This mapping unit is a strip that runs north and south from one end of the county to the other. It consists of the levee that is a mile east of the Mississippi River and of the borrow pit from which soil material was removed to build the levee (fig. 12).

The levee is about 300 feet wide at the bottom and 15 feet wide at the top. It is 20 to 30 feet high, and its sides are steep in places. A gravel road runs along the top. The borrow pit is along the western edge of the levee. It is about 300 feet wide and about 10 to 15 feet deep. Some parts of the pit hold water all year. The texture of the soil material in the levee and borrow pit ranges from sand to clay.

The levee provides a refuge for livestock and wildlife during floods. Grass on each side of the levee provides some grazing. Weeds, willow trees, and cottonwood trees grow in the parts of the borrow pit that are not flooded. The ponded areas attract fish and waterfowl. (Woodland group 11; wildlife group 9; not placed in a capability class)

Loring silt loam, 2 to 5 percent slopes (LoB).—This is a deep, nearly well drained, silty soil that developed in loess 20 to 60 feet thick. The uppermost 30 inches is friable, well drained, and easy to work. A weak fragipan begins about 30 inches below the surface. The pan is about 20 inches thick, and water moves rather slowly through it. Below the fragipan is brown, friable silt loam.

This soil is in 5- to 40-acre tracts on fairly wide, gently sloping hilltops scattered over the eastern half of the county. The area is known as "poplar ridge land." The main layers of a typical profile are—

0 to 6 inches, brown, very friable silt loam.
6 to 30 inches, dark-brown, friable silt loam or silty clay loam.
30 to 48 inches, mottled brown and gray, slightly compact silt loam.
48 to 72 inches, brown, friable silt loam.

Figure 11.—**Gullied land in loess uplands. This area was probably Memphis silt loam before the gullies formed. Memphis soils erode rapidly if not protected.**

Figure 12.—**Levee and borrow pit on the Mississippi River bottom. The borrow pit is filled with water in many places. A gravel road runs along the top of the levee.**

In places the friable silt loam extends from the surface down to the bottom of the loess deposit, which may be at a depth of 60 feet.

This soil is normally adjacent to Memphis and Grenada soils. It is not so well drained as Memphis soils, but it is better drained than Grenada soils.

Roots, air, and water penetrate this soil to a depth of 30 inches. The weak fragipan retards slightly but does not interfere seriously with drainage, aeration, or root growth. This soil is medium acid or strongly acid and has moderately high natural fertility. Crops respond extremely well to lime and fertilizer. The available water capacity is very high, and plants generally have a good supply of moisture. The soil is easy to work.

This soil is used to grow cotton, corn, hay, and pasture. If it is limed and fertilized, it can produce high yields of all the commonly grown crops. Erosion, even though it is not serious, is the main limitation. (Capability unit IIe–1; woodland group 6; wildlife group 2)

Loring silt loam, 2 to 5 percent slopes, severely eroded (LoB3).—This deep, nearly well drained, silty soil developed in loess 20 to 60 feet thick. Erosion has removed most of the original surface layer. The present plow layer is mostly former subsoil material. It consists of dark-brown, friable silt loam and is about 6 inches thick. The subsoil is dark-brown, friable silty clay loam or silt loam. It is underlain at about 24 inches by a weak fragipan that extends to a depth of about 40 inches. The fragipan is mottled brown, yellowish-brown, and gray, slightly compact silt loam. Beneath the fragipan is a layer of dark-brown, friable silt loam several feet thick.

This soil is in 5- to 40-acre tracts on fairly wide hilltops in the eastern part of the county. It makes up a big part of an area known as "poplar ridge land."

The uppermost 24 inches is easy to work and is easily penetrated by roots, water, and air. The fragipan retards slightly but does not interfere seriously with drainage, aeration, and root growth. This soil has a very high available water capacity, and ordinarily it has a good supply of moisture for plants. It is medium acid or strongly acid and is moderately high in natural fertility. Crops respond extremely well to lime and fertilizer.

This soil is used for row crops, hay, and pasture. All the commonly grown crops are well suited. The erosion hazard is the only limitation. (Capability unit IIIe–1; woodland group 6; wildlife group 2)

Loring silt loam, 5 to 8 percent slopes, severely eroded (LoC3).—This is a deep, nearly well drained, silty soil that developed in loess 20 to 60 feet thick. It is in 5- to 30-acre tracts on rather short, sloping hillsides that are scattered over the eastern half of the county. Most of the original surface layer has been removed by erosion. Consequently, the 6-inch plow layer of dark-brown, friable silt loam is mostly former subsoil material. The subsoil is dark-brown, friable silty clay loam or silt loam. It has a weak fragipan beginning about 24 inches below the surface and extending to about 40 inches. The fragipan consists of mottled brown and gray, slightly compact silt loam. Below it is a layer of brown, friable silt loam several feet thick.

Roots, water, and air penetrate this soil to a depth of 24 inches. The fragipan retards slightly but does not interfere seriously with drainage, aeration, and root growth. This soil is strongly acid or medium acid and has moderately high natural fertility. Crops respond well to lime and fertilizer. If surface runoff is controlled, plants have a good supply of moisture because of the very high available water capacity.

This soil is used for row crops, hay, and pasture. If it is limed, fertilized, and otherwise well managed, it can produce good yields of all of the commonly grown crops. Erosion control is the main problem. (Capability unit IIIe–1; woodland group 6; wildlife group 2)

Loring silt loam, 8 to 12 percent slopes, severely eroded (LoD3).—This deep, silty soil is in 5- to 30-acre tracts on short hillsides in the eastern half of the county. It developed in loess 20 to 60 feet thick. Because of past erosion, the present plow layer is mostly former subsoil material. It consists of dark-brown, friable silt loam and is about 6 inches thick. The subsoil is dark-brown, friable silty clay loam or silt loam. A weak fragipan begins about 24 inches below the surface and extends to about 40 inches. The fragipan consists of mottled brown and gray silt loam that is slightly compact. Below it is a layer of brown, friable silt loam, much like the surface layer. In spots the plow layer is immediately over the fragipan, and in some areas a few small gullies have formed.

This soil is easy to work. Roots, water, and air penetrate it to a depth of 24 inches. The fragipan retards slightly but does not interfere seriously with drainage, aeration, and root growth. This soil is medium acid or strongly acid and has moderately high natural fertility. Crops respond well to lime and fertilizer. Plants generally have a good supply of moisture if surface runoff is controlled, for the available water capacity is very high.

Hay, pasture, and row crops are grown on this soil, which can produce good yields of all the commonly grown crops but is too steep and too easily eroded for frequent cultivation. (Capability unit IVe–1; woodland group group 6; wildlife group 2)

Loring silt loam, 12 to 20 percent slopes, severely eroded (LoE3).—This deep, silty soil is in 5- to 30-acre tracts on fairly steep hillsides in the eastern part of the county. It developed in loess 20 to 60 feet thick. Erosion has removed practically all of the original surface layer, and the present plow layer is mostly former subsoil material. It consists of dark-brown, friable silt loam and is about 6 inches thick. The subsoil is dark-brown, friable silty clay loam or silt loam and has a weak fragipan about 20 inches thick beginning about 24 inches below the surface. The fragipan consists of mottled brown and gray, slightly compact silt loam. Below it is a layer of brown silt loam several feet thick. Some areas have spots where the plow layer is directly over the fragipan, and a few areas have a small gully or two.

Roots, water, and air penerate this friable soil to a depth of 24 inches. The fragipan retards slightly but does not interfere seriously with root growth, drainage, and aeration. This soil is medium acid or strongly acid and has moderately high natural fertility. Crops respond well to lime and fertilizer. The available water capacity is very high. Plants generally have a good supply of moisture if surface runoff is controlled.

Hay and pasture are grown on this soil. All the commonly grown hay and pasture crops grow well if lime and fertilizer are applied. Row crops are poorly suited because erosion is hard to control. (Capability unit VIe–1; woodland group 6; wildlife group 2)

Loring-Gullied land complex, 12 to 20 percent slopes (LrE).—This mapping unit is in 5- to 30-acre tracts in the eastern half of the county. A network of gullies, generally 3 to 6 feet deep, covers about a third of each area. In the part that is not gullied, erosion has removed practically all of the original surface layer and some of the subsoil. The surface layer consists of dark-brown, friable silt loam and is 4 to 6 inches thick. The subsoil is dark-brown, friable silt loam or silty clay loam. A weak fragipan of mottled brown and gray, slightly compact silt loam begins 10 to 20 inches below the surface.

Though the soil is silty and friable, these areas are difficult to work because of the gullies. Pasture and trees are grown. Hay and pasture grow well if lime and fertilizer are applied, but some filling and smoothing of gullies is necessary. (Capability unit VIe–1; woodland group 7; wildlife group: Loring, 2 and Gullied land, 9)

Made land (Ma).—This mapping unit consists of areas from which soil material has been removed, as well as areas that have been filled. The areas are mostly sites for airports, power substations, and large buildings. Most of these areas are flat, but a few slope as much as 20 percent. The soil material is brown, friable silt loam. (Woodland group 11; wildlife group 9; not placed in a capability class)

Memphis silt loam, 2 to 5 percent slopes (MfB).—This is a deep, well-drained, silty soil. It developed in loess that is as much as 90 feet thick in the hills at the edge of the Mississippi River bottoms and gradually thins to about 20 feet in the eastern part of the county. Both the surface layer and the subsoil are friable and easy to work. The main layers of a typical profile are—

0 to 6 inches, brown or dark-brown, very friable silt loam.
6 to 18 inches, dark-brown, friable silty clay loam or silt loam.
18 to 72 inches, dark-brown or brown, friable silt loam. (This layer is much like the surface layer.)

In some places the texture of all the layers is silt loam, but in most places the 12-inch layer just below the surface layer is slightly more clayey than the one above or the one below.

This soil is commonly adjacent to Loring soils. It is better drained than Loring soils.

This is one of the most productive upland soils in the State. Roots, water, and air penetrate it to a great depth. This soil is very easy to keep in good tilth. It has a deep root zone and a very high available water capacity. It is moderately high in natural fertility. Crops respond very well to fertilization and to other management practices.

This soil is used to grow cotton, corn, hay, and pasture. It can produce high yields of all the commonly grown crops. It is easy to manage; the slope is the only limitation. (Capability unit IIe–1; woodland group 6; wildlife group 2)

Memphis silt loam, 2 to 5 percent slopes, severely eroded (MfB3).—This is a well-drained, brown, silty soil. It developed in loess from 20 feet to 90 feet in thickness. It has been cleared and cropped for many years; consequently, nearly all of the original surface layer and, in places, the upper part of the former subsoil has washed off. The severe erosion has not greatly reduced the value of this soil for farming, because the subsoil is also friable and easy to work. The present plow layer is dark-brown, friable silt loam that is only slightly sticky when wet. The subsoil, which is several feet thick, is also dark-brown, friable silt loam; it is much like the plow layer.

This soil is strongly acid to slightly acid. It is moderately high in natural fertility. Crops respond extremely well to lime and fertilizer. Plants generally have a good supply of moisture because of the high available water capacity and the deep root zone. Roots, water, and air penetrate the soil to a depth of several feet.

This soil is used to grow row crops, hay, and pasture. It can produce high yields of all the commonly grown crops. Erosion control is the main management problem. (Capability unit IIIe–1; woodland group 6; wildlife group 2)

Memphis silt loam, 5 to 8 percent slopes (MfC).—This is a deep, well-drained, silty soil. It is in 5- to 30-acre tracts on long, narrow, winding ridgetops of the steep loess hills near the center of the county. Some of the ridgetops are the highest parts of Dyer County. This soil developed in loess 20 to 90 feet thick. The 8-inch surface layer is brown, very friable silt loam that has the dark stain of decayed leaves in its uppermost 3 inches. The subsoil, to a depth of 22 inches, is dark-brown, friable silty clay loam or silt loam. Below 22 inches it is friable silt loam. Below 40 inches it has a few gray mottles in places.

This soil has a very deep root zone. It has very high available water capacity and moderately high natural fertility. It is slightly acid to strongly acid. Crops respond very well to lime and fertilizer. Roots, water, and air easily penetrate this soil, which is easy to keep in good tilth.

Nearly all of this soil is wooded, but a few areas are in pasture. This soil can produce high yields of all the commonly grown crops, but it erodes rapidly when cultivated. Because of their size, shape, and location, some areas are rather difficult to farm as separate fields. (Capability unit IIIe–1; woodland group 6; wildlife group 2)

Memphis silt loam, 5 to 8 percent slopes, severely eroded (MfC3).—This is a deep, well-drained, silty soil in 5- to 50-acre tracts scattered over the eastern half of the county. It is on some of the highest parts of Dyer County, mostly on long, narrow, winding ridgetops between steep hills. A few areas are on rather short, sloping hillsides. This soil developed in loess 20 to 90 feet thick. Erosion has removed the original surface layer, and the present plow layer is mostly former subsoil material. It consists of dark-brown, friable silt loam and is about 6 inches thick. The subsoil is dark-brown, friable silty clay loam from a depth of 6 inches down to 14 inches. Below 14 inches it is silt loam. Below 30 inches it has some gray mottles in places.

Most areas have a smooth surface, but some have shallow gullies or prints of gullies that have been filled.

This soil is easily penetrated by roots, water, and air and is easily kept in good tilth. It is strongly acid to slightly acid and has moderately high natural fertility. It has a very high available water capacity and a very deep root zone. Plants have a good supply of moisture if surface runoff is controlled. Crops respond very well to lime and fertilizer.

Row crops, hay, and pasture are grown on this soil. Yields of all the commonly grown crops are good. Erosion control is the main management problem. (Capability unit IIIe-1; woodland group 6; wildlife group 2)

Memphis silt loam, 8 to 12 percent slopes, severely eroded (MfD3).—This very deep, well-drained soil is on the short slopes of rolling hills. It developed in loess that ranges in thickness from 20 feet in the eastern part of the county to 90 feet in the central part. This soil is silty to a depth of 20 feet or more. The plow layer consists of dark-brown, friable silt loam, which is former subsoil material. It is only slightly sticky when wet. Below the plow layer is a layer of dark-brown silt loam or silty clay loam about 6 to 10 inches thick. Below this is a layer of dark-brown or brown, friable silt loam several feet thick. In places there are some gray mottles below a depth of 30 inches.

The surface is mostly smooth, but there are some shallow gullies or prints of former gullies that have been filled.

This soil is easily penetrated by roots, water, and air. It has a deep root zone, and though severely eroded, it is easy to keep in good tilth. It has moderately high natural fertility and is strongly acid or medium acid. Crops respond well to lime and fertilizer. If surface runoff is controlled, plants have a good supply of moisture because of the high available water capacity.

This soil is used to grow hay, pasture, and row crops. It can produce good yields of all the commonly grown crops, but it is too steep and too erodible to be suitable for frequent cultivation. (Capability unit IVe-1; woodland group 6; wildlife group 2)

Memphis silt loam, 12 to 20 percent slopes, severely eroded (MfE3).—This is a deep, silty soil that developed in loess 20 to 90 feet thick. It is in 15- to 150-acre tracts on fairly steep hillsides in the eastern half of the county. Most areas have a few small gullies. Erosion has removed practically all of the original surface layer, and the present surface layer is mostly former subsoil material. It consists of dark-brown, friable silt loam and is 6 inches thick. The subsoil is dark-brown, friable silty clay loam from a depth of 6 inches down to 14 inches. Below 14 inches it is brown silt loam to a depth of several feet. Below 30 inches it has some gray mottles in places.

This soil has a very high available water capacity and a deep root zone. Therefore, plants have a good water supply if surface runoff is controlled. This soil is strongly acid or medium acid and has moderately high natural fertility. Crops respond well to lime and fertilizer.

Pasture and hay, which are both well suited to this soil, are the main crops. Many kinds of grasses and legumes grow well under good management. This soil is too steep and too erodible to be cultivated unless elaborate water-control measures are used. Even then, it should be cultivated only occasionally in a long cropping system. (Capability unit VIe-1; woodland group 6; wildlife group 2)

Memphis silt loam, 20 to 30 percent slopes (MfF).—This deep, well-drained, silty soil is in 15- to 300-acre tracts on long, steep hillsides scattered over the eastern half of the county. Most areas are on the steep loess hills near the central part. This soil developed in loess that is commonly between 20 and 90 feet thick but is only about 3 feet thick in spots on the steep bluff next to the Mississippi River bottoms. The 8-inch surface layer is brown, very friable silt loam. The subsoil is dark-brown, friable silty clay loam from a depth of 8 inches down to 22 inches. Below this, brown or dark-brown, friable silt loam extends to the bottom of the loess deposit.

A few gullies have formed in some areas.

This soil is easily penetrated by roots, air, and water. In spite of the steep slopes, farm machinery can be used to establish and maintain pasture. If surface runoff is controlled, plants generally have a good supply of moisture because of the very high available water capacity. This soil is strongly acid to slightly acid and is moderately high in natural fertility. Crops respond well to lime and fertilizer.

Nearly all of this soil is wooded, but a few areas are in pasture (fig. 13). The soil is well suited to trees, and if well managed it can produce good yields of all of the commonly grown pasture plants. (Capability unit VIe-1; woodland group 7; wildlife group 2)

Memphis silt loam, 20 to 30 percent slopes, severely eroded (MfF3).—This is a deep, silty soil on steep hillsides. It is in 15- to 300-acre tracts in the eastern part of the county. It developed in loess that is ordinarily 20 to 90 feet thick but is only about 3 feet thick in spots along the steep bluffs next to the Mississippi River bottoms. Erosion has removed practically all of the original surface layer, so the present plow layer is mostly former subsoil material. It consists of dark-brown, friable silt loam and is about 6 inches thick. The subsoil is dark-brown, friable silty clay loam from a depth of 6 inches down to 14 inches. Below this is silt loam that extends to a depth of several feet. In places, erosion has removed the silty clay loam layer, and the texture throughout is friable silt loam. Most areas have a few gullies and scars of old gullies that have been filled.

This soil is difficult to work because of steep slopes, but farm machinery can be used to establish and maintain pastures. Roots, water, and air easily penetrate this soil. If surface runoff is controlled, plants ordinarily have a good supply of moisture because of the very high available water capacity. Although this soil is strongly acid to slightly acid and moderately high in natural fertility, plants respond well to lime and fertilizer.

Most areas of this soil are in pasture, but some are covered with bushes and weeds. This soil can produce good yields of many pasture plants if it is well managed. It is

Figure 13.—**Pasture on Memphis silt loam, 20 to 30 percent slopes. This soil is productive of pasture but too steep and too easily eroded to be suitable for crops.**

a high-quality forest soil. (Capability unit VIe–1; woodland group 7; wildlife group 2)

Memphis silt loam, 30 to 50 percent slopes (MfG).—This deep, well-drained soil is on long, very steep hillsides that form deep, narrow, meandering, V-shaped valleys as they slope from the narrow, winding ridgetops. It is in 50- to 500-acre tracts near the central part of the county. It developed in loess that is 20 to 90 feet thick. The 8-inch surface layer is brown, very friable silt loam that has dark stains from decayed leaves in the uppermost 3 inches. The subsoil is dark-brown, friable silt loam or silty clay loam to a depth of 22 inches. It is silt loam below 22 inches.

A few gullies have formed in most areas.

This soil is in good tilth. It is easily penetrated by roots, water, and air. Plants ordinarily have a good supply of moisture, because of the very high available water capacity and the deep root zone. This soil is strongly acid or slightly acid and is moderately high in natural fertility.

This soil is in hardwood trees. It is very productive of trees, but it is poorly suited to pasture because of the steep slopes. (Capability unit VIIe–1; woodland group 7; wildlife group 2)

Memphis-Gullied land complex, 20 to 30 percent slopes (MgF).—This mapping unit is in 20- to 50-acre tracts in the eastern half of the county. About a fourth of each area is covered by patches of gullies that are 3 to 6 feet deep. Erosion has removed practically all of the original surface layer and part of the subsoil in the part that is not gullied. This deep, well-drained soil consists of dark-brown or brown, friable silt loam to a depth of several feet. It developed in loess that is ordinarily 20 to 90 feet thick. In a few areas on the steep bluff next to the Mississippi River bottoms, the loess is only about 3 feet thick.

These areas are in native pasture and second-growth trees. Trees are the best use. Pasture yields are good in reclaimed areas, but reclamation is costly. (Capability unit VIIe–1; woodland group 7; wildlife group: Memphis, 2 and Gullied land, 9)

Morganfield silt loam (Mo).—This is a nearly level, well-drained soil. It consists of 4 to 6 feet of brown silt loam that was washed from the nearby steep loess hills and deposited on the outer edge of the first bottoms of the Mississippi River. Some areas are along the small streams that meander through the loess hills. The tracts are 10 to 250 acres in size. The main layers of a typical profile are—

0 to 30 inches, brown, very friable silt loam.
30 to 60 inches, brown, very friable silt loam with a few gray mottles.

This soil is adjacent to Adler silt loam. It is better drained than Adler silt loam.

Morganfield silt loam is one of the most fertile soils in the State. It is well supplied with lime, phosphorus, and potassium. It has a very high available water capacity. It is very easy to work and is easily penetrated by roots, water, and air.

This soil can produce high yields of all crops suited to the climate. It is well suited to annual cultivation. Two or three crops of vegetables are grown on most of it each year. (Capability unit I–1; woodland group 1; wildlife group 1)

Robinsonville fine sandy loam (Ro).—This is a level, well-drained soil of the first bottoms. It is in strips next to the Mississippi River. The main layers of a typical profile are—

0 to 24 inches, brown, very friable fine sandy loam.
24 to 72 inches, brown, very friable loam, silt loam, and sandy loam.

This soil is adjacent to Crevasse and Commerce soils. It has less sand than Crevasse soils and is better drained than Commerce soils.

This soil is fertile and easy to keep in good tilth. It does not need lime, and it is well supplied with phosphorus and potassium. It is easily penetrated by roots, water, and air. Plants have a good supply of moisture because of the high available water capacity.

Every 5 to 10 years this soil is flooded for 2 or 3 weeks in winter or spring.

Row crops, native pecan trees, hay, and pasture are grown on this soil, which can produce high yields of all the commonly grown crops and is well suited to the production of a row crop each year. (Capability unit I–1; woodland group 1; wildlife group 1)

Robinsonville loam (Rs).—This is a deep, well-drained soil on level first bottoms. It is in 10- to 300-acre tracts alongside the Mississippi River and is flooded for 2 or 3 weeks in winter or spring every 5 to 10 years. The main layers of a typical profile are—

0 to 18 inches, brown, very friable loam.
18 to 72 inches, brown, very friable loam, silt loam, and sandy loam.

Robinsonville loam is adjacent to Crevasse and Commerce soils. It has less sand than Crevasse soils and is better drained than Commerce soils.

Roots, water, and air easily penetrate this soil, which is easy to keep in good tilth. Plants generally have a good supply of moisture because the available water capacity is very high. This soil has high natural fertility. It is rich in phosphorus and potassium and does not need lime. Crops respond well to nitrogen.

Robinsonville loam can produce high yields of the commonly grown crops and is well suited to the production of a row crop each year. It is used to grow row crops (fig. 14), native pecans, hay, and pasture. (Capability unit I–1; woodland group 1; wildlife group 1)

Figure 14.—Soybeans on Robinsonville loam, a well-drained, fertile soil on first bottoms. The house is in a grove of pecan trees.

Routon silt loam (Rt).—"Buckshot land" and "white land" are common names for this gray, poorly drained soil, which is in 50- to 500-acre tracts on the low, flat uplands in the eastern half of the county. A few 5- to 15-acre tracts are in flat depressions surrounded by rolling uplands. This soil developed in loess 20 to 50 feet thick. The main layers of a typical profile are—

0 to 18 inches, gray, very friable silt loam with many concretions ("buckshot").
18 to 48 inches, mottled gray and yellowish-brown silty clay loam; sticky and plastic when wet, hard when dry; many concretions ("buckshot").
48 to 72 inches, gray, friable silt loam.

Routon silt loam is adjacent to Calloway, Waverly, and Dekoven soils. It is more poorly drained than Calloway soils; it has more clay than Waverly soils and is less acid. It is lighter colored than Dekoven soils.

The uppermost 18 inches is easily penetrated by roots, water, and air. The dense, poorly aerated subsoil restricts root growth and slows drainage. The slow drainage causes excessive wetness in winter and spring, and the shallow root zone causes droughtiness in summer. Generally, this soil is slightly acid or neutral, but in a few small areas it is strongly acid. Nearly all of it is flooded in winter and spring every 3 or 4 years, and some areas are flooded every year. After the excess water has drained away, this soil is easy to work.

Soybeans, pasture, and trees are grown on Routon silt loam. Poor drainage and the shallow root zone limit the selection of crops. The best suited crops are soybeans, sorghum, and other shallow-rooted annuals that can be planted late (fig. 15), and tall fescue, white clover, or similar pasture plants that can stand wetness in winter and spring. (Capability unit IIIw–3; woodland group 10; wildlife group 7)

Figure 15.—**Soybeans on Routon silt loam. Soybeans and other shallow-rooted annuals that can be planted late are suited to this gray, poorly drained soil.**

Sharkey clay (Sa).—"Gumbo" is a common name for this nearly black soil, which is in 20- to 1,000-acre tracts on low, broad flats of the Mississippi River bottoms. The soil consists of at least 30 inches of nearly black or dark-gray clay that was deposited by ponded water from the Mississippi River. This layer of clay is generally 4 to 6 feet thick and is underlain by sediment ranging from silty clay loam to sand in texture. The main layers of a typical profile are—

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0 to 12 inches, nearly black clay; very sticky and very plastic when wet, hard and cloddy when dry.
12 to 60 inches, dark-gray clay; plastic and sticky.

Sharkey clay is commonly adjacent to Tunica, Bowdre, and Alligator soils. It is in thicker beds of clay than Tunica and Bowdre soils, and its darker colored subsoil is less acid than that of Alligator soils.

This soil is flooded for several days every winter and spring. Most areas dry out early enough for planting, but some remain wet and sitcky well into summer. The poorly aerated clay subsoil restricts root growth and the movement of water and air. This soil has poor tilth and is hard to work. It breaks into clods that slack or crumble when they get wet. It swells when wet and shrinks when dry. When it dries, a network of cracks forms. These cracks are 1 to 2 inches wide and extend down 2 to 3 feet into the soil (fig. 16). Sharkey clay is neutral and has moderately high natural fertility. It does not need lime. Crops respond poorly to fertilizer, except nitrogen.

Soybeans, pasture, and trees are grown on Sharkey clay. Flooding, poor drainage, and the clayey texture limit the selection of crops. The best suited crops are row crops that can be planted late, such as soybeans, and pasture or hay crops that tolerate wetness in winter and spring, such as tall fescue and white clover. Because of the cloddy nature of this soil, chemical preemergence sprays generally are not effective in controlling weeds. (Capability unit IIIw–2; woodland group 2; wildlife group 5)

Sharkey silty clay loam (Sh).—This black, poorly drained, clayey soil is in flat depressions on the Mississippi River bottoms. The top 7 to 12 inches is black silty clay loam that is sticky when wet. It is underlain by dark-

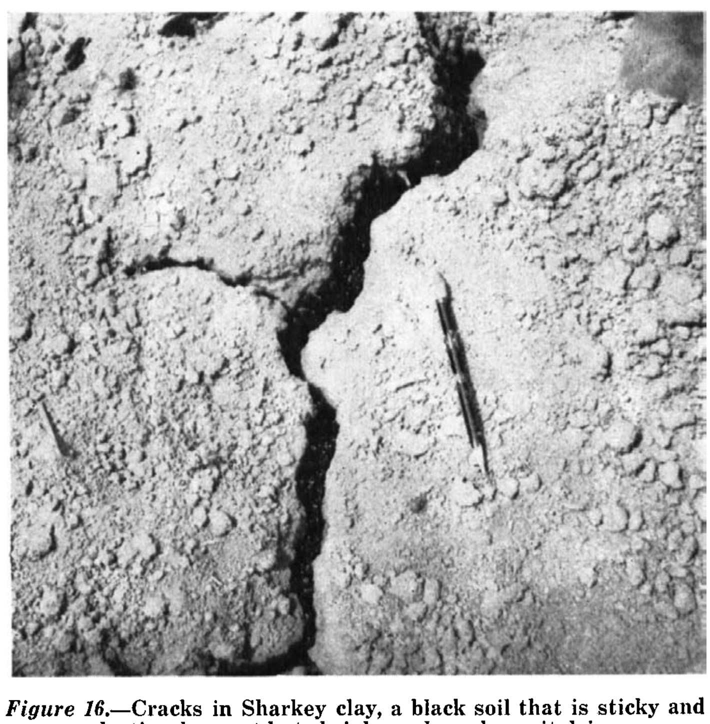

Figure 16.—**Cracks in Sharkey clay, a black soil that is sticky and plastic when wet but shrinks and cracks as it dries.**

gray, very sticky clay that extends to a depth of 4 to 6 feet. The main layers of a typical profile are—

0 to 12 inches, black silty clay loam; sticky and plastic when wet.
12 to 48 inches, dark-gray clay mottled with shades of brown; very sticky and very plastic when wet.

The poorly aerated clay subsoil restricts the growth of roots and the movement of water and air. Because of the limited root zone, this soil is slightly droughty at times, even though it has high available water capacity. It is flooded every 3 or 4 years in winter and spring; some areas are flooded every winter. The clayey texture makes this soil difficult to work and to keep in good tilth, except under ideal moisture conditions. Even when this soil is not flooded, it is wet and sticky in winter and early in spring. It swells when wet and shrinks when dry, thus forming a network of cracks that are about 1 inch wide and extend about 2 feet down into the dry soil.

Sharkey silty clay loam has moderately high natural fertility. It is neutral and does not require lime. Crops, except those that need nitrogen, respond only slightly to fertilizer.

Poor drainage, flooding, and clayey texture limit the selection of crops. Soybeans are the main crop. Other annuals that can be planted late, and pasture or hay crops that tolerate wetness in winter and spring, are also suited. (Capability unit IIIw–2; woodland group 2; wildlife group 5)

Swamp (Sw).—This mapping unit is in depressions that hold 1 to 3 feet of standing water most of the year. Ordinarily these areas are wet and soggy but do not hold water late in summer and in fall. In some years, however, they hold water the year round.

Swamp is in 15- to 400-acre tracts on bottom lands along the Obion, Forked Deer, and Mississippi Rivers. The soil material is gray and black silt loam to clay. The tracts are conspicuous because cypress trees are growing on them (fig. 17). The areas are too wet for most other plants, but they are choice spots for duck hunting. (Capability unit VIIw–1; woodland group 5; wildlife group 8)

Tunica clay (Tc).—This soil is in 20- to 1,000-acre tracts on broad, flat bottoms of the Mississippi River. It consists of 20 to 30 inches of nearly black clay that is underlain by loamy sediment. The clay was deposited by ponded water from the Mississippi River. The main layers of a typical profile are—

0 to 24 inches, nearly black clay mottled with various shades of brown and gray; very sticky and very plastic when wet, hard when dry.
24 to 60 inches, brown, friable fine sandy loam, loam, or silt loam (or layers of all three) mottled with gray.

In some places the material below a depth of 2 feet is loamy sand or sand.

Tunica clay is alongside Bowdre and Sharkey soils. It is in thicker beds of clay than Bowdre soils and in thinner ones than Sharkey soils.

This poorly aerated soil restricts root growth and the movement of water and air. It has poor tilth, and it is hard to work unless moisture conditions are nearly ideal. It breaks into clods that swell and crumble or slack when they get wet. It shrinks when dry and swells when wet. Consequently, when the soil is dry, cracks 1 to 2 inches wide extend down through the clay layer.

The available water capacity is high, but the soil, nevertheless, is somewhat droughty at times because the root zone is shallow. This soil is flooded 2 or 3 weeks in winter or spring every 4 or 5 years, and some areas are flooded more frequently. Even when it is not flooded, the soil is wet and sticky in winter and early in spring. It is moderately high in natural fertility. It is neutral and does not require lime. Crops, except those that need nitrogen, respond poorly to fertilizer.

Soybeans are grown on most of the area. A few areas are wooded. Flooding, wetness in winter and spring, and the clay texture limit the selection of crops. The best suited crops are row crops that can be planted late and pasture or hay crops that tolerate wetness in winter and spring. Cotton will grow well where the soil dries out early enough for planting. Because of the cloddy nature of this soil, chemical preemergence sprays are generally not effective in controlling weeds. (Capability unit IIIw–2; woodland group 2; wildlife group 5)

Wakeland silt loam (Wa).—This is a flat, silty soil on first bottoms. It consists of 2 to 4 feet of silt loam that was washed from the nearby steep loess hills. The silt loam was spread over the outer edge of the bottoms of the Mississippi, Forked Deer, and Obion Rivers. The top 12 to 15 inches is grayish-brown, very friable silt loam. It is underlain by a layer of mottled gray and brown, friable silt loam that extends to a depth of about 4 feet. Below this the texture varies considerably but commonly is silty clay loam. The main layers of a typical profile are—

0 to 12 inches, dark grayish-brown, very friable silt loam.
12 to 24 inches, mottled dark grayish-brown and gray, friable silt loam.
24 to 48 inches, gray, friable silt loam.

Wakeland silt loam is adjacent to Adler and Birds soils. It is not so well drained as Adler soils, nor is it so poorly drained as Birds soils.

Because of its location, this soil is excessively wet in winter and early in spring. It generally dries out in spring. After it dries out it is easy to work and to keep in good tilth. In about 1 year in 5, the lowest areas are wet until fairly late in spring. The available water capacity is very high, so plants have a good supply of moisture.

Figure 17.—**Cypress trees in standing water on Swamp, a land type that is covered with a few inches to a few feet of water most of the year.**

This soil is neutral and has high natural fertility. It does not need lime, and it is well supplied with phosphorus.

Soybeans, cotton, corn, and some vegetables are grown. If drained by means of open ditches or tile, this soil can produce good yields of many crops. It can be used for a row crop every year. (Capability unit IIw–1; woodland group 4; wildlife group 6)

Waverly silt loam (Ws).—This flat, poorly drained, silty soil is in 10- to 1,000-acre tracts on broad first bottoms in the eastern half of the county. It consists of silt loam that washed from the nearby rolling loess uplands. The main layers of a typical profile are—

0 to 8 inches, dark grayish-brown, friable silt loam with a few gray mottles.
8 to 72 inches, gray, friable silt loam with yellowish-brown mottles.

In a few areas the material at a depth of about 2 feet is black silty clay loam.

Waverly silt loam is more poorly drained than Falaya soils. It is lighter colored and more acid than Dekoven soils.

During winter and spring, the water table seldom drops more than a foot below the surface, and water stands on the surface in low spots. This soil is flooded every winter or spring. It is easy to work after it dries out. Since it dries out rather late in spring and has a high available water capacity, it provides ample moisture to plants throughout the summer. Roots can easily penetrate this soil after the excess water has drained away. This soil is medium acid or strongly acid and moderate in natural fertility. Crops respond well to lime and fertilizer.

Soybeans and pasture are grown on this soil. Some small tracts are wooded. The best suited crops are soybeans or other annual crops that can be planted late, and tall fescue or similar pasture plants that tolerate wetness in winter and spring. (Capability unit IIIw–3; woodland group 9; wildlife group 6)

Waverly silt loam, low (Wv).—This soil is in long, wide, continuous strips on the lowest part of the bottoms along the crooked Obion and Forked Deer Rivers. The strips are up to 2,000 acres in size. This soil, which is poorly drained or very poorly drained, is gray, friable silt loam to a depth of 6 feet or more. In a few small areas, most of which are next to the river channels, it has layers of fine sandy loam.

This soil is flooded all winter and spring. Two or three floods during the summer are common in wet years. This soil is strongly acid or medium acid and has moderately high natural fertility. It seldom dries out enough to be worked.

Water-tolerant trees grow on practically all of this soil. Prolonged wetness and severe flooding keep pasture and row crops from growing. (Capability unit VIIw–1; woodland group 5; wildlife group 8)

Use of the Soils for Crops and Pasture

This section has several parts. The first explains the capability classification. Then management of groups of soils, the capability units, is described. Next the estimated yields of the principal crops under two levels of management are given, along with a discussion of practices for managing the soils.

Capability Groups of Soils

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

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

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion; *w* means that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the 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 limit 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 for making many statements about management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe–1 or IIIe–2.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations; but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

The eight classes in the capability system and the subclasses and units in this county are described in the list that follows.

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

Unit I–1.—Well drained and nearly well drained, level soils on bottom lands and low 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.

Unit IIe-1.—Deep, well-drained, gently sloping, medium-textured soils.

Unit IIe-2.—Moderately well drained, gently sloping soils that have a fragipan at a depth of about 2 feet.

Subclass IIw.—Soils that have moderate limitations because of excess water.

Unit IIw-1.—Moderately well drained and somewhat poorly drained, nearly level soils on bottom lands and low terraces.

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

Subclass IIIe.—Soils subject to severe erosion if they are cultivated and not protected.

Unit IIIe-1.—Deep, gently sloping soils that are well drained and nearly well drained.

Unit IIIe-2.—Gently sloping and sloping, moderately well drained soils that have a fragipan at a depth of about 2 feet.

Subclass IIIw.—Soils that have severe limitations because of excess water.

Unit IIIw-1.—Somewhat poorly drained soils that have a fragipan at a depth of about 2 feet.

Unit IIIw-2.—Poorly drained to moderately well drained, nearly level, clayey soils.

Unit IIIw-3.—Poorly drained, nearly level soils.

Subclass IIIs.—Soils that are severely limited by low moisture capacity.

Unit IIIs-1.—Level and gently sloping, very sandy soils.

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 are not protected.

Unit IVe-1.—Well drained and nearly well drained, medium-textured, sloping and strongly sloping soils.

Unit IVe-2.—Moderately well drained, sloping and strongly sloping soils that have a fragipan near the surface.

Class V.—Soils that have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover. (None in Dyer County.)

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

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

Unit VIe-1.—Deep, strongly sloping to steep, well drained and nearly well drained, silty soils.

Unit VIe-2.—Moderately well drained, strongly sloping soils that have a fragipan near the surface.

Class VII.—Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIe.—Soils and landforms that are severely limited, chiefly by risk of erosion if a protective cover is not maintained.

Unit VIIe-1.—Steep, silty soils.

Unit VIIe-2.—Sloping to steep soils that have many shallow to deep gullies.

Subclass VIIw.—Soils that are very severely limited by excess water.

Unit VIIw-1.—Soils under shallow standing water most of the year.

Class VIII.—Soils and landforms that have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply, or esthetic purposes. (None in Dyer County.)

Management by Capability Units

Soils in one capability unit have about the same limitations. They are suited to the same kinds of crops and can produce about the same yields. The soils in one unit, therefore, need about the same kind of management, though they may have formed from different kinds of parent materials and in different ways. The capability units are described in the following pages. The soils in each unit are listed, and management suitable for the soils of each unit is suggested.

Capability unit I-1

In this unit are brown, loamy soils on bottom lands and low terraces. These soils are well drained and nearly well drained, and they have a high or a very high available water capacity. Slopes are mostly between 0 and 2 percent, but in a few places they are slightly more than 2 percent. The soils in this unit are—

Adler slit loam.
Bosket sandy loam.
Bosket silt loam.
Collins silt loam.
Dubbs silt loam.
Morganfield silt loam.
Robinsonville fine sandy loam.
Robinsonville loam.

These soils are strongly acid to mildly alkaline, and they have moderate or high natural fertility. They are easy to work. Plant roots can penetrate the friable subsoil to a depth of 4 feet or more. Some areas are flooded occasionally in winter and spring. Along the smaller streams, floodwater stands only a few hours, but next to the Mississippi River it stands for several days.

The soils in this unit are among the most productive in the county. They are easy to manage because of the nearly level slopes and good internal drainage, and they can produce row crops every year. All the commonly grown crops and pasture plants are suited, and yields are high. The large amounts of plant roots and stalks that are produced help to maintain the organic-matter content and to keep the soil in good tilth.

Floodwater or water from the nearby hills is the only limitation. Excess water can be removed by small drainage ditches, except along the major rivers. Floodwater does not prevent the growing of crops, but occasionally it delays planting in some areas along the Mississippi River.

Johnsongrass, the seed of which is spread by floodwater, is a problem near the Mississippi.

Capability unit IIe-1

The soils in this unit are silty and well drained. Their plow layer is friable silt loam, and their subsoil is friable silt loam or silty clay loam. Plant roots penetrate to a depth of 4 feet or more. The soils are—

Loring silt loam, 2 to 5 percent slopes.
Memphis silt loam, 2 to 5 percent slopes.

These soils have a high available water capacity. They are moderately high in natural fertility and are medium acid or strongly acid. They are easy to work. Crops on these soils respond well to management.

These soils are among the most productive in the county. If adequately fertilized and otherwise well managed, they produce good yields of corn, cotton, soybeans, lespedeza, alfalfa (fig. 18), white clover, tall fescue, orchardgrass, and all other crops suited to the climate.

Control of erosion is the main problem. Even though the slope is gentle, some washing occurs when these soils are cultivated. Thus, these soils should not be cultivated every year. They can be conserved and kept productive by means of a suitable cropping system, adequate fertilization, and water-control practices. A row crop can be grown every other year, or 2 years of a row crop can be followed by 2 years of a close-growing crop. Any of the commonly grown row crops and close-growing hay and pasture crops can be used in these cropping systems. Stripcropping or farming on the contour in a system of terraces will reduce runoff, conserve water, and increase yields. The slopes are well suited to contouring, terracing, and stripcropping. The response to fertilizer is good enough to justify heavy applications.

If well fertilized and well managed these soils produce high yields. The high-yielding crops provide a good vegetative cover, which helps control runoff and conserve water, and a large amount of crop residue, which helps to maintain organic-matter content and to keep the soil in good tilth.

Capability unit IIe-2

Grenada silt loam, 2 to 5 percent slopes, is the only soil in this unit. It has a fragipan at a depth of about 2 feet.

***Figure 18.*—Alfalfa on Loring and Memphis soils in capability unit IIe-1. These soils are suited to many crops.**

Above the fragipan, the soil is silty and easily penetrated by roots, air, and water. Water moves slowly through the fragipan, and as a result the 6 to 8 inches just above the fragipan is waterlogged during wet seasons. Most roots are restricted to the uppermost 18 to 24 inches.

This soil is medium acid or strongly acid and moderately low in natural fertility. Crops respond fairly well or well to fertilizer. The soil is easy to work. Because of the fairly shallow root zone, it is slightly droughty in summer.

If adequately fertilized and otherwise well managed, this soil can produce fair to good yields of nearly all the crops commonly grown. Cotton, soybeans, and small grain grow well. Tall fescue, white clover, lespedeza, and orchardgrass are good for hay or pasture. Corn yields are fair in most years, but they vary considerably from year to year, according to summer rainfall. Alfalfa stands ordinarily do not last more than 2 years, because of seasonal wetness in the lower subsoil and the limited root zone.

The principal limitation is seasonal waterlogging caused by the fragipan. This limitation can be partly overcome by selecting plants that can stand excess water in winter and spring and are not heavy users of water in summer. A less serious limitation is erosion caused by runoff resulting from the gentle slope and restricted internal drainage. Runoff can be reduced and erosion controlled by means of suitable cropping systems, adequate fertilization, and water-control practices.

This soil is not suitable for cultivation every year, but it can be cultivated 1 out of 2 years. Two years of row crops—cotton or soybeans, for example—and 2 years of grass and legumes is a suitable cropping system. A winter cover crop should be planted after each row crop. Contouring is feasible and is effective in controlling erosion. Terracing or stripcropping also helps to reduce the erosion hazard.

Fertilizer, applied according to the results of soil tests, increases yields and profits and also ensures a better vegetative cover and thereby helps to reduce runoff and evaporation. The end result is more water for growing plants. Turning under stalks and stubble of high-yielding crops, a practice that helps to maintain the organic-matter content and to preserve good tilth, will make these soils more productive.

Capability unit IIw-1

The soils in this unit are on nearly level first and second bottoms. Their surface layer is loamy and easy to work. Their subsoil, which ranges from sandy loam to silty clay loam in texture, is mottled brown and gray as a result of waterlogging. Most areas are flooded in winter and spring. Floodwater remains a few hours in the higher areas and several days in the lower areas. The water table is within 1 or 2 feet of the surface most of the winter. It drops to 5 feet or more below the surface during the drier part of the year. The soils in this unit are—

Commerce loam.
Commerce silty clay loam.
Dekoven silt loam.
Dekoven silt loam, overwash.
Dundee clay loam.
Dundee loam.
Dundee silt loam.
Falaya silt loam.
Wakeland silt loam.

These soils have moderate to high natural fertility. The Dundee and Falaya soils generally need lime, but the other soils do not. Lime and fertilizer requirements should be determined by soil tests to ensure that proper amounts are applied. All of these soils have a very high available water capacity, and all are easy to work after they dry out. Crops respond well to management.

These are excellent soils for soybeans, tall fescue, white clover, and lespedeza. Also, they produce high yields of summer pasture because they have enough moisture for plant growth even in the dry part of the summer. Corn grows well, but it must be planted slightly later on these soils than on better drained soils. Yields of cotton are high in years of average rainfall, but yields are low about once in 5 years when the soils, especially those on the Mississippi River bottoms, remain wet until late in spring. In some years, replanting or shifting to other crops is necessary. A small grain can be grown if surface drainage is good and flooding is not severe. Most of these soils are too wet for alfalfa, and even though they produce high yields of pasture, they are too wet and too soft for grazing during much of winter and early in spring.

Excess water is the main limitation. This limitation can be overcome partly by using a system of drainage ditches to remove the excess water and partly by selecting crops that are least likely to be damaged by the wetness in winter and spring. These soils can be row cropped every year because they are nearly level and erosion is no problem, but their good physical condition must be maintained. Incorporating large amounts of plant residue into the soil will help to maintain the organic-matter content and to preserve good tilth. Proper fertilization helps to produce high-yielding crops that return large amounts of residue, in the form of stalks and roots, to the soil.

Capability unit IIIe-1

In this unit are well drained and nearly well drained, silty soils on gently rolling uplands. Their plow layer is friable silt loam that is easy to work. Their subsoil is friable silt loam or silty clay loam that is well aerated and easily penetrated by plant roots. The root zone extends to a depth of 5 feet or more. The soils in this unit are—

Loring silt loam, 2 to 5 percent slopes, severely eroded.
Loring silt loam, 5 to 8 percent slopes, severely eroded.
Memphis silt loam, 2 to 5 percent slopes, severely eroded.
Memphis silt loam, 5 to 8 percent slopes.
Memphis silt loam, 5 to 8 percent slopes, severely eroded.

These soils have a high available water capacity. They are moderately high in natural fertility and are medium acid or strongly acid. Crops respond well to management.

If these soils are well fertilized and otherwise well managed, they can produce good yields of many crops, including corn, cotton, small grain, lespedeza, red clover, white clover, alfalfa, orchardgrass, and tall fescue. They are productive of pasture, and since they do not become wet or soft, they can be grazed during winter and spring.

Control of erosion is the main management problem. These soils are silty and erode rather easily when cultivated. Runoff and erosion can be controlled by means of a suitable cropping system, adequate fertilization, and water-control practices.

If these soils are farmed on the contour, a suitable cropping system is 1 year of a row crop, 1 year of a small grain, and then 3 or 4 years of grass and legumes for hay or pasture. If stripcropping is used, a suitable cropping system is 1 year of a row crop and 2 years of grass and legumes grown for hay and pasture. Terracing is especially helpful in controlling erosion, because these soils are on long slopes.

Proper fertilization helps to increase yields and to ensure large amounts of residue. The residue provides protection against erosion and, when returned to the soil, helps to maintain the organic-matter content and to preserve good tilth.

Capability unit IIIe-2

Grenada silt loam, 2 to 5 percent slopes, severely eroded, is the only soil in this unit. It has a fragipan that begins about 12 to 20 inches below the surface. This soil is mostly on gentle slopes but is severely eroded. Above the fragipan, it consists of brown or yellowish-brown, friable silt loam that is easily worked and easily penetrated by plant roots, water, and air. The poorly aerated fragipan restricts drainage and limits the growth of roots to the uppermost 12 to 20 inches.

This soil is strongly acid or medium acid and moderately low in natural fertility. Because of the fairly shallow root zone, it is droughty in summer. Crops respond fairly well to management.

This soil, even with proper fertilization, can produce only fair yields of most of the commonly grown crops. Tall fescue, white clover, annual lespedeza, sericea lespedeza, and orchardgrass are good for hay and pasture. Cotton and soybeans are fairly well suited, but corn and alfalfa are poorly suited. Alfalfa stands ordinarily become infested with weeds and die after 1 or 2 years.

The severe erosion has resulted in a fairly shallow zone for root growth and water storage and, consequently, in greater runoff and more difficulty in controlling erosion. Erosion can be controlled with a suitable cropping system, proper fertilization, and water-control practices, including terracing, stripcropping, and contour farming.

A suitable cropping system consists of 1 year of a row crop, planted on the contour, followed by 2 years of grass and legumes for hay or pasture. Two years of cotton or soybeans, planted on the contour, followed by 6 years of grass and legumes is also suitable.

Proper fertilization increases yields and produces more stalks and roots, which protect the soil, supply organic matter, and help to preserve good tilth.

Capability unit IIIw-1

Calloway silt loam is the only soil in this unit. It is a pale-colored soil, and it has a fragipan that begins about 2 feet below the surface. It is on low, broad, flats. Slopes are generally less than 2 percent.

The 8-inch plow layer is pale-colored, friable silt loam. The subsoil is mottled yellowish-brown and gray, friable silt loam in the upper part and dense silty clay loam or silt loam in the fragipan. The subsoil is poorly aerated and slowly permeable to air and water. It restricts the growth of roots. The strong mottling and gray color indicate that it is saturated part of the year.

Rainfall and runoff from higher areas collect and drain away slowly. Thus, in winter and spring this soil is excessively wet and even ponded in spots, but it is somewhat droughty in summer because of the shallow root zone. It is strongly acid or medium acid and low in natural fertility. When not too wet, it is easy to work. The response of crops to management is fair to good.

This soil is suitable for soybeans, grain sorghum, white clover, tall fescue, and other crops that tolerate wetness in winter and spring. It produces fair to good yields of lespedeza but only fair yields of corn. Cotton grows well in some years, but because the soil is slow to dry out in spring, the probability of a near failure is high. Small grain grows fairly well where water does not stand on the surface. Deep-rooted legumes, such as alfalfa, are poorly suited.

Wetness in winter and spring is the main limitation. It can be overcome partly by selecting crops that tolerate wetness and partly by using open ditches to remove surface water from pockets and low areas. Tile drainage probably will not be effective, because of slow internal water movement.

Growing a row crop every year probably will not damage this soil, because it is nearly level and is not likely to erode. If a row crop is grown every year, large amounts of fertilizer should be applied and the stalks and stubble should be plowed under to supply organic matter and to help preserve good tilth.

Capability unit IIIw-2

The soils in this unit are on bottom lands of the Mississippi River. Drainage is poor to fairly good. Some areas are flooded for several days each winter. The soils are—

Alligator clay.
Alligator-Crevasse complex.
Bowdre clay.
Bowdre clay, coarse subsoil.
Sharkey clay.
Sharkey silty clay loam.
Tunica clay.

The uppermost 8 to 20 inches consists of dark-colored clay. The material below a depth of 20 inches is variable. It ranges from light-colored sand, as in Bowdre clay, coarse subsoil, to dark-gray or black clay, as in the Sharkey soils, but in most of the soils it is loamy.

The clayey plow layer of these soils is sticky when wet and hard and cloddy when dry. It can be worked only when the moisture content is right. A network of cracks about 1 inch wide and several inches deep forms during the dry summer.

The available water capacity is fairly high, and the moisture supply is generally sufficient for plant growth. Bowdre clay, coarse subsoil, is an exception; it is droughty. Natural fertility is fairly high. Lime generally is not needed. Crops respond well to management.

Annual crops and crops that tolerate wetness in winter and spring are best suited to these soils. Among these crops are soybeans, grain sorghum, white clover, tall fescue, and annual lespedeza. Good yields of cotton and alfalfa are produced on the higher, better drained sites, but alfalfa stands are killed by the floods that cover all of these soils about every 5 years. Because of the clayey plow layer, yields of corn are only medium or low. Bowdre clay, coarse subsoil, is limited in its use for crops by its droughty, infertile, very sandy subsoil.

Special knowledge acquired by experience is needed to farm these soils. Floods, standing water, and the sticky clay plow layer create management problems. Open ditches remove surface water satisfactorily during most of the growing season, but little can be done to prevent winter and spring floods. Tile drainage is unsatisfactory because of the clayey texture, which also makes tillage and preparation of a seedbed difficult. Most farmers prefer to plow or turn the soil late in fall or early in spring, when it is moist or even slightly wet. Freezing weather and rain then break down the large clods, and at planting time the soil can be harrowed into a fairly smooth seedbed.

Since erosion is not a problem, a row crop such as soybeans can be grown every year. Plowing under stalks and stubble helps to maintain the organic-matter content and to improve tilth.

Capability unit IIIw-3

Gray, wet soils make up this unit. Their surface layer is gray silt loam. Their subsoil is gray silt loam or silty clay loam. The gray color indicates that these soils are poorly aerated and that they are saturated for long periods during winter and spring. The poor aeration prevents roots from growing and developing properly. The soils in this unit are—

Birds silt loam.
Forestdale silt loam.
Forestdale-Crevasse complex.
Routon silt loam.
Waverly silt loam.

The Crevasse soils in the Forestdale-Crevasse complex are very sandy and droughty.

The soils in this unit are excessively wet during winter and spring. Most areas are flooded for several days every 3 or 4 years, and some are flooded every year. Planting in spring is delayed occasionally by the excess water, but seldom for long enough to reduce crop yields.

These soils are variable in natural fertility, and they range from neutral to very strongly acid. Therefore, the need for lime and fertilizer should be determined by soil tests.

Soybeans, sorghum, or other short-lived summer annuals that can be planted late (fig. 19) are the crops best suited to these poorly drained soils. Tall fescue and white clover grow well, but these soils are too wet and too soft for grazing during much of winter and spring. Cotton and corn are fairly well suited. They occasionally have to be planted late because the soils warm up slowly in spring.

Figure 19.—**Soybeans on Forestdale silt loam, one of the wet soils in capability unit IIIw-3. Most of the soils in this unit are used for soybeans.**

Wetness in winter and spring is a major limitation. It can be overcome partly by selecting plants that grow in summer or that tolerate wetness in winter and partly by using open ditches to remove some of the excess water. Little can be done to lower the seasonally high water table or to control flooding.

A row crop can be grown on these soils every year if adequate surface drainage is provided. Plowing under the stalks and stubble of adequately fertilized crops helps to maintain the organic-matter content and to improve tilth.

Capability unit IIIs-1

Very sandy, excessively drained soils make up this unit. These soils are on knolls and ridges that are scattered throughout the Mississippi River bottoms. Slopes are less than 2 percent. The plow layer is brownish loamy sand or sandy loam and is about 8 inches thick. The subsoil is light-colored, loose loamy sand or sand and ranges from 2 to 4 feet in thickness. The soils are—

Crevasse loamy sand.
Crevasse sandy loam.

These soils are droughty during summer because they have a low available water capacity. They can supply moisture to plants for only a few days after each rain. They are sometimes flooded for several days in winter and spring.

Natural fertility ranges from low in the loamy sand to moderate in the sandy loam. The areas next to the Mississippi River do not need lime; those east of the Obion River are strongly acid, and most crops there respond to applications of lime. Crops grown on the droughty loamy sand respond poorly to all fertilizers except nitrogen, which increases the growth of winter small grain and pasture. On the sandy loam, crops respond fairly well to fertilizers. Since water drains rapidly through these soils, they can be worked easily a few hours after a rain.

Small grain, pasture, and other crops that grow in winter and spring when moisture is plentiful are best suited to the loamy sand. Crevasse sandy loam produces moderate yields of summer crops such as soybeans, cotton, and alfalfa. Corn is poorly suited to both Crevasse loamy sand and Crevasse sandy loam. Once every 5 to 10 years a winter or spring flood kills the crops on these soils. When the flood recedes, the excess water quickly drains away without leaving pockets of standing water. Even if adequately fertilized, Crevasse loamy sand can produce only low yields of most crops, and Crevasse sandy loam only moderate yields.

Droughtiness is the main limitation. Selecting crops that grow in winter and spring when available moisture is plentiful partly overcomes this limitation. Plowing under stalks, stubble, and cover crops probably increases slightly the ability of these soils to store moisture for plants. Since erosion is not a problem, growing a row crop each year will not damage these soils.

Capability unit IVe-1

Well drained and nearly well drained, silty, upland soils make up this unit. The slope range is 8 to 12 percent. Erosion has removed nearly all of the original surface layer. The present plow layer consists of dark-brown, friable silt loam and is about 6 inches thick. It is easy to work. The subsoil is dark-brown, friable silty clay loam or silt loam. Plant roots can grow to a depth of 4 feet or more. The soils in this unit are—

Loring silt loam, 8 to 12 percent slopes, severely eroded.
Memphis silt loam, 8 to 12 percent slopes, severely eroded.

These soils are moderately high in natural fertility and are medium acid or strongly acid. The root zone is deep, and the available water capacity is high. Crops on these soils are especially responsive to good management.

These soils can produce good yields of many crops, if they are well fertilized and otherwise properly managed. Cotton, corn, soybeans, alfalfa, orchardgrass, red clover, white clover, tall fescue, and lespedeza are among the well-suited crops. These soils produce good pasture, and they can be grazed throughout the year because they are not wet and soft in winter.

Controlling erosion is the main management problem. Because of their silty nature and their slope, these soils erode easily when cultivated. Runoff and erosion can be controlled with a suitable cropping system, proper fertilization, and water-control practices, such as contour cultivation and stripcropping.

A suitable cropping system consists of a row crop one-fourth of the time and grass and legumes three-fourths of the time; for example, 2 years of a row crop followed by 6 years of grass and legumes.

Proper fertilization increases yields and promotes the growth of roots and stalks, which provide protection against erosion and help to improve tilth.

Capability unit IVe-2

Grenada silt loam, 5 to 8 percent slopes, severely eroded, is the only soil in this unit. It has a fragipan that begins between 12 and 20 inches below the surface. Above the fragipan is brown or yellowish-brown, friable silt loam that is easily penetrated by roots, water, and air. The poorly aerated fragipan is compact silty clay loam or silt loam. It restricts root growth and drainage. The root zone for most plants is the uppermost 12 to 20 inches.

Because of the fairly shallow root zone, this soil is droughty in the dry part of the summer. It is medium acid or strongly acid and has moderately low natural fertility. It is easy to work. Suitable crops respond well to lime and fertilizer.

Plants that have either shallow root systems or roots that can penetrate the fragipan are best suited to this soil. Hay and pasture plants that grow well include tall fescue, white clover, annual lespedeza, and sericea lespedeza. Cotton and soybeans are fairly well suited, but corn and alfalfa are poorly suited. After 1 or 2 years, alfalfa stands ordinarily become infested with weeds and thin out or die. Row crops grow only fairly well, even with adequate fertilization. Suitable grasses and legumes grow well. Since excess water drains away in a few hours, this soil can be grazed nearly all year.

The severe erosion has resulted in a fairly shallow zone for root growth and water storage and, consequently, in greater runoff and more difficulty in controlling erosion. Erosion can be controlled with a suitable cropping system, proper fertilization, and water-control practices, including terracing, stripcropping, and contour farming.

This soil is not suited to the production of a row crop each year. A suitable cropping system is 2 years of a row crop followed by 6 years of grass and legumes for hay and pasture.

Adequate applications of fertilizer increase yields and promote the growth of roots and stalks, which supply organic matter and help to keep the soil in good tilth.

Capability unit VIe-1

This unit consists of silty, well drained and nearly well drained soils of the uplands. The slope range is 12 to 30 percent. All of the original surface soil has been removed by erosion, and in some areas shallow gullies occupy about a third of the acreage. The soils in this unit are—

Loring silt loam, 12 to 20 percent slopes, severely eroded.
Loring-Gullied land complex, 12 to 20 percent slopes.
Memphis silt loam, 12 to 20 percent slopes, severely eroded.
Memphis silt loam, 20 to 30 percent slopes.
Memphis silt loam, 20 to 30 percent slopes, severely eroded.

The 4- to 6-inch plow layer of these soils is dark-brown, friable silt loam. The subsoil is also dark brown and friable, but it is silty clay loam or silt loam. It is well aerated, and plant roots penetrate it easily and grow to a depth of 4 feet or more. These soils are moderately high in natural fertility and are strongly acid to medium acid. They have high available water capacity, but the supply of water for plants is limited by rapid runoff. Pasture and hay crops respond well to lime and fertilizer. Except where small gullies have formed, these soils are easy to work.

Row crops are poorly suited to these soils because rapid runoff causes severe erosion. Pasture and hay crops, including tall fescue, white clover, red clover, orchardgrass, bermudagrass, and alfalfa, are best suited. Grazing is possible during winter because these soils do not get wet and soft.

Because they are silty and steep, these soils erode easily if not protected. Thus, controlling runoff, in order to control erosion, is the main management problem. Well-fertilized grasses and legumes make good hay and pasture and, if not overgrazed or mowed too closely, help to reduce runoff and limit erosion. A grass-legume mixture affords better protection than a legume grown alone.

Capability unit VIe-2

Grenada silt loam, 8 to 12 percent slopes, severely eroded, is the only soil in this unit. It has a fragipan beginning about 12 to 20 inches below the surface. All of the original surface layer has been removed by erosion. The soil above the fragipan is brown or yellowish-brown, friable silt loam. It is easily worked and easily penetrated by roots, air, and water. The dense fragipan is poorly aerated. It restricts root growth and slows drainage. The roots of most plants cannot penetrate the fragipan; they are restricted to the uppermost 12 to 20 inches.

Because of the fairly shallow root zone, this soil is droughty in the dry part of the summer. It is medium acid to strongly acid and is moderately low in natural fertility. Suitable grasses and legumes respond well to lime and fertilizer. Pasture and hay plants are easily mowed.

Grasses and legumes that have either shallow root systems or roots that can penetrate the fragipan are best suited to this soil. Among the grasses and legumes that grow well are tall fescue, white clover, sericea lespedeza, and annual lespedeza. Deep-rooted perennials such as alfalfa are poorly suited. They ordinarily become infested with weeds and die after 1 or 2 years. Row crops are poorly suited because this soil erodes very easily. This soil can be grazed during most of the winter, because excess water drains away quickly.

Because of the slopes and the compact subsoil, this soil is difficult to manage. If properly fertilized, the suitable grasses and legumes make good hay and pasture. They also help to reduce runoff and to protect the soil from erosion, if they are not overgrazed or mowed too closely.

Capability unit VIIe-1

In this unit are silty, well-drained, upland soils that have slopes of 20 to 50 percent. The steepest slopes are wooded and have a surface layer of dark, organic-stained silt loam. Some areas are severely eroded. About two-thirds of the severely eroded acreage has a plow layer of dark-brown, very friable silt loam; the rest is badly scarred with shallow gullies. These soils have a subsoil of dark-brown, friable, silt loam. They have an unlimited root zone. The soils are—

Memphis silt loam, 30 to 50 percent slopes.
Memphis-Gullied land complex, 20 to 30 percent slopes.

These soils have a high available water capacity, but rapid runoff limits their ability to retain water for plants. They are medium acid or strongly acid and are moderately high in natural fertility.

These soils are best used for trees. The steep slopes and rough, uneven surface make the operation of farm machinery difficult.

Capability unit VIIe-2

Gullied land makes up this unit. It consists of soils that have been very severely damaged by gully erosion. In some areas gullies form a network of narrow drainageways that covers about three-fourths of the surface. In other areas there are large, deep, caving gullies that have nearly vertical sides. Most of these gullies are on steep hills, but the slope range is 12 to 50 percent. In the remaining areas the surface layer is mostly brown or dark-brown, friable silt loam or silty clay loam that is moderately high in natural fertility and slightly acid to strongly acid. In a few small areas the surface layer is dark-colored, clayey soil material.

This land type is best used for trees, though all kinds of trees grow slowly on it. Black locust comes in naturally in some areas.

Stabilizing the gullies is a major problem. Vegetation alone does not provide enough protection, especially in the deep, caving gullies. Water has to be diverted from the deep, caving gullies before trees can grow. Reclamation of the deep gullies is generally not practical, because of the great expense of moving a large volume of soil material. Some of the smaller gullies can be filled with surrounding soil material. Reclaimed areas are good for pasture, and the milder slopes can be row cropped occasionally.

Capability unit VIIw-1

Wet, gray soils on first bottoms make up this unit. These soils are along the Obion and Forked Deer Rivers and in segments of old channels of the Mississippi River. Many of the areas hold water nearly all year and are conspicuous because they are covered with cypress trees.

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Other areas are flooded all winter and spring but dry out during summer. In a wet year, however, they are flooded several times during summer.

The soils in this unit are—

Swamp.
Waverly silt loam, low.

Trees that tolerate wetness are suited to these soils. The wetter areas are limited to the production of cypress trees. These areas are attractive to waterfowl. The better drained spots—those not ponded during summer—are suitable for growing feed for waterfowl.

Flooding and standing water are the main limitations. Individual farmers can do little to prevent flooding or to remove standing water. Practically all of these areas are wooded. A sound harvesting program is the main requirement for good woodland management. To develop areas for waterfowl hunting, levees are needed to ensure an abundant supply of water.

Estimated Yields

Table 3 gives the estimated average acre yields of the main field and pasture crops grown in the county. It gives yields for each soil under two levels of management. Columns A give yields based on management that is common in Dyer County. Under common management, several but not all elements of high-level management are used. Columns B give the yields to be expected under high-level, or improved, management.

The figures in table 3 represent averages for the 10-year period that ended in 1962. They are based on data obtained through experiments and on information from farmers and agricultural workers who have had experience with crops and soils in Dyer County.

Gullied land, Made land, Gravel pits, Levees and borrow pits, and Swamp are not included in table 3. These land types generally are not suited to crops or pasture without extensive engineering work, and yields would depend on the nature of the soil material and on its location.

The system of management under which the yields in columns B can be expected includes the following general practices, which are applicable whatever crop is grown.

1. Selection of crops and cropping systems suited to the soil.
2. Application of fertilizer and lime in accordance with needs indicated by chemical tests and by past cropping and fertilizing practices.
3. Use of soil-conserving cropping systems like those suggested in the section "Management by Capability Units."
4. Adequate seedbed preparation.
5. Use of crop varieties that are high yielding and suited to the area.
6. Use of suitable methods in planting or seeding, use of proper rate of seeding, and planting of seed at the right time.
7. Inoculation of legumes.
8. Shallow cultivation of row crops.
9. Control of weeds, insects, and diseases.
10. Water management:
    (a) Surface drainage on the bottom lands and poorly drained uplands.
    (b) Contour cultivation and terracing or stripcropping on the uplands.
    (c) Sodding of waterways where needed.
11. Suitable harvesting methods.

The defined system of management for yields in columns B also includes specific practices for each of the crops listed in table 3.

Corn.—Three sets of practices are given for three different levels of estimated productivity.

1. Soils that yield 80 bushels or more per acre are excellent soils for corn. Practices upon which estimates are based are—
   a. Planting for a stand of about 16,000 plants per acre.
   b. Applying about 120 pounds of nitrogen per acre.
2. Soils that yield 60 to 80 bushels per acre are good soils for corn. Practices upon which estimates are based are—
   a. Planting for a stand of about 12,000 plants per acre.
   b. Applying 90 pounds of nitrogen per acre.
3. Soils that yield 40 to 60 bushels per acre are fair soils for corn. Practices upon which estimates are based are—
   a. Planting for a stand of about 8,000 plants per acre.
   b. Applying about 60 pounds of nitrogen per acre.

Soils that have an estimated potential yield of less than 40 bushels per acre under good management are poorly suited to corn and can be used more profitably for other crops.

To estimate the yield of corn silage, assume that plants yielding 5 bushels of corn will yield about 1 ton of silage. For example, a soil that yields 100 bushels per acre would produce approximately 20 tons of silage per acre. The number of plants and the rates of fertilization per acre are the same for silage as for corn grown for grain.

Cotton.—Practices on which the estimated yields are based are—

1. Spacing rows about 38 to 40 inches apart. Thinning the number of plants to between 20,000 and 60,000 per acre, without skips.
2. Applying about 70 pounds of nitrogen per acre on upland soils and 90 pounds per acre on bottom-land soils.

Soils that yield less than about 1 bale per acre are poorly suited to cotton and can be used to better advantage for other crops.

Soybeans.—No specific management practices are assumed.

Alfalfa.—Management practices on which the estimates are based are—

1. Applying up to 15 pounds of nitrogen and 20 pounds of borax at seeding time. Applying annually, after the first year, 20 pounds of borax, and phosphate and potash in amounts determined by soil tests.
2. Controlling grazing and cutting hay at the proper time and to the right stubble height. No cutting of hay from about September 10 to the date of the first killing frost.

Wheat.—Management practices on which the estimates for wheat are based are—

1. Applying 20 to 30 pounds of nitrogen at seeding time in the fall and 30 pounds per acre as a top-dressing in spring.

Lespedeza.—The estimates are for lespedeza seeded in spring on a prepared seedbed or for volunteer stands.

Lespedeza overseeded on small grain harvested for grain will yield about half as much as lespedeza seeded alone. The overseeding method may be expected to result in nearly complete failure of the lespedeza 1 year out of every 2 or 3 years. When the small grain is harvested for hay, the lespedeza yield can usually be expected to be about 80 percent as much as the yield of lespedeza seeded alone.

Pasture.—The practices on which the estimated yields for pasture are based are—

1. Applying about 30 ponds of nitrogen at seeding time.
2. Applying up to 30 pounds of nitrogen annually, late in February, if the mixture is less than 30 percent clover.
3. Applying phosphate and potash annually after the first year.
4. Protecting pastures from overgrazing.

The estimated yields are for mixtures of orchardgrass and white clover or of tall fescue and white clover. The better drained soils are about equally well suited to either mixture and produce nearly the same yield of either. The poorly drained and somewhat poorly drained soils are better suited to the mixture of tall fescue and white clover.

Vegetables.—Table 4 gives the estimated average yields per acre of the principal vegetable crops grown in the county. It gives yields only for the soils on which these crops are commonly grown. Vegetable production is highly specialized farming and requires high-level management. Nearly all vegetable farmers use all the known elements of high-level management, except irrigation, and the yields in table 4 are those to be expected under high-level management.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*

[Estimates are based on average rainfall over a long period of time, without irrigation. Yields in columns A are to be expected under common or average management, and those in columns B under improved management. Absence of yield indicates crop is not suited to the soil or is not commonly grown on it]

Soil	Corn		Cotton		Soybeans		Alfalfa		Wheat		Lespedeza		Pasture [1]	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Adler silt loam	65	100	675	800	28	40	2.5	3.8	30	40	1.4	1.9	150	200
Alligator clay	25	35	300	400	20	28	----	----	----	----	.6	1.0	85	125
Alligator-Crevasse complex	----	----	200	300	15	20	----	----	----	----	.4	.8	70	105
Birds silt loam	45	65	375	575	25	35	----	----	----	----	.9	1.5	95	140
Bosket sandy loam	50	75	475	675	20	30	2.7	3.4	27	40	1.2	1.7	110	160
Bosket silt loam	60	80	550	750	25	35	2.7	3.4	27	40	1.2	1.7	125	175
Bowdre clay	35	55	400	600	25	35	----	----	21	27	1.0	1.4	90	150
Bowdre clay, coarse subsoil	----	----	----	----	----	----	----	----	----	----	----	----	55	80
Calloway silt loam	40	60	420	550	20	32	----	----	21	30	.8	1.2	105	150
Collins silt loam	65	100	625	800	28	40	2.2	3.0	23	34	1.4	1.9	145	200
Commerce loam	60	90	600	750	28	40	2.2	3.0	21	32	1.2	1.8	140	195
Commerce silty clay loam	50	80	450	650	26	40	2.0	2.8	21	32	1.2	1.7	135	185
Crevasse loamy sand	----	----	----	----	----	----	----	----	18	27	----	----	35	45
Crevasse sandy loam	25	35	350	400	18	25	1.8	2.2	25	30	.5	.6	70	110
Dekoven silt loam	50	80	450	625	28	38	----	----	----	----	1.0	1.5	115	165
Dekoven silt loam, overwash	55	85	450	700	30	40	----	----	----	----	1.0	1.5	120	170
Dubbs silt loam	55	85	500	725	30	40	2.0	3.0	27	40	1.2	1.7	125	170
Dundee clay loam	45	65	350	575	25	32	----	----	17	24	1.1	1.5	115	165
Dundee loam	50	75	400	650	28	35	----	----	17	24	1.2	1.6	115	165
Dundee silt loam	50	75	400	650	28	35	----	----	17	24	1.2	1.6	115	165
Falaya silt loam	55	80	500	700	25	36	----	----	----	----	1.2	1.7	135	185
Forestdale silt loam	35	55	375	500	26	34	----	----	----	----	.8	1.2	105	150
Forestdale-Crevasse complex	----	----	200	300	15	20	----	----	----	----	.5	.9	75	110
Grenada silt loam, 2 to 5 percent slopes	50	75	475	650	26	34	1.6	2.2	23	35	.9	1.6	120	170
Grenada silt loam, 2 to 5 percent slopes, severely eroded	40	60	300	500	17	25	1.3	1.7	15	30	.7	1.0	105	150
Grenada silt loam, 5 to 8 percent slopes, severely eroded	30	45	200	400	14	20	1.1	1.5	15	24	.4	.9	105	140
Grenada silt loam, 8 to 12 percent slopes, severely eroded	----	----	----	----	----	----	----	----	13	20	.3	.7	95	130
Loring silt loam, 2 to 5 percent slopes	55	80	600	725	25	36	2.5	3.5	33	40	1.2	1.7	130	180
Loring silt loam, 2 to 5 percent slopes, severely eroded	50	80	450	650	22	30	2.2	2.9	25	35	.7	1.3	125	175
Loring silt loam, 5 to 8 percent slopes, severely eroded	40	60	350	525	18	24	2.0	2.6	20	30	.6	1.4	115	160

See footnotes at end of table.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Corn		Cotton		Soybeans		Alfalfa		Wheat		Lespedeza		Pasture [1]	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Loring silt loam, 8 to 12 percent slopes, severely eroded	30	50	300	450	15	20	2. 0	2. 4	17	25	. 4	. 9	105	145
Loring silt loam, 12 to 20 percent slopes, severely eroded	----	----	----	----	----	----	----	----	----	----	----	----	70	125
Loring-Gullied land complex, 12 to 20 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----	60	90
Memphis silt loam, 2 to 5 percent slopes	60	90	625	750	28	38	2. 8	4. 0	33	40	1. 2	1. 8	140	190
Memphis silt loam, 2 to 5 percent slopes, severely eroded	50	80	475	650	23	32	2. 5	3. 4	26	36	. 7	1. 3	125	175
Memphis silt loam, 5 to 8 percent slopes	55	85	500	675	22	34	2. 6	3. 8	31	38	1. 1	1. 5	130	180
Memphis silt loam, 5 to 8 percent slopes, severely eroded	40	60	375	575	19	25	2. 3	2. 9	26	35	. 6	1. 2	115	160
Memphis silt loam, 8 to 12 percent slopes, severely eroded	35	50	275	500	16	22	2. 0	2. 5	17	30	. 5	1. 0	105	145
Memphis silt loam, 12 to 20 percent slopes, severely eroded	----	----	----	----	----	----	----	----	----	----	----	----	70	125
Memphis silt loam, 20 to 30 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----	70	125
Memphis silt loam, 20 to 30 percent slopes, severely eroded	----	----	----	----	----	----	----	----	----	----	----	----	60	90
Memphis silt loam, 30 to 50 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Memphis-Gullied land complex, 20 to 30 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----	50	80
Morganfield silt loam	65	100	675	800	28	40	2. 5	4. 0	30	40	1. 4	1. 9	150	210
Robinsonville fine sandy loam	60	85	550	725	26	34	2. 5	3. 7	30	40	1. 3	1. 6	140	190
Robinsonville loam	65	100	675	800	28	40	2. 5	4. 0	30	40	1. 6	1. 9	150	200
Routon silt loam	35	55	390	500	22	35	----	----	----	----	. 8	1. 2	105	150
Sharkey clay	30	50	375	450	27	32	----	----	----	----	. 8	1. 2	90	140
Sharkey silty clay loam	35	55	375	500	27	35	----	----	----	----	. 8	1. 2	90	140
Tunica clay	30	50	375	500	27	35	----	----	----	----	1. 0	1. 4	90	145
Wakeland silt loam	55	85	500	700	28	38	----	----	----	----	1. 2	1. 7	130	180
Waverly silt loam	40	60	400	500	23	34	----	----	----	----	. 8	1. 4	95	135
Waverly silt loam, low	----	----	----	----	----	----	----	----	----	----	----	----	----	----

[1] Improved pastures of tall fescue and white clover, of orchardgrass and white clover, or of bermudagrass.
[2] Number of days in 1 year that 1 acre will provide grazing for 1 cow, 1 steer, 1 horse, 5 swine, or 7 sheep, without injury to the pasture.

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

[Estimates are based on average rainfall over a long period of time, without irrigation. Absence of yield indicates crop is not suited to the soil or is not commonly grown on it]

Soil	English peas	Kale	Lima beans	Mustard greens	Spinach	Turnip greens
	Lb.	*Tons*	*Lb.*	*Tons*	*Tons*	*Tons*
Adler silt loam	4, 500	6. 0	3, 000	6. 0	3. 5	6. 0
Bosket silt loam	----	----	2, 000	----	----	----
Collins silt loam	4, 500	6. 0	3, 000	6. 0	3. 5	6. 0
Commerce loam	4, 000	5. 0	2, 500	5. 0	3. 0	5. 0
Dundee loam	----	----	1, 800	----	----	----
Forestdale silt loam	----	----	1, 500	----	----	----
Morganfield silt loam	4, 500	6. 0	3, 000	6. 0	3. 5	6. 0
Robinsonville fine sandy loam	4, 000	5. 0	2, 500	5. 0	3. 5	5. 0
Robinsonville loam	4, 500	5. 0	3, 000	5. 0	3. 5	5. 0
Sharkey silty clay loam	2, 000	----	----	----	----	----

Engineering Properties of the Soils[4]

Soil engineering deals with soil as structural material and as foundation material upon which structures rest. Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, water-storage facilities, erosion-control structures, drainage systems, and sewage-disposal systems. This section discusses those properties of the soils in Dyer County that most affect engineering. The information was developed by soil scientists and engineers working together. It can be used to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils for use in the planning of agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways and airports and in planning detailed investigations of the selected locations.
4. Locate probable sources of gravel and other construction materials.
5. Correlate performance of engineering structures with soil mapping units and thus develop information that will be useful in designing and maintaining certain engineering structures.
6. Determine the suitability of the soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.

This information does not eliminate the need for sampling and testing the soil material in place at the proposed site of engineering work; it should be used primarily in planning more detailed field investigations; it will enable soil engineers to concentrate on the most suitable soils, to take fewer soil samples, and to make an adequate investigation at minimum cost.

Some terms used by soil scientists may be unfamiliar to engineers; other terms, for example, *soil*, *clay*, *silt*, *sand*, *topsoil*, *aggregate*, and *granular*, have special meanings in soil science. These terms and others are defined in the Glossary at the back of this report.

Engineering Classification of the Soils

Most highway engineers classify soils according to the system used by the American Association of State Highway Officials (AASHO) (*1*). In this system there are seven principal groups. The groups range from A–1, which consists of gravelly soils of high bearing capacity, to A–7, which consists of clayey soils that have low strength when wet. Within each group the relative engineering value of the soil material is indicated by a group index number. The numbers range from 0 for the best material to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol, for example, A–4(1).

Some engineers prefer the Unified soil classification system (*17*). In this system, soil materials are identified as coarse grained (eight classes), fine grained (six classes), or highly organic (one class).

Both the AASHO and the Unified systems classify soil material according to gradation and plasticity characteristics. The classification permits the engineer to make a rapid appraisal of the soil by comparing it with more familiar soils that have the same clasification.

Table 5 shows both the AASHO and the Unified classification of specified soils in Dyer County as determined by laboratory tests. Table 6 shows the estimated classification of all soils in the county according to both systems.

Engineering Test Data

Samples from the principal types of six extensive soil series were tested according to standard procedures (*1*) to help evaluate the soils for engineering purposes. The test data are given in table 5.

In the moisture-density (compaction) test, soil material is compacted into a mold several times, each time at a successively higher moisture content but with the compactive effort remaining constant. The dry density (unit weight) of the compacted material increases as the moisture content increases, until the optimum moisture content is reached. After that, the dry density decreases as the moisture content increases. The highest dry density obtained in the compaction test is the *maximum dry density*, and the corresponding moisture content is the *optimum moisture*. Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density at approximately optimum moisture content.

The liquid limit and the plasticity index indicate the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from semisolid to plastic. As the moisture content is further increased, the material changes from plastic to liquid. The *plastic limit* is the moisture content at which the material changes from semisolid to plastic. The *liquid limit* is the moisture content at which the material changes from plastic to liquid. The *plasticity index* is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which the soil material is plastic.

The two engineering classifications given each soil sample in table 5 are based on the liquid limit, the plasticity index, and the data obtained by mechanical analysis.

Engineering Descriptions and Physical Properties

Table 6 gives estimates of some of the soil characteristics significant in engineering and the engineering classification of the soil material in the principal horizons

[4] DAVID L. ROYSTER, chief soils engineer, Materials and Test Division, Tennessee Department of Highways, assisted with this section.

TABLE 5.—*Engi*

[Tests performed by the Tennessee Department of Highways and Public Works according to

Soil name and location	Parent material	Tennessee report no.	Depth	Horizon	Moisture-density data [1]	
					Maximum dry density	Optimum moisture
			In.		*Lb. per cu. ft.*	*Percent*
Bosket silt loam:						
2.5 miles SW. of Bogota and 300 feet N. of gravel road. (Ortho)	Alluvium from Mississippi River.	8	0 to 6	Ap	101	12
		27	14 to 24	B22	98	18
		7	40 to 50	C2	100	16
1.0 mile SW. of Bogota. (Ortho)	Alluvium from Mississippi River.	6	0 to 7	Ap	103	12
		29	18 to 25	B22	97	20
		5	40 to 52	Du1	105	14
0.5 mile SSW. of school at Richwood. (Overwash phase)	Alluvium from Mississippi River.	36	0 to 7	A1p	100	15
		37	18 to 32	B2	95	23
		34	56 to 94	Du	100	14
Crevasse loamy sand:						
1.7 miles S. of Heloise and 50 feet E. of road. (Ortho)	Alluvium from Mississippi River.	4	0 to 7	Ap	108	12
		28	32 to 59	Du2	89	22
		3	59 to 83	Du3	102	13
4.75 miles W. of Lenox, 660 feet N. of main levee and 990 feet E. of side levee. (Ortho)	Alluvium from Mississippi River.	2	0 to 7	Ap	102	8
		1	7 to 21	C1	98	7
		30	26 to 46	Du1	98	20
Dekoven silt loam:						
1.0 mile NE. of U.S. Highway No. 51 bypass and 0.25 miles SE. of U.S. Highway No. 51. (Ortho)	Alluvium from loess	11	0 to 6	Ap1	92	19
		12	10 to 18	A1b1	92	19
		16	39 to 56	C2g	100	16
1.8 miles S. of RoEllen and 0.8 mile W. and 0.2 mile S. of gravel road. (Ortho)	Alluvium from loess	17	0 to 8	Ap	97	17
		23	8 to 15	A1b1	96	21
		24	37 to 55	C2g	100	15
1.7 miles S. and 0.6 mile W. of RoEllen and 0.2 mile SSE. of grade crossing of GM & O RR. (Coarse textured)	Alluvium from loess	40	0 to 7	Ap	110	12
		41	7 to 24	A1b	105	13
		39	24 to 60	C1	98	18
Grenada silt loam:						
6.0 miles E. of Four Points on State Highway No. 20 and 1.2 miles NNE. along pipeline. (Ortho)	Loess or alluvium from loess	14	0 to 5	Ap	101	15
		13	5 to 18	B2	102	16
		21	24 to 37	B3m2	97	19
		20	72 to 90	C2	102	16
Loring silt loam:						
6.0 miles E. of Four Points on State Highway No. 20 and 1.2 miles NNE. along pipeline. (Ortho)	Loess or alluvium from loess	15	0 to 5	Ap	102	14
		19	8 to 25	B2	99	18
		18	39 to 73	B3m2	96	18
		22	73 to 90	C	102	14
Tunica clay:						
0.4 mile N. of Midway Road and 0.3 mile W. of Obion River. (Ortho)	Alluvium from Mississippi River.	31	0 to 5	Ap	83	30
		32	5 to 19	B21 or C1	87	28
		10	25 to 32	Du1	96	15
3.7 miles S. of Heloise and 0.2 mile W. of main levee and 0.7 mile S. of Midway Road. (Ortho)	Alluvium from Mississippi River.	25	0 to 7	Ap	86	28
		26	7 to 25	B2 or C	85	26
		9	29 to 38	Du2	99	10
1.5 miles SE. of Chic. (Underlain by sand)	Slack-water alluvium from Mississippi River.	38	3 to 22	C	91	24
		35	22 to 30	D1	108	11
		33	30 to 180	D2	102	14

[1] Based on AASHO Designation: T 99–57, Method A (*1*).

[2] Mechanical analysis according to AASHO Designation: T88–57 (*1*). Results by this procedure may differ somewhat from results 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 analysis data in this table are not suitable for naming textural classes for soils.

neering test data

standard procedures of the American Association of State Highway Officials (AASHO) (*1*)]

Specific gravity	Mechanical analysis [2]							Liquid limit	Plasticity index	Classification	
	Percentage passing sieve—			Percentage smaller than—						AASHO	Unified [3]
	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
2.65	100	99	91	76	30	17	13	25	[4] NP	A-4(8)	ML.
2.72	--------	100	95	87	45	27	24	37	11	A-6(8)	ML-CL.
2.70	--------	100	81	67	31	16	14	28	NP	A-4(8)	ML.
2.65	100	99	79	64	32	12	8	NP	NP	A-4(8)	ML.
2.73	--------	100	88	73	46	34	30	43	17	A-7-6(11)	ML-CL.
2.68	--------	100	23	16	10	7	6	NP	NP	A-2-4(0)	SM.
2.63	100	98	83	72	40	17	12	23	NP	A-4(8)	ML.
2.72	100	98	82	73	43	24	21	32	6	A-4(8)	ML.
2.67	100	87	6	5	4	3	3	NP	NP	A-3(0)	SP-SM.
2.66	100	96	14	13	12	7	5	NP	NP	A-2-4(0)	SM.
2.72	--------	100	99	96	88	54	40	50	20	A-7-5(14)	ML-CL.
2.67	100	98	18	13	5	2	2	NP	NP	A-2-4(0)	SM.
2.66	100	30	5	5	5	4	3	NP	NP	A-1-b(0)	SW-SM.
2.68	100	65	3	2	2	2	1	NP	NP	A-3(0)	SP.
2.72	--------	100	90	77	58	37	30	39	15	A-6(10)	ML-CL.
2.66	100	99	99	93	66	30	24	41	12	A-7-6(9)	ML.
2.67	100	99	99	91	69	36	31	46	20	A-7-6(13)	ML-CL.
2.73	100	99	98	95	61	28	24	40	13	A-6(9)	ML-CL.
2.68	100	99	98	96	73	34	26	36	9	A-4(8)	ML.
2.71	100	99	98	94	71	36	32	45	20	A-7-6(13)	ML-CL.
2.75	100	99	99	94	65	30	24	42	18	A-7-6(12)	ML-CL.
2.67	100	99	71	65	48	19	14	24	4	A-4(7)	ML-CL.
2.68	100	99	81	73	48	21	17	30	8	A-4(8)	ML-CL.
2.73	100	99	97	94	70	34	27	45	18	A-7-6(12)	ML-CL.
2.66	100	97	85	78	44	14	10	NP	NP	A-4(8)	ML.
2.69	100	99	98	92	62	28	22	33	6	A-4(8)	ML.
2.76	100	99	98	91	64	31	24	41	16	A-7-6(11)	ML-CL.
2.73	--------	--------	100	94	58	22	17	31	5	A-4(8)	ML.
2.66	100	99	90	83	48	15	11	NP	NP	A-4(8)	ML.
2.73	--------	100	99	93	63	32	27	37	10	A-4(8)	ML.
2.72	100	99	98	94	62	28	23	38	10	A-4(8)	ML.
2.73	100	98	94	90	62	21	18	34	10	A-4(8)	ML-CL.
2.69	--------	100	97	97	93	74	58	64	29	A-7-5(20)	MH.
2.73	--------	100	99	98	94	72	58	66	32	A-7-5(20)	MH-CH.
2.68	--------	100	76	43	22	13	10	NP	NP	A-4(8)	ML.
2.69	--------	100	99	98	94	67	54	58	28	A-7-5(19)	MH-CH.
2.74	--------	100	99	98	95	74	56	64	30	A-7-5(20)	MH.
2.67	--------	100	20	11	4	2	2	NP	NP	A-2-4(0)	SM.
2.71	100	97	93	90	82	65	54	54	24	A-7-5(16)	MH-CH.
2.67	[5] 99	37	9	9	9	8	8	NP	NP	A-1-b(0)	SW-SM.
2.67	100	41	1	0	0	0	0	NP	NP	A-1-b(0)	SP.

[3] Soil Conservation Service and Bureau of Public Roads have agreed to consider that all soils having plasticity indexes within two points from A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are ML-CL and MH-CH.

[4] NP stands for nonplastic.

[5] One-hundred percent passed sieve no. 4.

All the mapping units are listed in this table except Made land, Gullied land, Levees and borrow pits, Gravel pits, and Swamp, all of which are miscellaneous land types. Because the soil material in these units is variable, on-site studies are necessary to determine the engineering properties.

Depth to the seasonally high water table and the frequency of flooding are based on field observations. If neither is mentioned in the column headed "Description of soil" in table 6, the soil does not flood and the water table is at a depth of several feet.

Permeability is estimated for uncompacted soil material. The estimates are based on structure and consistence, and on field observations and some laboratory data.

The available water capacity, measured in inches per inch of soil, is an approximation of the amount of capil-

TABLE 6.—*Brief description of the soils, and*

Map symbol	Soil	Description of soil	Depth from surface	Classification
				USDA texture
			Inches	
Ad	Adler silt loam.	About 5 feet of brown silt loam underlain by gray silty clay loam. Local wash from loess hills.	0 to 60	Silt loam
Ag	Alligator clay.	About 4 feet of plastic clay underlain by stratified layers of varied texture. Ordinarily flooded several days each winter and spring.	0 to 48	Clay
At	Alligator-Crevasse complex.	See the description and estimates given for Alligator clay and Crevasse loamy sand.		
Bd	Birds silt loam.	About 3 feet of silt loam over 1 foot of silty clay loam underlain by 2 feet of loam. Poorly drained. Seasonally high water table at depth of about 1 foot.	0 to 36 36 to 48 48 to 60	Silt loam Silty clay loam Loam
Bo	Bosket sandy loam.	About 1½ feet of sandy loam over about 2 feet of silty clay loam underlain by sandy loam or loamy sand.	0 to 18 18 to 42 42 to 72	Sandy loam Silty clay loam Sandy loam or loamy sand.
Bs	Bosket silt loam.	About 1½ feet of silt loam over about 2 feet of silty clay loam underlain by sandy loam or loamy sand.	0 to 18 18 to 42 42 to 72	Silt loam Silty clay loam or silt loam. Sandy loam or loamy sand.
Bt	Bowdre clay.	About 1½ feet of clay over about 3½ feet of silt loam, loam, or sandy loam. Recent alluvium on Mississippi River bottom. Flooded about once every 5 years.	0 to 18 18 to 60	Clay Silt loam, loam, or sandy loam.
Bw	Bowdre clay, coarse subsoil.	About 1 foot of clay over about 5 feet of sand or loamy sand. Ordinarily flooded a few days each winter and spring.	0 to 12 12 to 72	Clay Sand or loamy sand.
Ca	Calloway silt loam.	About 2 feet of silt loam over about 2 feet of silty clay loam underlain by several feet of silt loam. Internal drainage impeded by fragipan. Seasonally high water table at depth of less than 2 feet.	0 to 24 24 to 48 48 to 72	Silt loam Silty clay loam Silt loam
Cl	Collins silt loam.	About 6 feet of silt loam. Likely to be flooded every winter. Seasonally high water table at depth of about 2 feet.	0 to 72	Silt loam
Cm	Commerce loam.	About 3 feet of loam or silt loam over layers ranging in texture from sand to clay. Subject to flooding. Seasonally high water table at depth of about 2 feet.	0 to 36	Loam or silt loam.
Co	Commerce silty clay loam.	About 2 feet of silty clay loam over 4 feet of silt loam, loam, or sandy loam. Flooded nearly every winter. Seasonally high water table at depth of about 2 feet.	0 to 24 24 to 72	Silty clay loam Silt loam, loam, or sandy loam.
Cr	Crevasse loamy sand.	About 3 feet of loamy sand or sand over layers ranging from silt loam to clay. Flooded every 5 to 10 years.	0 to 36	Loamy sand or sand.

lary water in a soil that is wet to field capacity. It is the approximate amount of water held in the soil between ⅓ atmosphere and 15 atmospheres of tension. If the soil is at permanent wilting point, this amount of water will wet it to a depth of 1 inch. Laboratory data on available water capacity are available for a few of the soils in Dyer County; for the others, estimates are based on data for similar soils.

Dispersion refers to the degree to which and the rate at which the aggregates disintegrate when saturated with water. This property is estimated on the basis of soil structure and texture.

The shrink-swell potential is an indication of the volume change to be expected with a change in moisture content. It is estimated primarily on the basis of the amount and type of clay in the soil material.

their estimated physical and chemical properties

Classification—Continued		Percentage passing sieve—		Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
				Inches per hour	*Inches per inch of soil*	*pH*		
ML	A-4	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	High	Low.
MH-CH	A-7	100	100	<0. 05	0. 15 to 0. 20	5. 1 to 6. 5	Low	High.
ML	A-4	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	High	Low.
ML-CL	A-6	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 5	Moderate	Moderate.
ML or CL	A-4	100	60 to 90	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 5	High	Low.
ML	A-4	100	50 to 65	0. 8 to 2. 50	0. 15 to 0. 20	5. 5 to 6. 5	High	Low.
ML or ML-CL	A-6	100	85 to 100	0. 8 to 2. 50	0. 15 to 0. 25	5. 1 to 5. 5	Moderate	Moderate.
SM	A-2 or A-4	100	30 to 50	2. 50 to 5. 0	0. 05 to 0. 10	5. 1 to 5. 5	High	Low.
ML	A-4	100	80 to 95	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 5	High	Low.
CL	A-4 or A-6	100	85 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 5. 5	Moderate	Moderate.
SM	A-2 or A-4	100	30 to 50	2. 50 to 5. 0	0. 05 to 0. 10	5. 1 to 5. 5	High	Low.
MH-CH	A-7	100	100	0. 05 to 0. 20	0. 15 to 0. 20	6. 6 to 7. 3	Low	High.
ML or ML-CL.	A-4	100	50 to 90	0. 8 to 2. 50	0. 15 to 0. 25	6. 6 to 7. 3	High	Low.
MH-CH	A-7	100	100	0. 05 to 0. 20	0. 15 to 0. 20	6. 6 to 7. 3	Low	High.
SM	A-2	100	15 to 30	5. 0 to 10. 0	<0. 05 to 0. 10	6. 6 to 7. 3	High	Low.
ML	A-4	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 5	Moderate	Low.
ML-CL	A-6	100	95 to 100	0. 05 to 0. 20	0. 20 to 0. 25	5. 1 to 7. 3	Low	Moderate.
ML-CL	A-6	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 7. 3	Moderate	Moderate.
ML-CL	A-4	100	90 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 0	Moderate	Low.
ML or ML-CL.	A-4	100	75 to 95	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	Moderate	Low.
ML-CL	A-6 or A-7	100	90 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	Moderate	Moderate.
ML or SM	A-2 or A-4	100	35 to 90	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	High	Low.
SM or SP	A-2 or A-3	100	5 to 35	>10. 0	0. 05 to 0. 10	6. 6 to 7. 3	High	Low.

757-411—65——4

TABLE 6.—*Brief description of the soils, and*

Map symbol	Soil	Description of soil	Depth from surface	Classification
				USDA texture
			Inches	
Cs	Crevasse sandy loam.	About 1 foot of sandy loam over 4 feet of sand or loamy sand. Subject to flooding.	0 to 12 12 to 60	Sandy loam Loamy sand or sand.
Dk Do	Dekoven silt loam. Dekoven silt loam, overwash.	About 1 foot of silt loam over about 2 feet of silty clay loam underlain by about 3 feet of silt loam. Seasonally high water table at depth of about 1 foot. Likely to be ponded.	0 to 12 12 to 24 24 to 72	Silt loam Silty clay loam Silt loam
Ds	Dubbs silt loam.	About 1½ feet of silt loam over about 2 feet of silty clay loam underlain by sandy loam or loamy sand.	0 to 18 18 to 42 42 to 72	Silt loam Silty clay loam or silt loam. Sandy loam or loamy sand.
Dt	Dundee clay loam.	About 3½ feet of clay loam over about 3 feet of loam. Flooded nearly every winter.	0 to 42 42 to 72	Clay loam Loam
Du	Dundee loam.	About 1 foot of loam over 2 feet of clay loam underlain by loam or fine sandy loam. Subject to flooding.	0 to 12 12 to 36 36 to 60	Loam Clay loam Loam or fine sandy loam.
Dv	Dundee silt loam.	About 1½ feet of silt loam over about 2 feet of silty clay loam underlain by sandy loam or loamy sand.	0 to 18 18 to 42 42 to 72	Silt loam Silty clay loam or silt loam. Sandy loam or loamy sand.
Fa	Falaya silt loam.	About 6 feet of silt loam. Flooded every winter. Seasonally high water table at depth of 1 foot.	0 to 72	Silt loam
Fd	Forestdale silt loam.	About 1 foot of silt loam over about 3 feet of silty clay loam and silty clay underlain by fine sandy loam. Seasonally high water table at depth of about 1 foot. Subject to flooding.	0 to 12 12 to 48 48 to 72	Silt loam Silty clay loam or silty clay. Sandy loam or loam.
Fo	Forestdale-Crevasse complex.	See the description and estimates given for Forestdale silt loam and for Crevasse loamy sand.		
GrB	Grenada silt loam, 2 to 5 percent slopes.	Silty upland soil that has a fragipan at depth of about 2 feet. Internal drainage impeded by fragipan.	0 to 24 24 to 36 36 to 72	Silt loam Silty clay loam Silt loam
GrB3 GrC3 GrD3	Grenada silt loam, 2 to 5 percent slopes, severely eroded. Grenada silt loam, 5 to 8 percent slopes, severely eroded. Grenada silt loam, 8 to 12 percent slopes, severely eroded.	Silty upland soils that have a fragipan at depth of about 1 foot. Internal drainage impeded by fragipan.	0 to 12 12 to 24 24 to 36	Silt loam Silty clay loam Silt loam
LoB	Loring silt loam, 2 to 5 percent slopes.	Silty upland soil that has a weak fragipan at depth of about 30 inches.	0 to 6 6 to 24 24 to 72	Silt loam Silty clay loam Silt loam
LoB3 LoC3 LoD3 LoE3 LrE	Loring silt loam, 2 to 5 percent slopes, severely eroded. Loring silt loam, 5 to 8 percent slopes, severely eroded. Loring silt loam, 8 to 12 percent slopes, severely eroded. Loring silt loam, 12 to 20 percent slopes, severely eroded. Loring-Gullied land complex, 12 to 20 percent slopes.	Silty upland soils that have a weak fragipan beginning at depth between 12 and 24 inches.	0 to 6 6 to 18 18 to 72	Silt loam Silty clay loam Silt loam

their estimated physical and chemical properties—Continued

Classification—Continued		Percentage passing sieve—		Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
				Inches per hour	*Inches per inch of soil*	*pH*		
ML or SM	A-2 or A-4	100	30 to 65	5.0 to 10.0	0.10 to 0.15	4.5 to 7.3	High	Low.
SM or SP	A-1 or A-2	100	5 to 35	>10.0	<0.05 to 0.10	4.5 to 7.3	High	Low.
ML or ML-CL.	A-4 or A-6	100	90 to 100	0.8 to 2.50	0.20 to 0.25	6.6 to 7.3	Moderate	Low.
ML-CL	A-7	100	90 to 100	0.20 to 0.80	0.20 to 0.25	6.6 to 7.3	Low	Moderate to high.
ML-CL	A-6 or A-7	100	90 to 100	0.8 to 2.50	0.20 to 0.25	6.6 to 7.3	Moderate	Low.
ML	A-4	100	90 to 100	0.8 to 2.50	0.20 to 0.25	5.0 to 6.5	High	Low.
ML or ML-CL	A-6	100	85 to 100	0.8 to 2.50	0.20 to 0.25	5.0 to 5.5	Moderate	Moderate.
SM	A-2 or A-4	100	30 to 50	2.50 to 5.0	0.05 to 0.10	5.0 to 5.5	High	Low.
CL	A-6 or A-7	100	90 to 100	0.8 to 2.50	0.15 to 0.20	5.1 to 6.0	Low	Moderate to high.
ML-CL	A-4	100	60 to 90	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	High	Low.
ML	A-4	100	60 to 90	0.8 to 2.50	0.20 to 0.25	5.1 to 6.5	High	Low.
ML or CL	A-6 or A-7	100	85 to 100	0.8 to 2.50	0.15 to 0.20	5.1 to 6.0	Moderate	Low.
ML-CL	A-4	100	60 to 90	0.8 to 2.50	0.15 to 0.20	4.5 to 5.5	High	Low.
ML	A-4	100	90 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.5	High	Low.
CL or ML-CL	A-6	100	85 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 5.5	Moderate	Moderate.
SM	A-2 or A-4	100	30 to 50	2.50 to 5.0	0.05 to 0.10	5.1 to 5.5	High	Low.
ML-CL	A-4	100	90 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Low.
ML-CL	A-4	100	90 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.5	Moderate	Low.
MH-CH	A-7	100	95 to 100	0.05 to 0.20	0.15 to 0.20	5.1 to 5.5	Low	High.
ML	A-4	100	50 to 90	0.8 to 2.50	0.15 to 0.20	5.1 to 6.0	High	Low.
ML or ML-CL	A-4	100	85 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.5	Moderate	Low.
ML-CL	A-6	100	95 to 100	0.05 to 0.20	0.20 to 0.25	5.1 to 5.5	Moderate	Moderate.
ML or ML-CL	A-4	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 5.5	Moderate	Low.
ML-CL	A-4 or A-6	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.5	Moderate	Low.
ML-CL	A-6	100	95 to 100	0.05 to 0.20	0.20 to 0.25	5.1 to 5.5	Moderate	Moderate.
ML or ML-CL	A-4 or A-6	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 5.5	Moderate	Low.
ML	A-4	100	90 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Low.
ML or ML-CL	A-4 or A-6	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Moderate.
ML or ML-CL	A-4	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Low.
ML	A-4	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Low.
ML or ML-CL	A-4 or A-6	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Moderate.
ML or ML-CL	A-4	100	95 to 100	0.8 to 2.50	0.20 to 0.25	5.1 to 6.0	Moderate	Low.

TABLE 6.—*Brief description of the soils, and*

Map symbol	Soil	Description of soil	Depth from surface	Classification
				USDA texture
			Inches	
MfB	Memphis silt loam, 2 to 5 percent slopes.	Well-drained silty upland soils	0 to 6	Silt loam
MfB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded.		6 to 18	Silty clay loam
			18 to 72	Silt loam
MfC	Memphis silt loam, 5 to 8 percent slopes.			
MfC3	Memphis silt loam, 5 to 8 percent slopes severely eroded.			
MfD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded.			
MfE3	Memphis silt loam, 12 to 20 percent slopes, severely eroded.			
MfF	Memphis silt loam, 20 to 30 percent slopes.			
MfF3	Memphis silt loam, 20 to 30 percent slopes, severely eroded.			
MfG	Memphis silt loam, 30 to 50 percent slopes.			
MgF	Memphis-Gullied land complex, 20 to 30 percent slopes.			
Mo	Morganfield silt loam.	About 5 feet of brown silt loam underlain by gray silty clay loam. Local outwash from loess hills.	0 to 60	Silt loam
Rs	Robinsonville loam.	About 1½ feet of loam or silt loam over stratified layers of loam to sandy loam. Likely to be flooded every few years.	0 to 18	Loam
			18 to 72	Loam or sandy loam.
Ro	Robinsonville fine sandy loam.	About 2 feet of fine sandy loam over layered loam and sandy loam. Likely to be flooded every few years.	0 to 24	Fine sandy loam
			24 to 72	Loam or sandy loam.
Rt	Routon silt loam.	Poorly drained silty upland soil that has a fragipan at depth of 1½ feet. Fragipan causes high water table during wet seasons. Most areas likely to be flooded or ponded. Seasonally high water table at depth of 1 foot.	0 to 18	Silt loam
			18 to 48	Silty clay loam
			48 to 72	Silt loam
Sa	Sharkey clay.	Thick beds of poorly drained black clay; below a depth of 48 inches, texture ranges from clay to sand. Likely to be flooded every year.	0 to 48	Clay
Sh	Sharkey silty clay loam.			
Tc	Tunica clay.	About 2 feet of black clay over sediment ranging from silty clay loam to sand. Likely to be flooded every year.	0 to 24	Clay
			24 to 60	Silty clay loam to sand.
Wa	Wakeland silt loam.	About 4 feet of silt loam over 1 foot of silty clay loam underlain by 1 foot of loam. Seasonally high water table at depth of 2 feet.	0 to 48	Silt loam
Ws	Waverly silt loam.	About 6 feet of poorly drained silt loam. Seasonally high water table at depth of about 1 foot. Flooded every year.	0 to 72	Silt loam
Wv	Waverly silt loam, low.			

their estimated physical and chemical properties—Continued

Classification—Continued		Percentage passing sieve—		Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)					
				Inches per hour	*Inches per inch of soil*	*pH*		
ML	A-4	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 5	Moderate	Low.
ML or ML-CL	A-4 or A-6	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 5. 5	Moderate	Moderate.
ML or ML-CL	A-4	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 5	Moderate	Low.
ML	A-4	100	95 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	High	Low.
ML	A-4	100	75 to 95	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	High	Low.
ML or SM	A-4	100	35 to 80	0. 8 to 2. 50	0. 15 to 0. 25	6. 6 to 7. 3	High	Low.
ML or SM	A-4	100	40 to 70	0. 8 to 2. 50	0. 15 to 0. 20	6. 6 to 7. 3	High	Low.
ML or SM	A-4	100	35 to 80	0. 8 to 2. 50	0. 15 to 0. 20	6. 6 to 7. 3	High	Low.
ML	A-4	100	90 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 0 to 7. 3	Moderate	Low.
ML or CL	A-4 or A-6	100	90 to 100	0. 05 to 0. 20	0. 20 to 0. 25	6 . 0 to 7. 3	Low	Moderate.
ML or CL	A-4 or A-6	100	90 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 0 to 7. 3	Moderate	Moderate.
MH or CH	A-7	100	100	0. 05 to 0. 20	0. 15 to 0. 20	6. 6 to 7. 3	Low	High.
MH or MH-CH.	A-7	100	90 to 100	0. 05 to 0. 20	0. 15 to 0. 20	6. 6 to 7. 3	Low	High.
SM or ML	A-1, A-2, or A-4.	100	20 to 75	0. 80 to 5. 0	0. 10 to 0. 25	6. 6 to 7. 3	Moderate to high.	Low.
ML-CL	A-4	100	90 to 100	0. 8 to 2. 50	0. 20 to 0. 25	6. 6 to 7. 3	High	Low.
ML-CL	A-4	100	90 to 100	0. 8 to 2. 50	0. 20 to 0. 25	5. 1 to 6. 0	Moderate	Low.

Features Affecting Engineering Work

Table 7 lists, for each soil series, suitability ratings for specific purposes and soil features that affect highway construction or soil- and water-conservation engineering. These features generally are not apparent to an engineer unless he has seen the results of a field investigation. They are, however, significant enough to influence construction practices.

The ratings of the soils as sources of topsoil are for the uppermost 12 inches of the soil profile, because normally only the surface layer is removed for use as topsoil. Nevertheless, a few of the soils are suitable sources of topsoil to a depth of 3 feet or more. These are Adler, Bosket, Collins, Commerce, Dubbs, Loring, Memphis, Morganfield, and Robinsonville soils. Good-quality topsoil is plentiful in Dyer County.

Few of the soils are suitable sources of sand, but sand is plentiful in the county. Sand bars in the Mississippi River offer an abundance of poorly graded sand. Other sources include the Crevasse soils and in some places the subsoil of the Tunica, Bowdre, and Robinsonville soils. Most of the sand in the county is fine grained and poorly graded.

The only known source of gravel in the county is a deposit buried under 20 to 30 feet of loess in the bluffs along the edge of the Mississippi River bottoms.

Natural material suitable for road fill is not plentiful in the county. The most suitable is the sandy material of the soils on the Mississippi River bottoms and the gravelly material in the substrata of the loess-covered hills near the central part of the county. The suitability of a soil material for road fill depends mainly on texture and natural water content. Generally, the most desirable material is coarse textured and easily drained. A highly plastic soil is rated poor or fair, depending on its natural water content and on the ease with which it can be handled, dried, and compacted. A highly erodible soil, for example, one that is composed primarily of fine sand and silt (fig. 20), also is rated poor or fair. Fills made with such a soil must have gentle slopes, and vegetation must be established quickly otherwise a network of gullies will form. A silty soil requires close control of moisture during compaction.

Gravel of the Coastal Plain, which is buried by several feet of loess in this county, can be used economically for secondary and county roads. It is not used as an aggregate for roadway pavements and structures, because removing the sand, silt, and other material involves a rather lengthy screening and washing process. It costs less to bring in crushed limestone than to set up a wash plant. Besides, depending on the mineralogic makeup of the gravel, a

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability as source of—			Soil features affecting—	
	Topsoil	Sand	Road fill	Highway location	Dikes or levees
Adler (Ad).	Good	Unsuitable	Poor to fair	Soil properties are favorable.	High erodibility on slopes; compaction at optimum moisture required.
Alligator (Ag, At).	Poor	Unsuitable	Poor	Highly plastic consistence; flooding.	High shrink-swell potential; cracks when dry; poor compaction.
Birds (Bd).	Top 6 inches is fair.	Unsuitable	Poor to fair	Flooding; high water table.	High erodibility on slopes; compaction at optimum moisture required.
Bosket (Bo, Bs).	Good	Poor	Good	Soil properties are favorable.	Soil properties are favorable.
Bowdre (Bt, Bw).	Poor	Layers of poorly graded sand or loamy sand below the surface of Bowdre clay, coarse subsoil.	Good below depth of 1 or 2 feet.	Highly plastic consistence; flooding.	Good material below depth of 8 to 20 inches; surface layer is highly plastic.
Calloway (Ca).	Fair	Unsuitable	Poor to fair	High water table during wet periods, caused by fragipan at depth of 18 inches.	High erodibility on slopes; compaction at optimum moisture required.
Collins (Cl).	Good	Unsuitable	Poor to fair	Flooding; high water table	High erodibility on slopes; compaction at optimum moisture required.

See footnote at end of table.

Figure 20.—**Caved-in embarkment of a bridge approach. The soil is silty, and consequently is unstable and erodible.**

deleterious aggregate-cement reaction may take place, which would result in deterioration of the concrete. The gravel, however, can be used in roadways under the crushed limestone, thus decreasing the amount of limestone required.

Features that are unfavorable to highway location include instability of the soil material (highly plastic clay or highly erodible material), seepage, a high water table, and flooding. Many soils in Dyer County either are flooded or have a seasonally high water table. Highways on these soils must have an embankment high enough to keep the roadway above high water. Some soils have seepage above their fragipan. Seepage can cause slumping or sliding.

Farm ponds are an important source of water in Dyer County, especially in the eastern two-thirds of the county where permanent streams are few. Most of the soils in the county are suitable as reservoir sites. A few have layers of sand that should either be removed from the reservoir area or should be mixed with clayey material and compacted. Most of the soils on the Mississippi River bottoms are likely to have layers of sand in their profiles. The deep loess in the uplands is good material for reservoirs, but it is not so good for embankments. It has low strength and stability and is highly erodible.

Many of the soils in Dyer County are poorly drained. Some can easily be drained artificially; others would be difficult to drain. The permeable soils on the bottom lands, such as Birds, Wakeland, Falaya, and Waverly soils, can be drained by tile or by open ditches if suitable outlets are available. The poorly drained clay soils, as well as those with a fragipan, can be drained by open ditches. Tile drains do not work well in such soils, because of slow permeability.

interpretations

Soil features affecting—Continued					Degree of limitation for use as septic tank filter field
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	
Reservoir area	Embankment				
Soil properties are favorable.	High erodibility	Drainage not needed.	Soil properties are favorable.	Usually not needed, but soil properties are favorable.	Moderate.
Soil properties are favorable.	High shrink-swell potential; poor compaction.	Slow permeability; surface drainage needed; subsurface drainage difficult.	Very slow intake rate; suitability questionable.	Not needed	Severe; generally unsuitable because of slow permeability and flooding.
Soil properties are favorable.	High erodibility	High water table; permeable soil.	Poor drainage	Not needed	Severe; generally unsuitable because of high water table.
Permeable to depth of 3 to 5 feet.	Soil properties are favorable.	Not needed	Soil properties are favorable.	Usually not needed, but soil properties are favorable.	Slight.
Permeable material at depth of 8 to 20 inches.	Good material below depth of 8 to 20 inches; surface layer is highly plastic clay.	Slow permeability in surface layer; surface drainage needed.	Slow intake rate	Not needed	Severe; generally unsuitable because of flooding.
Soil properties are favorable.	High erodibility	Surface drainage needed; slow permeability in subsoil.	Slow permeability; shallow root zone; suitability questionable.	Usually not needed, but soil properties are favorable.	Severe; generally unsuitable because of slow permeability and intermittent wetness.
Soil properties are favorable.	High erodibility	Surface drainage needed; subsurface drainage adequate.	Soil properties are favorable.	Not needed	Severe; generally unsuitable because of intermittent wetness and high water table.

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability as source of—			Soil features affecting—	
	Topsoil	Sand	Road fill	Highway location	Dikes or levees
Commerce (Cm, Co).	Good	Unsuitable	Fair to good	Flooding; high water table.	Intermittent wetness
Crevasse (Cr, Cs, At, Fo).	Poor	Fair to good; sand is mostly fine grained.	Good	Flooding	Very rapid permeability; good compaction.
Dekoven (Dk, Do).	Fair	Unsuitable	Poor	High water table	Intermittent wetness; cracks when dry.
Dubbs (Ds).	Good	Poor; thin layers of fine sand below depth of 3 feet.	Fair to good	Soil properties are favorable.	Soil properties are favorable.
Dundee (Dt, Du, Dv).	Good	Poor; thin layers of fine sand below depth of 3 feet.	Fair to good	Flooding; high water table.	Soil properties are favorable.
Falaya (Fa).	Top 8 inches is fair to good.	Unsuitable	Poor to fair	Flooding; high water table.	High erodibility on slopes; compaction at optimum moisture required.
Forestdale (Fd, Fo).	Top 6 inches is fair.	Unsuitable	Fair to poor	Flooding; high water table.	Soil properties are favorable.
Grenada (GrB, GrB3, GrC3, GrD3).	Good	Unsuitable	Poor to fair	Erodible in sloping cuts; high water table during wet periods caused by fragipan; seepage along surface of pan for short periods.	High erodibility on slopes; compaction at optimum moisture required.
Loring (LoB, LoB3, LoC3, LoD3, LoE3, LrE).	Good	Unsuitable	Poor to fair	Erodible in sloping cuts.	High erodibility on slopes; compaction at optimum moisture required.
Memphis (MfB, MfB3, MfC, MfC3, MfD3, MfE3, MfF, MfF3, MfG, MgF).	Good	Unsuitable	Poor to fair	Erodible in sloping cuts.	High erodibility on slopes; compaction at optimum moisture required.
Morganfield (Mo).	Good	Unsuitable	Poor to fair	Soil properties are favorable.	High erodibility on slopes; compaction at optimum moisture required.
Robinsonville (Ro, Rs).	Good	Thin layers of fine sand or very fine sand below depth of 3 feet.	Good to fair	Soil properties are favorable.	Soil properties are favorable.
Routon (Rt).	Poor	Unsuitable	Poor to fair	Seasonal very high water table during wet periods, caused by fragipan at depth of 18 inches; flooding.	Poor stability

See footnote at end of table.

interpretations—Continued

Soil features affecting—Continued: Farm ponds: Reservoir area	Farm ponds: Embankment	Agricultural drainage	Irrigation	Terraces and diversions	Degree of limitation for use as septic tank filter field
Rapid permeability to depth of 3 to 6 feet.	Fair to good strength and stability.	Seasonal high water table; flooding.	Soil properties are favorable.	Not needed	Severe; generally unsuitable because of flooding.
Very rapid permeability.	Very rapid permeability; good compaction.	Not needed	Low available water capacity; rapid intake rate; frequent water applications required.	Not needed	Severe; generally unsuitable because of flooding and very rapid permeability.
Soil properties are favorable.	Cracks when dry; high erodibility.	Surface drainage needed; subsurface drainage difficult.	Soil properties are favorable.	Not needed	Severe; generally unsuitable because of high water table and intermittent wetness.
Permeable to depth of 3½ to 6 feet.	Soil properties are favorable.	Not needed	Soil properties are favorable.	Usually not needed, but soil properties are favorable.	Slight.
Permeable to depth of 3 to 6 feet.	Soil properties are favorable.	Surface drainage needed.	Soil properties are favorable.	Usually not needed, but soil properties are favorable.	Severe; generally unsuitable because of intermittent wetness and flooding.
Soil properties are favorable.	High erodibility	Seasonal high water table; flooding.	Soil properties are favorable.	Usually not needed, but soil properties are favorable.	Severe; generally unsuitable because of intermittent wetness and flooding.
Permeable to depth of 3 to 6 feet.	Soil properties are favorable.	Surface drainage needed; subsurface drainage difficult; slow permeability.	Slow permeability in subsoil; suitability questionable.	Not needed	Severe; generally unsuitable because of flooding and a slowly permeable subsoil.
Soil properties are favorable.	High erodibility	Not needed	Moderately deep root zone; slow permeability in subsoil.	Fragipan at depth of 12 to 24 inches; strong slopes.	Moderate; slowly permeable fragipan.
Soil properties are favorable.	High erodibility	Not needed	Soil properties are favorable.	Strong slopes	Slight.
Soil properties are favorable.	High erodibility	Not needed	Soil properties are favorable.	Strong slopes	Slight.
Soil properties are favorable.	High erodibility	Not needed	Soil properties are favorable.	Usually not needed, but soil properties are favorable.	Slight.
Rapid permeability.	Soil properties are favorable.	Not needed	Soil properties are favorable.	Not needed	Severe; generally unsuitable because of flooding.
Soil properties are favorable.	Low strength and stability.	Surface drainage needed; subsurface drainage difficult.	Shallow root zone; slow permeability in subsoil.	Not needed	Severe; generally unsuitable because of a slowly permeable subsoil, seasonal high water table, and flooding.

TABLE 7.—*Engineering*

Soil series and map symbols [1]	Suitability as source of—			Soil features affecting—	
	Topsoil	Sand	Road fill	Highway location	Dikes or levees
Sharkey (Sa, Sh).	Poor	Unsuitable	Poor	Highly plastic consistence; flooding.	High shrink-swell potential; cracks when dry; slow permeability.
Tunica (Tc).	Poor	Some profiles have fine or very fine sand below depth of 2 feet.	Poor	Highly plastic consistence; flooding.	High-shrink-swell potential; cracks when dry.
Wakeland (Wa).	Top 8 inches is fair.	Unsuitable	Poor to fair	Seasonal high water table.	High erodibility on slopes; compaction at optimum moisture required.
Waverly (Ws, Wv).	Top 6 inches is fair to good.	Unsuitable	Poor	Flooding; high water table.	High erodibility on slopes; compaction at optimum moisture required.

[1] For interpretations of the soils that make up a complex, it is necessary to refer to the respective series.

Use of the Soils for Woodland [5]

Dense forests originally covered all of Dyer County. The early settlers found productive stands of oak, hickory, walnut, poplar, gum, beech, cypress, and other trees. Capt. A. M. Stevens erected the first sawmill in the county in 1849. Logs were floated from the woods to the mill down the three major rivers in the county—the Forked Deer, the Obion, and the Mississippi.

Since the settlement of the county, the woodlands have been gradually cleared. About 95,000 acres, or 28 percent, out of the total land area of 337,280 acres is now wooded. Most of this acreage is on the steeper hills of the uplands and on the wetter parts of the Mississippi River bottoms. In 1961, sawtimber volume for all species was 264.9 million board feet, mainly in second-growth stands (*16*).

According to the State Division of Forestry, 583 acres was planted to trees between 1929 and 1950, and 234 acres was planted between 1951 and 1961. The loblolly pine, black walnut, yellow-poplar, black locust, and cottonwood plantings have grown into beautiful stands.

Markets for rough logs and lumber are available locally. Markets for handle stock, staves, veneer, plywood, and pulpwood are available within 100 miles of Dyersburg and can be reached by water, rail, and highway.

Woodland Groups

Management of woodland can be planned more easily if soils are grouped according to those characteristics that affect tree growth. For this reason, the soils of Dyer County have been placed in 11 woodland groups. Each group consists of soils that have about the same suitability for wood crops, require about the same management, and have about the same potential productivity. Table 8 lists the 11 woodland groups, which are described in the text also. Table 8 gives, for each group, the average site index for various kinds of trees, the degree of limitation imposed by hazards that affect management, the species to favor in managing existing stands, and the species suitable for planting. The terms used in this table are explained in the text.

SITE INDEX.—The potential productivity of a soil for a specified kind of tree is expressed as a site index. A site index is the height, in feet, that a specified kind of tree growing on a given soil will reach in a specified period, usually 50 years. The site index depends mainly on the capacity of the soil to provide moisture and growing space for tree roots. The site indexes in table 8 are averages for the groups. They were determined at 50 years of age for all species except cottonwood, for which an age of 30 years was used. The site index for any one soil in the group may be slightly different from the average.

SEEDLING MORTALITY.—Even when healthy seedlings of a suitable species are correctly planted or occur naturally in adequate numbers, some will not survive if characteristics of the soil are unfavorable. Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking; in some places replanting to fill open spaces will be necessary. Mortality is *severe* if more than 50 percent of the planted seedlings die, or if trees do not ordinarily reseed naturally in places where there are enough seeds. If mortality is severe, it is necessary to plant seedlings where seeds do not grow, to prepare special seedbeds, and to replant where needed to ensure a full stand of trees.

[5] By C. E. BURGER, woodland conservationist, Soil Conservation Service, Nashville, Tenn.

interpretations—Continued

Soil features affecting—Continued					Degree of limitation for use as septic tank filter field
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	
Reservoir area	Embankment				
Soil properties are favorable.	High shrink-swell potential; cracks when dry.	Surface drainage needed; subsurface drainage difficult.	Very slow intake rate.	Not needed	Severe; generally unsuitable because of slow permeability and flooding.
Permeable below depth of 2 feet.	High shrink-swell potential; cracks when dry.	Surface drainage needed; subsurface drainage difficult.	Very slow intake rate.	Not needed	Severe; generally unsuitable because of flooding.
Soil properties are favorable.	High erodibility	Surface drainage needed; subsurface drainage difficult.	Slow permeability	Not needed	Severe; generally unsuitable because of high water table and intermittent wetness.
Soil properties are favorable.	High erodibility	Seasonal high water table; flooding.	Poor drainage; subject to flooding.	Not needed	Severe; generally unsuitable because of flooding and high water table.

Plant competition.—Undesirable brush, trees, and plants may invade abandoned fields or openings in a forest canopy. The invading growth competes with the desirable trees and hinders their establishment and growth. Competition is *slight* if unwanted plants are no special problem. It is *moderate* if the invaders delay but do not prevent the establishment of a normal, fully stocked stand. Where plant competition is moderate, seedbed preparation is generally not needed and simple methods will prevent undesirable plants from invading. Competition is *severe* if trees cannot regenerate naturally or if unwanted plants threaten to smother planted trees. Where competition is severe, the unwanted plants should be destroyed by controlled burning, spraying with chemicals, or girdling, and the site should be carefully prepared for planting.

Equipment limitation.—Drainage, slope, stoniness, soil texture, or other soil characteristics may restrict or prohibit the use of ordinary equipment in planting, thinning, harvesting, or other woodland operations. Different soils may require different kinds of equipment or special methods of operation, or they may be unsuitable for equipment use at different seasons. The limitation is *slight* if there are no restrictions on the type of equipment or on the time of year that the equipment can be used. It is *moderate* if slopes are moderately steep, if wetness in winter and early in spring restricts the use of heavy equipment, or if tree roots are damaged to some extent by the use of equipment. The limitation is *severe* if many types of equipment cannot be used, if the period during which equipment cannot be used is more than 3 months in a year, and if the roots of trees and the structure and stability of the soil are severely damaged by the use of equipment.

Erosion hazard.—Woodland soils can be protected from erosion by growing suitable kinds of trees, by adjusting the rotation age and cutting cycles, by using special techniques in management, and by carefully constructing and maintaining roads, trails, and landings. The erosion hazard is rated according to the risk of erosion in well-managed woodland that is not protected by special practices. It is *slight* where only a small loss of soil is expected, generally on slopes of 0 to 2 percent where runoff is slow or very slow. The erosion hazard is *moderate* where the vegetation is not adequate for protection and a moderate loss of soil would be expected if runoff were not controlled. It is *severe* where slopes are steep, runoff is rapid, and infiltration and permeability are slow.

Windthrow hazard.—Soil characteristics affect the development of tree roots and the firmness with which the roots anchor the tree in the soil so that it resists the force of the wind. Adequate root development may be prevented by a high water table or by an impermeable layer. The protection offered by surrounding trees also affects windthrow hazard. Knowing the degree of this hazard is important when choosing trees for planting and when planning release cuttings or harvest cuttings. The windthrow hazard is *slight* if roots hold the tree firmly against a normal wind; individual trees are likely to remain standing if protective trees on all sides are removed. The hazard is *moderate* if roots hold the tree firmly except when the soil is excessively wet and the wind velocity is very high. It is *severe* if roots are not deep enough to give adequate stability and individual trees are likely to be blown over if released on all sides, that is, if protective trees are removed.

Woodland group 1

This group consists of well drained and nearly well drained soils on the Mississippi River bottoms. These soils are silty or loamy to a depth of several feet. They have a deep root zone and a very high available water capacity, and they are high in natural fertility. Some

TABLE 8.—*Woodland groups of soils, their site indexes, and ratings*

Woodland group	Site index [1]					
	Bottomland oak	Sweetgum [2]	Cottonwood	Mixed upland oak	Yellow-poplar	Black walnut
Group 1: Well drained and nearly well drained loamy soils on the Mississippi River bottoms. Ad, Bo, Bs, Cl, Cm, Co, Ds, Mo, Ro, Rs.	[3] 100	[3] 105	97±12 (11)	[4]	[4]	[3] 95
Group 2: Black, clayey soils on the Mississippi River bottoms. Ag, At, Bt, Bw, Sa, Sh, Tc.	91±9 (8)	95±8 (6)	112±13 (5)	[4]	[4]	85 (2)
Group 3: Very sandy, droughty soils on the Mississippi River bottoms. Cr, Cs.	[4]	[4]	80 (2)	[4]	[4]	[4]
Group 4: Poorly drained and somewhat poorly drained, loamy soils on the Mississippi River bottoms. Bd, Dk, Do, Dt, Du, Dv, Fd, Fo, Wa.	97 (3)	92 (2)	105 (1)	[4]	[4]	[4]
Group 5: Silty soils on bottom lands; under a few inches to 1 or 2 feet of water nearly all year. Sw, Wv.	[3] 80	[3] 85	[4]	[4]	[4]	[4]
Group 6: Well-drained, undulating to hilly soils that developed in deep loess. LoB, LoB3, LoC3, LoD3, LoE3, MfB, MfB3, MfC, MfC3, MfD3, MfE3.	[3] 90	[3] 90	[4]	[3] 90	[3] 98	[3] 95
Group 7: Well-drained, hilly to very steep soils that developed in deep loess. LrE, MfF, MfF3, MfG, MgF.	[3] 90	[3] 70	[4]	86±14 (14)	95±8 (10)	90 (2)
Group 8: Moderately well drained, silty soils that have a fragipan. GrB, GrB3, GrC3, GrD3.	[4]	[3] 80	[4]	69±2 (5)	90 (3)	[3] 65
Group 9: Poorly drained and somewhat poorly drained, silty soils on bottom lands. Fa, Ws.	107±6 (6)	103 (3)	100±10 (5)	[4]	[4]	[4]
Group 10: Poorly drained and somewhat poorly drained, silty soils that have a fragipan. Ca, Rt.	90±9 (14)	97±14 (9)	[4]	[3] 70	[4]	[4]
Group 11: Variable land types that include deep gullies, graded land, and open pits and levees on the Mississippi River bottoms. Ga, Gu, Lb, Ma.	[5]	[5]	[5]	[5]	[5]	[5]

[1] Plus and minus values (±) are standard deviations calculated when four or more plot measurements were available. A number in parentheses below the site index indicates the number of measured plots on which the average site index value is based. The site indexes are averages for groups and were determined at 50 years of age for all species except cottonwood, for which an age of 30 years was used.

[2] Commonly known as redgum on the bottom lands.

for major limitations and hazards affecting management

Seedling mortality	Plant competition	Equipment limitation	Erosion hazard	Windthrow hazard	Species to favor in existing stands	Species suitable for planting
Slight	Severe	Slight	Slight	Slight	Cottonwood, cherrybark oak, sweetgum, water oak, sycamore, white oak, black walnut, hackberry, sweet pecan, and holly.	Cherrybark oak, cottonwood, black walnut, sweetgum, and sweet pecan.
Moderate	Severe	Severe	Slight	Moderate	Cypress, cottonwood, bottom-land oak, persimmon hackberry, sweetgum, black willow, sycamore, and black walnut.	Cypress, cottonwood swamp white oak, sweetgum, and black walnut.
Moderate	Slight	Slight	Slight	Moderate	Cottonwood, sweet pecan, sycamore, hackberry, and black willow.	Cottonwood, sycamore, and black willow.
Slight	Severe	Moderate	Slight	Slight	Cottonwood, bottom-land oak, sweetgum, and green ash.	Cottonwood, cherrybark oak, water oak, and sweetgum.
Severe	Severe	Severe	Slight	Slight	Cypress, tupelo-gum, bottom-land oak, sweetgum, cottonwood, hackberry, and persimmon.	Cypress and cottonwood. (Planting not practical in many areas)
Slight	Moderate	Slight	Moderate to severe.	Slight	Yellow-poplar, black walnut, cherrybark oak, southern red oak, white oak, northern red oak, loblolly pine, black cherry, black locust, sycamore, hickory, cottonwood, redcedar, holly, persimmon, and dogwood.	Black walnut, loblolly pine, yellow-poplar, and black locust.
Slight	Moderate	Moderate	Severe	Slight	Yellow-poplar, black walnut, cherrybark oak, southern red oak, white oak, northern red oak, loblolly pine, black cherry, black locust, sycamore, hickory, cottonwood, redcedar, holly, persimmon, and dogwood.	Black walnut, loblolly pine, yellow-poplar, and black locust.
Slight	Slight	Slight	Moderate to severe.	Moderate	American elm, hickory, cherrybark oak, chinkapin oak, Shumard oak, white oak, southern red oak, loblolly pine, shortleaf pine, and sweetgum.	Loblolly pine and shortleaf pine.
Slight to moderate.	Severe	Severe	Slight	Slight	Cottonwood, bottom-land oak, sweetgum, persimmon, sycamore, and sweet pecan.	Cottonwood, cypress, and bottom-land oak.
Slight to moderate.	Moderate	Moderate	Slight	Moderate	Cherrybark oak, white oak, sweetgum, water oak, southern red oak, and Shumard oak.	Loblolly pine.
Slight to severe.	Moderate	Slight to severe.	Slight to severe.	Slight to severe.	Pines and existing trees of good form and vigor.	Shortleaf pine and loblolly pine.

[3] Inferred from data for similar soils.
[4] Generally not found on soils in this group.
[5] Site indexes range from very low to very high.

areas are flooded for a few days each winter and spring. The soils in this group are—

Ad Adler silt loam.
Bs Bosket silt loam.
Bo Bosket sandy loam.
Cl Collins silt loam.
Cm Commerce loam.
Co Commerce silty clay loam.
Ds Dubbs silt loam.
Mo Morganfield silt loam.
Ro Robinsonville fine sandy loam.
Rs Robinsonville loam.

Nearly all of the acreage is cleared and is used for row crops. The wooded areas—in the corners and along the edges of some fields—are small. These soils are excellent sites for high-quality bottom-land hardwoods. Natural or existing stands consist mainly of cherrybark oak, hackberry, sweetgum, sweet pecan, sycamore, walnut, and cottonwood (fig. 21).

Because of the high natural fertility and the high moisture supply, plant competition is severe. Cottonwood and sweetgum field plantings need cultivation during the first year in order to survive and grow. Black walnut and cherrybark oak can be established by direct seeding, but they too require weeding during the first year or two. Removing cull trees and low-value trees from existing stands and leaving sufficient seed trees of preferred species (3 to 5 per acre) will help to restock the stands with good-quality trees.

Woodland group 2

This group consists of dark grayish-brown to nearly black, plastic clay soils on bottom lands along the Mississippi River. These soils are slowly permeable, and the water table rises nearly to the surface in winter and spring. Most areas are flooded for several days during these seasons. The soils in this group are—

Ag Alligator clay.
At Alligator-Crevasse complex.
Bt Bowdre clay.
Bw Bowdre clay, coarse subsoil.
Sa Sharkey clay.
Sh Sharkey silty clay loam.
Tc Tunica clay.

A large part of the acreage is woodland. Some tracts are as much as 500 acres in size. Existing stands consist mainly of bottom-land oak, hackberry, sweetgum, sycamore, black willow, and cottonwood. Some cypress grows in the wetter spots. These soils are good to excellent sites for high-quality bottom-land hardwoods.

Figure 21.—**Fast-growing cottonwood trees on Adler silt loam, a soil in woodland group 1.**

Seedling mortality on the soils in this group is moderate. The clay texture and excess water are the principal causes of the loss of seedlings. Since the soils are plastic when wet and are hard and cloddy when dry, preparing a good seedbed is difficult. Some areas are under water for as much as 2 weeks in winter and spring. The standing water can be expected to kill some seedlings, especially of Nuttall oak.

These soils are high in natural fertility, and consequently plant competition is severe. Weeds, vines, and briers grow abundantly in new plantings and in openings in existing stands. Cottonwood and sweetgum plantings need cultivation during the first year in order to survive and grow. Removing cull trees and low-value trees from existing stands is beneficial.

Severe equipment limitations are imposed by floods and a high water table in winter and spring, and by the slick plastic nature of the soils. Use of logging equipment usually is limited to the dry summer months.

Windthrow is a problem only on Bowdre clay, coarse subsoil. It is a moderate hazard on this soil, because the almost pure sand at a depth of 10 to 15 inches does not provide a strong foothold for trees.

Woodland group 3

This group consists of very sandy soils on the Mississippi River bottoms. These soils form narrow strips either near the present bank of the river or near former banks. They are open and porous, and they have a low available water capacity. The surface layer in some areas consists of sandy loam and is 10 inches thick. In other areas it consists of loamy sand. The subsoil consists of alternating layers of loamy sand and sand. The soils in this group are—

Cr Crevasse loamy sand.
Cs Crevasse sandy loam.

About a third of the acreage is in forest. Most stands are thin and consist mainly of cottonwood, hackberry, and black willow. There is some small vegetation. These soils are droughty and are only fair sites for bottom-land hardwoods such as cottonwood, pecan, sycamore, hackberry, and black willow.

Seedling mortality is moderate on these soils. The loss of seedlings is caused mainly by the lack of water. Some replanting may be necessary to ensure good stands.

Heavy equipment likely cannot be operated on these sandy soils, but the problem is not serious because the areas are narrow and are next to soils on which heavy equipment can be used.

Woodland group 4

This group consists of poorly drained and somewhat poorly drained soils on low terraces or second bottoms of the Mississippi River. These soils are silty or loamy to a depth of several feet. Their subsoil is poorly aerated below a depth of 15 to 24 inches. These soils are often waterlogged in winter and spring as a result of seepage, flooding, and a high water table. They dry out late in spring, and excess water is only a slight limitation or no limitation at all from then until late in fall. The soils in the group are—

- Bd Birds silt loam.
- Dk Dekoven silt loam.
- Do Dekoven silt loam, overwash.
- Dt Dundee clay loam.
- Du Dundee loam.
- Dv Dundee silt loam.
- Fd Forestdale silt loam.
- Fo Forestdale-Crevasse complex.
- Wa Wakeland silt loam.

About 5 percent of the acreage is in forest. The present stands consist of a wide variety of bottom-land hardwoods. Although these soils are used mostly for crops and pasture, they are good to excellent sites for bottom-land hardwoods.

High natural fertility combined with high moisture supply encourages vegetation to grow vigorously. Vines, briers, and bushes grow in abandoned fields and in openings in the existing stands. Nevertheless, natural regeneration can be relied upon to provide adequate restocking of desirable trees. It may be necessary to remove cull trees, low-value trees, and invading vegetation from existing stands to ensure the growth of good-quality trees. In abandoned fields and in openings where planting is needed, site preparation and weeding may be needed.

Moderate equipment limitations are imposed by occasional floods and by wetness in winter and in spring. Logging is possible about 8 or 9 months out of the year.

Woodland group 5

This group consists of wet silty soils of the bottom lands. Some areas are covered with water nearly all year; others dry out for a few weeks in summer. The wetness results from a high water table and flooding. The soils in this group are—

- Sw Swamp.
- Wv Waverly silt loam, low.

These soils are largely forested. Their acreage includes some of the largest tracts of timber in the county. Existing stands consist mostly of gum, cypress, willow, cottonwood, Nuttall oak, and overcup oak. In some places these soils are so waterlogged or so swampy that some of the trees, particularly oaks, are dying. These soils are good to excellent sites for cypress, tupelo-gum, and sweetgum and fair to poor sites for bottom-land oak.

Because planting generally is not feasible in many areas, natural regeneration must be depended upon for restocking even though it may not provide fully stocked stands in areas that are waterlogged nearly all year.

The kind of equipment that can be used is severely limited. Most areas can be logged only late in summer or early in fall.

Woodland group 6

This group consists of deep, well-drained soils that developed in loess. These soils have a deep, well-aerated root zone and a high available water capacity. The soils in this group are—

- LoB Loring silt loam, 2 to 5 percent slopes.
- LoB3 Loring silt loam, 2 to 5 percent slopes, severely eroded.
- LoC3 Loring silt loam, 5 to 8 percent slopes, severely eroded.
- LoD3 Loring silt loam, 8 to 12 percent slopes, severely eroded.
- LoE3 Loring silt loam, 12 to 20 percent slopes, severely eroded.
- MfB Memphis silt loam, 2 to 5 percent slopes.
- MfB3 Memphis silt loam, 2 to 5 percent slopes, severely eroded.
- MfC Memphis silt loam, 5 to 8 percent slopes.
- MfC3 Memphis silt loam, 5 to 8 percent slopes, severely eroded.
- MfD3 Memphis silt loam, 8 to 12 percent slopes, severely eroded.
- MfE3 Memphis silt loam, 12 to 20 percent slopes, severely eroded.

Most of the acreage is cleared. The acreage that is not cleared consists of small woodlots. A wide variety of upland hardwoods makes up the existing stands. These soils are excellent sites for upland hardwoods and for loblolly pine and black locust. Loblolly pine does not grow naturally, but trial plantings up to 20 years of age show that it is well adapted.

These soils are fertile and have a high available moisture capacity. Plant competition is moderate. Mainly because of a lack of suitable seed trees, natural regeneration cannot always be relied upon to provide adequate restocking of high-value trees. In natural stands, planting of seedlings and removal of cull trees, low-value trees, and bushes may be necessary. Abandoned fields and openings where planting is needed may require site preparation, cultivation, and weeding.

These silty soils erode easily if unprotected. Therefore, protection must be provided if roads and trails are located on these soils. Unnecessary disturbance of the soils should be avoided.

Woodland group 7

The soils in this group are largely in the belt of steep hills next to the Mississippi River bottoms. They developed in loess and are very deep and well drained. Surface runoff is rapid and the erosion hazard is severe. The soils in this group are—

- LrE Loring-Gullied land complex, 12 to 20 percent slopes.
- MfF Memphis silt loam, 20 to 30 percent slopes.
- MfF3 Memphis silt loam, 20 to 30 percent slopes, severely eroded.
- MfG Memphis silt loam, 30 to 50 percent slopes.
- MgF Memphis-Gullied land complex, 20 to 30 percent slopes.

A large part of the acreage is wooded. Existing stands consist of a wide variety of upland hardwoods. These soils are good to excellent sites for upland hardwoods and for pine. Loblolly pine does not grow naturally, but plantings up to 20 years of age show that it is well adapted. Site index ratings for oak, yellow-poplar, black walnut, and sweetgum are given in table 8. Studies by the U.S. Forest Service show that the average site index for cherrybark oak is 83±5 on 18 plots of severely eroded Memphis and Loring soils and 98±5 on 17 plots of uneroded Memphis and Loring soils.

These soils are fertile and have a high available water capacity. Plant competition is moderate. Undesirable plants may delay but will not prevent the establishment of a stand of desirable trees. Natural regeneration will ordinarily restock the stands, but removal of bushes, cull trees, and low-value trees will be necessary to ensure good stands of desirable trees. In abandoned fields and in openings where planting is necessary, site preparation and weeding may be needed.

The steep slopes impose moderate equipment limitations.

These soils erode rapidly if unprotected. Gully erosion is especially likely. Some areas now have many shallow gullies. The severe erosion hazard must be considered in locating roads and trails. Unnecessary disturbance of the soils should be avoided.

Woodland group 8

This group consists of moderately well drained, silty soils that have a fragipan at a depth of 10 to 24 inches. The material above the fragipan is permeable, friable, and easily penetrated by roots. The fragipan is slowly permeable, and it restricts root growth. These soils formed in deep loess on uplands. Their slope range is 2 to 12 percent. Their texture is silt loam to a depth of 10 feet or more. The soils in this group are—

GrB Grenada silt loam, 2 to 5 percent slopes.
GrB3 Grenada silt loam, 2 to 5 percent slopes, severely eroded.
GrC3 Grenada silt loam, 5 to 8 percent slopes, severely eroded.
GrD3 Grenada silt loam, 8 to 12 percent slopes, severely eroded.

Most of the acreage is cleared and is in row crops. Forests occur mostly as small woodlots. Existing stands consist of some redcedar and a wide variety of upland hardwoods. These soils are fair to good sites for upland hardwoods and good sites for loblolly pine and shortleaf pine. Loblolly pine does not grow naturally on these soils, but plantings up to 20 years of age show that it is well suited.

These soils erode easily, because they are silty and their lower subsoil is slowly permeable. They must be protected against erosion if used for roads and trails. Disturbance of the soils should be avoided as much as possible.

Because of the fragipan and the shallow root zone, a moderate windthrow hazard may be expected if trees are released on all sides.

Woodland group 9

This group consists of permeable, silty soils on bottom lands. These soils are somewhat poorly drained and poorly drained. They are waterlogged during much of winter and spring because of seepage, flooding, and a high water table. The texture is silt loam to a depth of several feet. The soils in this group are—

Fa Falaya silt loam.
Ws Waverly silt loam.

Most of the acreage has been cleared, but there is still a large part in forest, including a few large tracts in the wettest areas. Existing stands consist mainly of green ash, cottonwood, hackberry, bottom-land oak, red maple, persimmon, sweetgum, and sycamore, all of which are well suited to these soils.

Seedling mortality is moderate, especially late in spring. Floods during this time of year are the principal cause of the loss of seedlings, especially on Waverly silt loam. Because of the high natural fertility and the high moisture supply, vines, briers, and bushes grow in abandoned fields and in openings in tree stands. Cultivation of cottonwood plantings is required during the first 2 years to ensure a good stand.

Flooding and a high water table impose severe equipment limitations. Logging is possible mainly during the dry summer months.

Woodland group 10

This group consists of poorly drained and somewhat poorly drained, silty soils that have fragipan. These soils have a slowly permeable subsoil, and they are poorly aerated below a depth of 8 inches. They have a shallow root zone and an erratic moisture supply. In winter and spring they are very wet and often ponded, but they are very dry in summer and fall. The soils in this group are—

Ca Calloway silt loam.
Rt Routon silt loam.

Much of the acreage of these soils has been cleared for crops and pasture. Existing woodlands consist mainly of white oak, water oak, southern red oak, and sweetgum. These soils are good for water-tolerant trees.

Seedling mortality is slight to moderate. The main problem, especially on the Routon soil, is preventing seedlings from drowning.

Plant competition is moderate. Undesirable plants will slow down but will not prevent the establishment of a stand of trees. Areas planted to loblolly pine should be weeded within 2 years of planting.

Woodland group 11

This group consists of areas deeply cut by gullies, areas that have been graded for engineering uses, open pits, and levees on the Mississippi River bottoms. Soil texture, depth of the root zone, and water capacity are highly variable. In this group are—

Ga Gravel pits.
Gu Gullied land.
Lb Levees and borrow pits.
Ma Made land.

In prescribing forest management for these areas, each site or field must be studied individually. Even areas of Gullied land vary, because the number of gullies varies from place to place and so does the depth of the gullies.

Stand and Yield Data

Table 9 gives the total volume of wood per acre in mixed stands of upland oak for several site index classes, and table 10 gives this information for stands of yellow-poplar. These tables illustrate the relation between site index and yields in stands of specified ages.

Management of the Soils for Wildlife[6]

Hunting and fishing are important forms of recreation in the county. Game and fish can be attracted to a particular area by suitable management of soil, plants, and water. The practices that improve wildlife habitats also help to protect the soil and to conserve water.

Food and Habitat Needs

The food and habitat needs of wildlife and fish vary. Some wildlife species eat only insects and other animal foods, some eat only vegetative foods, and others eat a combination of the two. Some like to live in woodlands, others prefer open farmlands, and some, ducks for example, need a watery habitat. Some fish, like largemouth

[6] By FLOYD R. FESSLER, biologist, Soil Conservation Service, Nashville, Tenn.

TABLE 9.—*Stand and yield data for upland oak*

[Based on USDA Forest Service Technical Publication 560 (*13*)]

Site index	Age	Total volume per acre			Height of dominant trees	Average diameter	Total trees per acre
		Cubic feet	Cords	Board feet (International rule)			
	Years				*Feet*	*Inches*	*Number*
50	20	70	1	([1])	23	2. 2	2, 520
	30	540	6	350	33	3. 4	1, 246
	40	1, 090	13	1, 400	42	4. 5	789
	50	1, 600	19	3, 250	50	5. 3	623
	60	2, 080	24	5, 600	56	6. 1	507
	70	2, 510	30	8, 150	60	6. 9	419
	80	2, 900	34	10, 450	62	7. 5	375
	90	3, 230	38	12, 600	64	8. 1	346
	100	3, 520	41	14, 700	65	8. 7	320
60	20	170	2	([1])	30	2. 5	1, 945
	30	880	10	850	41	4. 0	965
	40	1, 580	19	3, 200	51	5. 3	611
	50	2, 230	26	6, 300	60	6. 3	482
	60	2, 800	33	9, 700	67	7. 2	390
	70	3, 290	39	12, 800	71	8. 0	326
	80	3, 730	44	15, 650	75	8. 8	292
	90	4, 120	48	18, 300	77	9. 4	268
	100	4, 480	53	20, 900	79	10. 1	248
70	20	360	4	150	36	2. 9	1, 500
	30	1, 270	15	1, 750	48	4. 6	743
	40	2, 090	26	5, 500	60	6. 0	472
	50	2, 830	33	9, 750	70	7. 2	374
	60	3, 480	41	13, 900	78	8. 3	304
	70	4, 030	47	17, 700	83	9. 3	252
	80	4, 510	53	21, 200	87	10. 2	224
	90	4, 960	58	24, 500	90	11. 0	207
	100	5, 400	64	27, 650	92	11. 7	192
80	20	620	7	350	43	3. 4	1, 160
	30	1, 690	20	3, 350	56	5. 3	578
	40	2, 610	31	8, 600	69	6. 9	366
	50	3, 450	41	13, 750	80	8. 3	290
	60	4, 160	49	18, 600	89	9. 5	235
	70	4, 770	56	23, 100	95	10. 7	196
	80	5, 340	63	27, 250	99	11. 7	174
	90	5, 870	69	30, 950	103	12. 7	161
	100	6, 380	75	34, 400	105	13. 6	148

[1] Not computed.

bass and bluegill, need warm water, but others, like trout, need cold water.

Following is a brief summary of the food and habitat needs of the kinds of wildlife and fish most important in Dyer County.

Bobwhite.—Choice foods are acorns, seeds, and fruit. Bobwhite also eat many kinds of insects. The food must be close to vegetation that provides shade and protection from predators and from adverse weather.

Deer.—Deer feed on the tender growth of grasses, herbs, shrubs, vines, and trees. Acorns, corn, soybeans, and similar foods are also choice. Wooded areas of 500 acres or more are suitable habitats. Deer drink water frequently, so sources of water should not be more than 1 mile apart.

Dove, mourning.—These birds eat only the seeds of plants; they do not eat insects, green leaves, or fruit. The seeds must be on open ground, because doves do not scratch for feed as do other birds. Doves drink water daily.

Duck, wild.—Wild ducks prefer their food covered with water, though they will feed occasionally on dry land when flooded food is not available. The water should not be more than 15 inches deep for ducks, such as mallards and pintails, that do not dive for their food.

Goose, wild.—Wild geese feed on corn and other grains. They graze clover, rye, ryegrass, wheat, and other green winter crops. These migratory birds use areas of water for resting and drinking.

Rabbit, cottontail.—Rabbits are the primary food of many kinds of predators. They need a brier-type habitat that provides protection as well as shelter. Clovers, winter grains, and grasses are suitable foods.

Squirrel.—These animals generally prefer wooded areas in which there are mixed stands of trees that bear acorns, nuts, fruit, and seeds. They also like corn. Squirrels nest in trees but prefer den holes in the trees for shelter and for rearing their young.

TABLE 10.—*Stand and yield data for yellow-poplar*

[Based on unpublished data furnished by E. F. McCarty, U.S. Forest Service]

Site index	Age	Total volume per acre			Height of dominant trees [1]	Average diameter	Total trees per acre
		Cubic feet	Cords	Board feet (International rule)			
	Years				*Feet*	*Inches*	*Number*
80	20	880	9	1, 200	44	6. 3	235
	30	1, 800	18	5, 500	58	7. 6	268
	40	2, 690	27	11, 230	70	9. 3	246
	50	3, 570	36	17, 620	80	11. 0	214
90	20	1, 180	12	2, 000	51	6. 6	252
	30	2, 300	23	8, 710	66	8. 3	260
	40	3, 390	34	16, 300	79	10. 1	230
	50	4, 480	45	24, 400	90	12. 2	194
100	20	1, 475	15	3, 400	56	6. 9	264
	30	2, 800	28	12, 150	74	8. 8	252
	40	4, 085	41	21, 790	89	10. 9	218
	50	5, 330	53	32, 150	100	13. 2	176
110	20	1, 765	18	5, 180	62	7. 2	266
	30	3, 320	33	15, 600	81	9. 3	244
	40	4, 800	48	27, 350	98	11. 6	204
	50	6, 220	62	40, 200	110	14. 1	164

[1] Determined from curves by WARREN DOOLITTLE, U.S. Forest Service.

Turkey, wild.—Wild turkeys thrive only in woodlands of 1,000 acres or more. They eat insects, acorns, grapes, grass seed, pine seed, and, in winter and spring, green forage. They need water daily.

Nongame birds.—The foods of the many kinds of nongame birds vary greatly. Several species eat only insects. A few eat insects and fruit. Several others eat insects, acorns, nutmeats, and fruit.

Fish.—Warm-water ponds are suitable for largemouth bass, bluegill, redear sunfish, and channel catfish. The choice foods of bluegill and redear sunfish are aquatic worms, insects, and insect nymphs and larvae. Bass and channel catfish feed on small fish. Channel catfish must weigh about a pound before they can feed readily on small fish. The supply of food for fish depends on the fertility of the water, on the nature of the soils of the watershed, and somewhat on the nature of the soils at the bottom of the pond. Most warm-water ponds need fertilizer to increase fish production and to discourage troublesome water weeds. Fertilizer containing nitrogen, phosphate, and potash is best. Lime is needed in all ponds but those on the Mississippi River bottoms and those on the adjacent steep hills. Supplementary feeding also can increase fish production.

Soil-Plant-Wildlife Relationship

Most wildlife species cannot be related directly to soils in the county. Instead, there is a two-step relationship: (1) each species is related to its choice foods, and (2) the choice foods, in turn, are related to a group of soils that have similar characteristics and, thus, similar capacity to produce food and cover for wildlife.

The soils in Dyer County have been placed, by soil series, in nine wildlife groups. These groups are discussed in the pages that follow.

Table 11 lists alphabetically the most important wildlife food plants in the county and rates them as *choice*, *fair*, or *unimportant* as food for given kinds of wildlife.

Table 12 lists the same plants and rates them as *suited*, *marginally suited*, *poorly suited*, or *not suited* to the soils in each of the nine wildlife groups.

The plants listed in the tables also furnish cover for some species. Vegetative cover is generally abundant in Dyer County or can be grown readily where needed.

Wildlife group 1

This group consists of deep, fertile soils on bottom lands. These soils are well drained or nearly well drained, and they are silty or loamy to a depth of 30 inches or more. Slopes are dominantly less than 3 percent, and most fields are practically level. These soils are easy to work, and they produce high yields of many crops. They are exceptionally productive of summer annual crops, and they can be row cropped every year. Many areas are flooded for a few days in winter and spring but rarely in summer and fall. The soil series in this group are—

Adler.
Bosket.
Collins.
Commerce.
Dubbs.
Dundee.
Morganfield.
Robinsonville.

Wildlife group 2

This group consists of deep, well-drained or practically well-drained soils that have a deep root zone and a high available moisture capacity. Both the surface layer and the subsoil are medium textured. The response to management is high.

Slope is a major limitation. The soils can produce high yields of locally grown crops, but few areas are level enough for annual cultivation. The dominant slope range is 2 to 12 percent, but there are some slopes of as much as 50 percent.

The soil series in this group are—

Loring.
Memphis.

Wildlife group 3

This group consists of the soils in the Grenada series. These soils have a fragipan at a depth of 1 to 2 feet. The root zone extends down to the pan. Within the root zone, the soil material is friable and easy to keep in good tilth. Because of the dense pan, water and air move slowly and the lower part of the subsoil is waterlogged during rainy seasons. The dominant slope range is 2 to 8 percent, but in a few areas the slopes range up to 12 percent. There are a few nearly level areas. Grenada soils respond well to management. They are suited to cultivation, but frequency of cultivation depends on steepness of slope. Nearly all locally grown crops grow well.

Wildlife group 4

This group consists of the soils in the Crevasse series. These soils are on nearly level first and second bottoms. They are either sand or loamy sand to a depth of 30 inches or more. These soils have a very low water-holding capacity. They produce low yields of summer annual crops. The best suited crops are those that mature in spring or early in summer when the moisture supply is least limited. Crevasse soils are in narrow strips along the Mississippi River and along former channels of the river.

TABLE 11.—*Suitability of plants as food for wildlife*

[The figure 1 indicates that the plant is *choice* (attractive and nutritious for a given kind of wildlife); the figure 2, *fair* (eaten when choice foods are unavailable); the figure 3, *unimportant* (eaten only in small amounts)]

Plant	Bobwhite	Deer	Dove	Duck	Goose	Rabbit	Squirrel	Turkey	Nongame birds [1]		
									Fruit eaters	Grain and seed eaters	Nut and acorn eaters
Alfalfa	3	1	3	3	1	1	3	3	3	3	3
Amaranth, or pigweed	2	3	1	3	3	3	3	3	3	2	3
Ash, green and white	1	2	3	2	3	3	2	2	3	2	2
Barley	2	2	2	2	1	2	1	1	3	2	3
Barnyard grass	3	3	1	1	1	3	3	3	3	2	3
Beech	1	3	3	1	3	3	1	1	3	3	1
Blackberry	1	2	3	3	3	3	1	1	1	3	1
Blackgum	2	2	3	3	3	3	2	2	1	3	3
Black locust	2	3	3	3	3	3	3	2	3	3	3
Bristlegrass, or fantail	1	2	1	1	3	3	3	3	3	1	3
Browntop millet	1	2	1	1	2	3	3	1	3	1	3
Buckwheat	2	1	2	2	3	3	3	1	3	2	3
Buttonclover and burclover	3	1	3	3	3	1	3	1	3	3	3
Cherry, black	3	2	3	3	3	3	1	2	1	3	3
Chufa	3	1	3	1	1	3	1	1	3	3	3
Clover, crimson and white	3	1	3	3	1	1	3	1	3	3	3
Corn	1	1	1	1	1	1	1	1	3	1	1
Cowpeas	1	1	2	3	3	2	3	1	3	3	3
Croton, woolly	1	3	1	3	3	3	3	3	3	3	3
Dewberry	1	2	3	3	3	2	2	1	1	3	1
Dogwood	1	1	3	3	3	3	2	1	1	3	2
Elm	3	2	3	3	3	3	1	2	3	2	3
Fescue	3	2	3	3	2	2	3	2	3	3	3
Grapes	3	1	3	3	3	3	2	1	1	3	3
Greenbrier	3	1	3	3	3	1	3	2	2	3	3
Hazelnut	3	3	3	3	3	3	1	3	3	3	1
Hickory	3	2	3	3	3	3	1	2	3	3	1
Honeysuckle	3	1	3	3	3	3	3	3	1	3	3
Japanese millet	3	3	1	1	1	3	3	3	3	1	3
Johnsongrass	2	2	1	3	3	3	3	3	3	1	3
Lespedeza, bicolor	1	1	3	3	3	2	3	3	3	3	3
Lespedeza, annual	1	1	3	3	3	2	3	2	3	2	3
Lespedeza, sericea	3	3	3	3	3	2	3	3	3	3	3
Magnolia	3	2	3	3	3	3	1	1	1	3	3
Maple	3	1	3	3	3	3	2	2	3	3	3
Mulberry	1	2	3	3	3	3	1	1	1	3	3
Oak (acorn)	1	1	3	1	3	3	1	1	3	3	1
Oats	2	1	1	2	1	1	1	1	3	1	3
Panicgrass	1	2	1	1	2	2	3	1	3	1	3
Partridgepea	1	3	3	3	3	3	3	3	3	3	3
Paspalum	1	2	1	1	3	3	3	1	3	1	3
Peavine	3	2	3	3	3	1	3	3	3	3	3
Pecan	1	2	3	3	3	3	1	1	3	3	3

See footnote at end of table.

TABLE 11.—*Suitability of plants as food for wildlife*—Continued

Plant	Bobwhite	Deer	Dove	Duck	Goose	Rabbit	Squirrel	Turkey	Nongame birds [1]		
									Fruit eaters	Grain and seed eaters	Nut and acorn eaters
Persimmon	3	2	3	3	3	3	2	1	2	3	3
Pine	1	3	1	3	3	3	1	1	3	3	1
Pokeberry	2	2	1	3	3	3	3	2	1	3	3
Privet	2	2	3	3	3	3	3	3	1	3	3
Pyracantha	3	3	3	3	3	3	3	1	1	3	3
Ragweed, common	1	2	1	3	3	3	3	2	3	1	3
Ragweed, giant	3	3	3	3	3	3	3	3	3	1	3
Rose, multiflora	3	3	3	3	3	3	3	2	1	3	3
Rye	1	3	3	2	2	2	3	1	3	2	3
Ryegrass	3	1	3	3	1	1	3	1	3	3	3
Sassafras	2	1	3	3	3	3	2	2	1	3	3
Smartweed	2	3	2	1	3	3	3	3	3	2	3
Sorghum	1	1	1	1	1	3	1	1	3	1	3
Soybeans	1	1	2	1	3	2	3	1	3	3	3
Sudangrass	1	3	1	1	3	3	2	3	3	1	3
Sumac	2	1	3	3	3	1	3	2	1	3	3
Sunflower	1	1	1	3	3	3	3	2	3	1	1
Sweetgum	1	2	1	3	3	3	3	1	3	3	1
Sycamore	3	2	3	3	3	3	3	3	3	2	3
Tickclover, or beggarweed	1	1	3	3	3	3	3	2	3	3	3
Tupelo	3	3	3	3	3	3	2	3	3	3	3
Vetch, hairy	1	1	3	3	3	2	3	2	3	3	3
Virginia-creeper	3	2	3	3	3	3	3	2	1	3	3
Walnut	3	3	3	3	3	3	1	3	3	3	1
Wheat	1	1	1	3	1	1	1	1	3	1	3
Yellow-poplar	3	3	3	3	3	3	1	3	3	2	3

[1] Fruit eaters include bluebirds, catbirds, mockingbirds, and waxwings. Grain and seed eaters include blackbirds, cardinals, meadow larks, sparrows, and towhees. Nut and acorn eaters include blue jays, chickadees, grackles, woodpeckers, and titmice.

TABLE 12.—*Suitability of plants to wildlife groups*

[The letter S indicates that the plant is *suited* to the soils in the given wildlife group; the letter M, *marginally suited;* the letter U, *poorly suited* or *not suited*]

Plant	Wildlife groups								
	1	2	3	4	5	6	7	8	9
Alfalfa	S	S	M	M	U	U	U	U	U
Amaranth, or pigweed	S	S	M	U	M	M	M	U	U
Ash, green and white	S	M	M	U	M	M	M	U	U
Barley	S	S	S	M	U	U	U	U	U
Barnyard grass	S	M	M	M	S	S	S	M	U
Beech	S	S	M	U	U	M	M	M	M
Blackberry	S	S	S	U	U	S	S	U	M
Blackgum	U	U	U	U	S	S	S	M	U
Black locust	S	S	M	U	U	U	U	U	M
Bristlegrass, or fantail	S	S	S	M	S	S	S	U	M
Browntop millet	S	S	M	U	M	M	M	U	U
Buckwheat	S	S	M	M	S	S	S	U	U
Buttonclover and burclover	S	S	S	U	U	U	U	U	U
Cherry, black	S	S	S	U	M	S	M	U	U
Chufa	S	S	S	M	S	S	S	M	U
Clover, crimson	S	S	S	U	U	U	U	U	U
Clover, white	S	S	S	U	S	S	S	U	U
Corn	S	S	S	U	M	S	S	U	U
Cowpea	S	S	S	U	M	S	S	U	U
Croton, woolly	S	S	S	M	S	S	S	U	M
Dewberry	S	S	S	U	M	S	S	U	M
Dogwood	S	S	S	U	U	U	U	U	U
Elm	S	S	S	M	S	S	S	U	M
Fescue	S	S	S	M	S	S	S	U	M

TABLE 12.—*Suitability of plants to wildlife groups*—Continued

Plant	Wildlife groups								
	1	2	3	4	5	6	7	8	9
Grapes	S	S	S	U	S	S	S	U	M
Greenbrier	S	S	S	U	U	S	S	U	S
Hazelnut	S	U	U	U	S	M	M	U	U
Hickory	S	S	S	U	S	S	M	U	U
Honeysuckle	S	S	S	M	S	S	S	U	S
Japanese millet	S	M	U	M	S	S	S	M	U
Johnsongrass	S	S	S	M	S	S	S	U	U
Lespedeza, bicolor	S	S	S	U	U	M	U	U	U
Lespedeza, annual	S	S	S	M	M	S	S	U	M
Lespedeza, sericea	S	S	S	M	M	M	M	U	M
Magnolia	S	S	S	U	U	M	M	U	M
Maple	S	S	S	M	S	S	S	U	U
Mulberry	S	S	S	U	U	M	U	U	U
Oak	S	S	S	M	S	S	S	S	M
Oats	S	S	S	M	M	M	M	U	U
Panicgrass	S	S	S	M	M	M	M	U	M
Partridgepea	S	S	S	M	M	M	M	U	M
Paspalum	S	S	S	M	M	M	M	U	M
Peavine, or winter pea	S	S	S	M	U	U	M	U	M
Pecan	S	S	S	S	M	M	U	U	U
Persimmon	S	S	S	U	M	M	M	U	M
Pine	M	S	S	M	U	U	U	U	M
Pokeberry	S	S	S	M	M	M	M	U	U
Privet	S	S	S	M	M	M	M	U	M
Pyracantha	S	S	S	M	M	M	M	U	M
Ragweed, common	S	S	S	M	M	M	M	U	U
Ragweed, giant	S	M	M	U	S	S	S	U	U
Rose, multiflora	S	S	S	U	U	U	U	U	M
Rye	S	S	S	U	U	U	U	U	M
Ryegrass	S	S	S	M	M	M	M	U	M
Sassafras	M	S	S	M	M	M	M	U	M
Smartweed	S	U	U	M	S	S	S	S	U
Sorghum	S	S	S	M	S	S	S	U	U
Soybean	S	S	S	M	S	S	S	U	U
Sudangrass	S	S	S	M	S	S	S	U	U
Sumac	S	S	S	U	M	M	M	U	M
Sunflower	S	S	S	U	M	M	M	U	U
Sweetgum	S	M	M	M	S	S	S	M	U
Sycamore	S	S	S	M	S	S	S	M	S
Tickclover	S	S	S	M	S	S	S	U	M
Tupelo	S	S	S	M	S	S	S	M	S
Vetch, hairy	S	S	S	U	U	U	U	U	M
Virginia-creeper	S	S	S	U	M	M	M	U	S
Walnut	S	S	M	U	U	U	U	U	U
Wheat	S	S	S	M	U	U	M	U	U
Yellow-poplar	S	S	S	M	U	U	U	U	U

Wildlife group 5

The soils in this group are on Mississippi River bottoms. Their uppermost part is black clay that extends 10 to 40 inches or more below the surface. These soils are high in natural fertility but, because of their clayey plow layer, are hard to work. They are sticky when wet and hard when dry. Most areas are likely to be flooded or ponded for several days in winter and spring. They dry out late in spring; thus, planting is frequently delayed. Summer annual crops and water-tolerant crops are best suited. Areas 3 acres or more in size can be developed as feeding areas for wild ducks by planting suitable food plants and then flooding. The soil series in this group are—

Alligator.
Bowdre.
Sharkey.
Tunica.

Wildlife group 6

The soils in this group are on bottom lands. They are poorly drained or almost poorly drained and have a gray subsoil 12 to 18 inches below the surface. Most areas are likely to be flooded for short periods during winter and spring. The water table is near the surface during much of winter and spring but drops to 4 feet or more below the surface in summer. These soils are medium textured to a depth of 30 inches or more.

The kinds of plants that can be grown are limited by excess water. Summer annual crops that do not require a long growing season are best suited. If the soils are adequately drained, however, they can produce good yields of all summer annual crops. Areas 3 acres or more in size can be developed as feeding places for wild ducks by planting suitable food plants and then flooding. The soil series in this group are—

Birds.
Dekoven.
Falaya.
Wakeland.
Waverly (Waverly silt loam only).

Wildlife group 7

The soils in this group are gray and poorly drained. They are in nearly level areas or in depressions. They have a silty, friable plow layer but a dense, slowly permeable subsoil. They are commonly very wet; water stands on the surface for short periods in winter and spring, but in summer they dry out and are droughty. They are medium in natural fertility and are strongly acid or neutral. They can be cultivated every year, but unless surface drainage is improved, only water-tolerant plants can be grown. The response to management is fair to good. Areas 3 acres or more in size are suitable for development as feeding areas for wild ducks. The soil series in this group are—

Calloway.
Forestdale.
Routon.

Wildlife group 8

This group consists of Swamp and Waverly silt loam, low. The areas are under 1 to 3 feet of water for at least 3 months out of the year. Practically all of the acreage is in forest. The dominant trees are cypress, gum, willow, and water oak. Most areas are either on the Mississippi River bottoms or on bottoms of tributary streams. There are small natural lakes in some areas.

Wildlife group 9

This group consists of Levees and borrow pits, Made land, and Gullied land. Some areas are deeply cut by gullies and partly covered by native vegetation. Most native plants grow well except on the nearly vertical sides of the gullies. The borrow pits consist of areas from which soil has been removed to build a levee. Some borrow pits hold water all year (fig. 22). Others dry out during the summer and support a good growth of native plants. Levees can produce a good growth of all locally grown plants.

Figure 22.—**Ponded borrow pit. Areas such as this attract waterfowl and can be stocked with fish.**

Included in this group are some areas that have been graded and smoothed to the extent that the original soil cannot be recognized. These areas can produce a good growth of all locally grown plants.

Formation and Classification of the Soils

The soils in Dyer County, as in almost any locality, differ from place to place. They differ for many reasons, not all of which are known. The characteristics of the soil at a given place depend on the nature of the parent material and the effects of the other soil-forming factors.

It has been said that the present is the key to the past. If this is true, then perhaps knowledge of the past combined with knowledge of the present is the key to the future. Thus, by studying the characteristics of a soil, which is like reading the history of that soil, one can better predict how that soil will act when used in a particular way.

Before reading the history of the soils in Dyer County and learning how the soils formed, let us consider what the area was like during the early ice age, more than fifty thousand years ago. At that time the present soils had not begun to form, but topography was much as it is today. Coastal Plain materials, deposited in an earlier sea, covered the rolling uplands. The soils that formed in that material were redder, more leached, less fertile, and less silty than the present soils. Sluggish streams meandered through broad, flat bottoms that dissected the rolling uplands. These bottoms were wider than the present ones, and they were covered by soils that contained more sand than the present soils. The bottoms along the Mississippi River were much as they are now, but they probably were 600 to 700 feet (*6*) lower and more swampy. The shifting of the river left oxbow lakes and broad flat sloughs that are still evident today.

Except in small areas where they are exposed in gullies, the soils of the early ice age are now from 20 to about 100 feet below the surface. They remained on the rolling, red uplands and on the rather swampy bottoms all through the ice age. When warming trends in what is now the northern part of the United States began to end the ice age, glaciers melting in the north caused floods along the Mississippi River. The floodwaters carried sediment that covered the bottoms. Each time the waters went down enough to leave some spots exposed, the winds from the west picked up loose silt from the exposed spots and carried it away. The largest particles dropped within a few miles, in what is now the eastern half of Dyer County. The deposits of this material, which is called Loveland loess, accumulated to a thickness of several feet.

Deposition slowed down, and a long period of soil formation began. Some of the loess washed away, and the layer left was of uneven thickness. Weathering and the processes of soil formation produced soils, now buried, that had lower fertility and more definite layers than the present soils.

After several thousand years, another warming trend occurred, and more silt-loaded waters flooded the bottoms along the Mississippi River. This time when the waters receded, the winds deposited a thinner layer of loess, called

Farmdale, on top of Loveland loess. Deposition stopped for a relatively short period, and soil formation lasted only long enough to produce minor changes in Farmdale loess. In places, erosion removed all of the loess.

When the glaciers began to melt for a third time, more floods occurred and more sediments were deposited. Then the winds began to deposit a third layer of loess, called Peorian. A blanket of this loess about 12 to 50 feet thick covered all the uplands and in places the outer edge of the flood plains. Peorian loess was the parent material of the soils that now cover the uplands.

Formation of the Soils

The nature of a soil at any given point is determined by the combined influence of the five soil-forming factors—parent material, climate, living organisms, relief, and time. All five of these factors affect the formation of every soil, but the importance of each differs from place to place. Sometimes one is more important, and sometimes another. In some places the influence from each is about equal.

Parent material, relief, and time have influenced soil formation most in Dyer County. Climate has made strong impressions on many soils, but it is uniform throughout the county and so does not account for major differences among the soils. Living organisms, mainly trees, also have influenced soil development, but they have not caused significant differences.

How the present soils formed

Loess and alluvium were the parent materials of most of the soils in the county. The loess hills in the eastern half of the county are in sharp contrast with the alluvial bottoms along the Mississippi River in the western half.

The following paragraphs will discuss both the loess hills and the alluvial bottoms, and they will point out how the soil-forming factors, particularly parent material, relief, and time, have influenced the soils in these two areas.

Loess hills.—This area is made up mostly of rolling and steep hills dissected by stream bottoms. Some flat uplands are intermingled with the hills and bottoms.

Peorian loess was the parent material of the soils in this area (fig. 23). In the western part of the uplands, the deposit of Peorian loess is as much as 90 feet thick. It becomes progressively thinner toward the east, and at the eastern edge of the county it is about 12 feet thick over Farmdale loess. When Peorian loess was deposited, it was gray or yellowish brown. It was rich in bases, mostly calcium carbonate, and was alkaline in reaction. The particles were mainly coarse silt, and they were uniform in size. High rainfall and forest vegetation favor rather intense leaching and movement of soluble and colloidal materials downward in the soil. Consequently much of the calcium carbonate, and other bases, has leached out, and the soils are now acid. Clay has been washed down from the upper 8 to 12 inches into the subsoil. Thus, the subsoil is finer textured and is the zone of highest clay content. The leaching of soluble minerals and the accumulation of iron and other less soluble materials in the subsoil account for the fact that well-drained, well-aerated soils like the Memphis and Loring soils are slightly redder than their parent material. The leaching of soluble minerals

***Figure 23.*—Profile of an upland soil. In Dyer County, Peorian loess was the parent material of soils on the uplands.**

and the downward movement of clay have taken place over a period of several thousand years.

Relief, or lay of the land, is the cause of major differences among the soils on the uplands. Also, it determines the kind of vegetation that will grow on the soils.

The deep, well-drained, well-aerated Loring and Memphis soils developed on hills and ridges, where excess water drains away readily. Early settlers found oak, hickory, black walnut, and many yellow-poplar trees on these hills and ridges. They called the area "poplar ridge land," a name still in use today.

The gray, poorly drained, poorly aerated Routon soils developed in low, flat depressions from which water drains away slowly. The parent material was waterlogged much of the time; thus, air was prevented from entering and oxidizing the soils, or turning them brown. The absence of air resulted in reduction or gleying of the soils. The places where these soils occur are called "white land" or "buckshot land," because the soils are light gray and contain many concretions.

Where relief and position are intermediate, Grenada and Calloway soils have formed. In drainage and aeration, these soils are intermediate between the Memphis soils and the Routon soils.

Soils that have a fragipan cover a large part of the loess hills. The fragipan consists of silt loam or silty clay loam and ranges from faint and weakly developed, as in Loring soils, to very firm, dense, and well developed, as in Grenada and Calloway soils. The soils in which a fragipan has formed range from flat to steep (20 percent slopes).

With each rain, some of the Peorian loess was carried from the uplands to the first bottoms and some was spread on the outer edge of the bottoms along the Mississippi River. The bottom-land soils are young and show slight evidence of soil formation. Nevertheless, differences in relief have caused some important differences among these soils. In the higher and better drained areas, the brown, well-aerated Morganfield, Adler, and Collins soils formed. In places where water drains away more slowly, the mottled gray Falaya and Wakeland soils formed. In low places where water collects, the gray, poorly aerated Waverly and Birds soils formed.

Mississippi River bottoms.—Alluvium is the parent material of the soils on the Mississippi River bottoms. It washed from soils that developed from many kinds of weathered rock, from glacial drift, from loess, and from marine deposits. It contains a number of different minerals, many of which are only partly weathered.

The soils on the Mississippi River bottoms differ widely in texture, because of the way the alluvium was deposited by the river. Crevasse and Robinsonville soils formed alongside the river channel, on the slightly elevated sandy and loamy strips known as natural levees, from the coarser particles that were dropped first as water overflowed the riverbanks. Commerce soils formed from medium-textured sediments consisting of silt mixed with a small amount of clay and some fine sand. These sediments were dropped as the floodwaters flowed away from the river and moved more slowly as they continued to spread. Sharkey, Alligator, and Tunica soils formed in depressions and old river channels from slack-water deposits consisting of clay and fine silt that settled out of muddy, still water trapped in these low places when the floodwaters drained away (fig. 24).

This simple pattern of coarse sediment next to the river, clayey slack-water deposits at a distance, and medium-textured sediment in between, no longer exists on the Mississippi River bottoms. The meandering river has shifted back and forth across its flood plain. It has cut away parts of the natural levees and has deposited layers of moderately coarse textured and medium-textured sediment over the clayey slack-water deposits. Thus, layers of different textures are one on top of the other.

The influence of relief and time has caused major differences among the soils on the Mississippi River bottoms. The soils alongside the river, on the strips of recently deposited loamy sediment referred to as young natural levees, have been changed very little by soil-forming processes.

***Figure 24.*—Slack-water deposits consisting of clay and fine silt settle out of muddy, still water trapped in low places. Soils like the Alligator, Sharkey, and Tunica develop from these deposits.**

Robinsonville soils, which are in the higher positions, are well drained. Commerce and Bowdre soils, in the intermediate positions, are not so well drained as Robinsonville soils. Tunica and Sharkey soils, in the low slack-water areas, are fine textured and poorly drained.

Well-developed soils have formed on the old natural levees that are next to abandoned channels of the Mississippi River. These levees have been in place for a long time. Most of the carbonates have been leached out of the soils, and clay minerals have moved downward and have accumulated in the subsoil. The loamy Bosket and Dubbs soils, which are in the higher positions, are well drained and well aerated. Forestdale and Alligator soils, in the lower positions, are rather fine textured, poorly drained, and poorly aerated. Dundee soils, which are predominantly loamy, are intermediate in position, drainage, and aeration.

Classification of the Soils

The system of soil classification used in the United States has six categories. Beginning with the highest and most inclusive, the categories are the order, the suborder, the great soil group, the family, the series, and the type.

The lowest category, the type, has the greatest number (thousands) of classes or subdivisions. It is used in the study and comparison of small areas within a farm or a county. Soil types are discussed in the section "How This Soil Survey Was Made," and each soil type in Dyer County is described in the section "Descriptions of the Soils." The family and suborder categories have never been fully developed and thus have been little used. Attention has been concentrated on the classification of soils into types and series within farms and counties or comparable areas and on the subsequent grouping of series into great soil groups and orders.

The order, the great soil group, and the series are discussed in the pages that follow. The order and the great soil group to which each series belongs are shown in table 13. Table 13 also describes briefly a profile of an uneroded representative soil of each series and the factors that account for the major differences among the soils of Dyer County.

The order

There are three orders—zonal, intrazonal, and azonal. The zonal order consists of soils having well-developed characteristics that reflect the influence of the active soil-forming factors—climate and living organisms, chiefly vegetation—in their formation. Such soils develop best on gently rolling uplands where internal drainage is good and the parent material has been in place long enough for the biological forces to have exerted their full influence.

The intrazonal order consists of soils that have more or less well-developed characteristics that reflect the dominant influence of relief or parent material over the effect of climate and vegetation. In Dyer County, flat and depressed relief and very clayey parent material have more influence than climate and vegetation.

The azonal order consists of soils that do not have well-developed characteristics, either because of their youth or because the parent material or the relief have prevented development of definite soil characteristics.

TABLE 13.—*Classification and distinguishing characteristics of the soil series*

Series	Brief description of uneroded profile	Parent material	Drainage class	Predominant slope range	Great soil group	Order
				Percent		
Adler	About 3 feet of brown, mildly alkaline or slightly acid silt loam; mottled with gray below a depth of 18 inches.	Local alluvium from loess.	Moderately well drained.	1 to 3	Alluvial	Azonal.
Alligator	8 to 12 inches of dark gray or very dark gray, slightly acid clay over gray, strongly acid clay.	Alluvium from Mississippi River.	Poorly drained	0 to 2	Low-Humic Gley.	Intrazonal.
Birds	About 3 feet of gray or dark-gray silt loam; mildly alkaline to slightly acid.	Local alluvium from loess.	Poorly drained	0 to 2	Low-Humic Gley.	Intrazonal.
Bosket	8 inches of brown silt loam or fine sandy loam over brown silt loam or silty clay loam; strongly acid to slightly acid.	Alluvium from Obion, Mississippi, and Forked Deer Rivers.	Well drained	0 to 2	Gray-Brown Podzolic.	Zonal.
Bowdre	8 to 20 inches of very dark grayish-brown clay over brown or grayish-brown sediment ranging from silt loam to sand; mildly alkaline to slightly acid.	Alluvium from Mississippi River.	Moderately well drained or somewhat poorly drained.	0 to 2	Alluvial	Azonal.
Calloway	About 8 inches of dark grayish-brown silt loam over yellowish-brown silt loam; fragipan beginning at a depth of 16 to 24 inches; strongly acid to slightly acid.	Loess	Somewhat poorly drained.	0 to 2	Planosol (with fragipan).	Intrazonal.
Collins	3 feet or more of brown silt loam mottled with gray below a depth of 18 inches; medium acid or strongly acid.	Alluvium from loess.	Moderately well drained.	0 to 2	Alluvial	Azonal.
Commerce	Dark grayish-brown silty clay loam or fine sandy loam grading to mottled brown and gray at a depth of 18 inches; neutral or slightly acid.	Alluvium from Mississippi River.	Moderately well drained or somewhat poorly drained.	0 to 2	Alluvial	Azonal.
Crevasse	30 to 40 inches of sand or loamy sand over layers ranging from clay to sand; mildly alkaline to very strongly acid.	Alluvium from Mississippi River.	Excessively drained.	0 to 2	Regosol	Azonal.
Dekoven	About 8 inches of very dark grayish-brown silt loam over black silty clay loam; neutral or slightly acid.	Local alluvium from loess.	Poorly drained	0 to 2	Humic Gley	Intrazonal.
Dubbs	About 8 inches of brown silt loam over brown silty clay loam; mottled with gray at a depth of 18 inches; strongly acid or medium acid.	Alluvium from Obion, Mississippi, and Forked Deer Rivers.	Moderately well drained.	0 to 2	Gray-Brown Podzolic.	Zonal.
Dundee	About 10 inches of dark grayish-brown loam, clay loam, or silt loam over mottled yellowish-brown and gray clay loam; strongly acid or medium acid.	Alluvium from Mississippi River.	Somewhat poorly drained.	0 to 2	Gray-Brown Podzolic.	Zonal.
Falaya	12 to 18 inches of brown or dark grayish-brown silt loam over grayish-brown and gray silt loam; medium acid or strongly acid.	Alluvium from loess.	Somewhat poorly drained.	0 to 2	Alluvial (intergrading to Low-Humic Gley).	Azonal.
Forestdale	8 to 10 inches of dark grayish-brown or grayish-brown silt loam over gray or mottled gray and yellowish-brown silty clay loam or clay; strongly acid to slightly acid.	Alluvium from Mississippi River.	Poorly drained	0 to 2	Low-Humic Gley.	Intrazonal.
Grenada	8 inches of brown silt loam over yellowish-brown silt loam; fragipan beginning at a depth of 20 to 26 inches; strongly acid or medium acid.	Loess	Moderately well drained.	0 to 8	Gray-Brown Podzolic (with fragipan).	Zonal.

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TABLE 13.—*Classification and distinguishing characteristics of the soil series*—Continued

Series	Brief description of uneroded profile	Parent material	Drainage class	Predominant slope range	Great soil group	Order
				Percent		
Loring	8 inches of brown silt loam over brown silty clay loam; weak fragipan beginning at a depth of about 30 inches; strongly acid to slightly acid.	Loess	Moderately well drained or well drained.	2 to 20	Gray-Brown Podzolic (with fragipan).	Zonal.
Memphis	8 inches of brown silt loam over dark-brown silty clay loam; strongly acid to slightly acid.	Loess	Well drained	2 to 50	Gray-Brown Podzolic.	Zonal.
Morganfield	30 inches or more of brown silt loam; mildly alkaline to slightly acid.	Local alluvium from loess.	Well drained	0 to 2	Alluvial	Azonal.
Robinsonville	30 inches or more of alternating 6- to 18-inch layers of brown and dark grayish-brown loam, silt loam, and fine sandy loam; neutral to moderately alkaline.	Alluvium from Mississippi River.	Well drained or moderately well drained.	0 to 2	Alluvial	Azonal.
Routon	12 to 18 inches of grayish-brown and gray silt loam over 3 to 4 feet of gray silty clay loam; strongly acid to neutral.	Loess	Poorly drained	0 to 2	Low-Humic Gley.	Intrazonal.
Sharkey	30 inches or more of dark-gray clay; neutral or slightly acid.	Alluvium from Mississippi River.	Poorly drained	0 to 2	Grumusol	Intrazonal.
Tunica	20 to 30 inches of dark-gray clay over sediment ranging from silty clay loam to sand; mildly alkaline to slightly acid.	Alluvium from Mississippi River.	Somewhat poorly drained.	0 to 2	Grumusol	Intrazonal.
Wakeland	About 20 inches of mottled dark grayish-brown and gray silt loam over gray or dark-gray silt loam; neutral or slightly acid.	Alluvium from loess.	Somewhat poorly drained.	0 to 2	Alluvial (intergrading to Low-Humic Gley).	Azonal.
Waverly	About 8 inches of dark grayish-brown or grayish-brown silt loam over gray silt loam; medium acid or strongly acid.	Alluvium from loess.	Poorly drained	0 to 2	Low-Humic Gley.	Intrazonal.

The great soil group

The soil series in Dyer County represent seven great soil groups. Only one group—the Gray-Brown Podzolic—is in the zonal order. Four groups—the Low-Humic Gley, the Planosol, the Humic Gley, and the Grumusol—are in the intrazonal order. The Alluvial and the Regosol great soil groups are in the azonal order. Some soil series, though placed in an appropriate great soil group, have some characteristics that are typical of a different great soil group. Such series are called intergrades.

Gray-Brown Podzolic great soil group.—The soils in this group have a thin organic cover and an organic-mineral layer over a lighter colored, leached layer that overlies a brown, illuvial layer. They develop under deciduous forest in a temperate, moist climate. Some have a fragipan in the lower part of their subsoil.

Low-Humic Gley great soil group.—The soils in this group are somewhat poorly drained or poorly drained. They have a thin surface horizon, moderately high in organic matter, over a mottled gray and brown, gleylike, mineral horizon that differs little in texture from the surface horizon (*15*).

Planosol great soil group.—Planosols have one or more horizons abruptly overlying and sharply contrasting with an adjacent horizon because of cementation, compaction, or illuviation (*15*). Planosols in Dyer County have a compact, brittle fragipan.

Humic Gley great soil group.—The soils in this group develop in marshes and swamps. They are poorly drained and high in organic-matter content. They have a thick, dark-colored mineral surface layer and a gray, mottled, gleyed subsoil.

Grumusol great soil group.—Grumusols develop from clays. Soil movement (self-swallowing) due to shrinking and swelling of the mass as it wets and dries tends to produce slickensides (internal pressure surfaces) and a gilgai microrelief.

Alluvial great soil group.—Alluvial soils form from recently deposited, transported alluvium. Because the soil material has been in place for only a short time, the soil-forming processes have had little effect.

Regosol great soil group.—Regosols form mostly in recent deposits of sand, loess, Coastal Plain materials, and glacial drift. They have developed no clearly expressed soil characteristics.

The series

Soil classification is based upon the properties of the soil profile. A soil reveals its history to those who learn to read its profile. By reading the soil profile, one can learn about the conditions under which the soil formed and can predict fairly accurately how the soil will behave when used in different ways. Soils that have a similar profile, within defined limits, make up a soil series.

The profile descriptions that follow will be useful for many years. Advances in technology can change management and fertilization requirements, but a soil profile changes little in a man's lifetime. Except for changes made by earth-moving equipment, which can destroy an entire profile, most changes that occur are in the surface layer. Erosion may wash away the surface layer in mismanaged fields, and the soil material may be deposited on top of soils at lower levels, or it may be carried by small streams to rivers and to oceans. Be the changes small or large, they can be measured in the future by comparing the profiles at that time to the ones described in this report.

Adler Series

The soils in the Adler series are deep and moderately well drained. They consist of recent deposits of neutral silt washed from the steep loess hills to narrow bottoms and to the outer edge of the Mississippi River flood plain.

Representative profile of Adler silt loam, 1¾ miles south of Finley and 15 feet east of a gravel road:

Ap—0 to 8 inches, brown (10YR 4/3 or 5/3) silt loam; weak, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.

C1—8 to 12 inches, brown (10YR 5/3) silt loam; common, coarse, gray (10YR 5/1) mottles; weak, thin, platy structure and weak, fine, granular structure; friable; pH 7.3; abrupt, wavy boundary.

C2—12 to 21 inches, brown (10YR 5/3) silt loam; few, fine, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; very friable; pH 7.3; clear, smooth boundary.

C3—21 to 43 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.

A1b—43 to 50 inches, very dark gray (N 3/0) silt loam; common, fine, dark reddish-brown (5YR 3/4) mottles; moderate, medium, granular structure; friable; pH 7.3.

Range in characteristics.—Adler soils are mottled at a depth ranging from 18 to 30 inches. In most places they are underlain by old Mississippi River alluvium at a depth ranging from 3 to 10 feet.

Alligator Series

The soils in the Alligator series are gray and poorly drained. They developed in clayey sediment from the Mississippi River and are in low, flat depressions.

Representative profile of Alligator clay, a quarter of a mile west of Rock Slough and a quarter of a mile north of Richwood-Midway road:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) clay; weak, fine, granular structure; sticky; pH 6.5; abrupt, smooth boundary.

A2g—6 to 9 inches, gray (10YR 5/1) silty clay loam; few yellowish-brown (10YR 5/4) mottles and many black stains; weak, medium, granular structure (thin, platy structure in uppermost inch); firm; pH 5.0; abrupt, broken boundary.

B2g—9 to 28 inches, gray (10YR 6/1) clay; many strong-brown (7.5YR 5/6) mottles; weak, coarse, columnar structure breaking to moderate, medium, angular and subangular blocky structure; firm; pH 5.0; gradual, smooth boundary.

B31g—28 to 32 inches, gray (10YR 6/1) clay; common, medium, yellowish-brown (10YR 5/6 and 5/8) mottles; weak, coarse, columnar structure extending down from horizon above and breaking to weak, medium, subangular and angular blocky structure; firm; pH 5.0; clear, smooth boundary.

B32g—32 to 48 inches, gray (10YR 6/1) clay; few, medium, yellowish-brown (10YR 5/4) mottles; massive; firm; pH 5.5.

Range in characteristics.—The soil material below the B32g horizon is commonly gray clay. In places it ranges from gray clay to grayish-brown sandy loam at a depth of 40 to 60 inches. Reaction ranges from medium acid to strongly acid.

Birds Series

The soils in this series are poorly drained. They developed on first bottoms in neutral, silty sediment that washed from the steep loess hills to low, flat areas, mostly on the outer edge of the Mississippi River bottoms.

Representative profile of Birds silt loam, about 2 miles south of Finley and about 100 feet south of a gravel road:

Ap—0 to 7 inches, dark-gray (10YR 4/1) silt loam; weak, fine, granular structure; very friable; pH 7.0; abrupt, smooth boundary.

C1g—7 to 9 inches, dark-gray (10YR 4/1) silt loam; moderate, thin, platy structure; firm (compact); pH 7.0; abrupt, smooth boundary.

C2g—9 to 38 inches, gray (10YR 5/1 or N 5/0) silt loam; common, coarse, yellowish-brown (10YR 5/4) mottles; weak, fine, granular structure; very friable; few concretions; pH 7.0; clear, smooth boundary.

IIC3g—38 to 48 inches, gray (N 5/0) silty clay loam or clay loam; few, yellowish-brown (10YR 5/4) mottles; massive; firm; pH 5.0; clear, smooth boundary.

IIIC4g—48 to 55 inches, gray (N 5/0) loam; common, dark-gray (10YR 4/1) mottles; massive; friable; pH 5.0.

Range in characteristics.—The IIC3g layer consists of alluvium from the Mississippi River; it ranges from 2 to several feet in thickness. Some profiles of Birds silt loam lack this layer.

Bosket Series

The soils in this series are well drained and range from slightly acid to strongly acid. They developed in silty and loamy sediment along former channels of the Mississippi River and on alluvial fans near the Obion and the Forked Deer Rivers. These alluvial fans are in areas where floodwaters from the Obion and the Forked Deer Rivers spread over the flat Mississippi River bottoms.

Representative profile of Bosket silt loam, 2 miles southwest of Bogota (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 1):

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable (firm, massive plowpan in lowest inch); pH 6.0; abrupt, smooth boundary.

B21t—6 to 14 inches, brown (10YR 4/3) silty clay loam or silt loam with ped surfaces of dark brown (7.5YR 4/4); weak, coarse, subangular blocky structure; friable; pH 5.0; gradual, smooth boundary.

B22t—14 to 24 inches, brown (10YR 4/3) silt loam with ped surfaces of dark brown (7.5YR 4/4); weak, coarse, subangular blocky and moderate, medium, subangular blocky structure; friable; pH 5.0; clear, smooth boundary.

B3t—24 to 34 inches, brown (10YR 4/3) silt loam with ped coatings of dark brown (7.5YR 4/4); weak, coarse and medium, angular blocky structure; friable; pH 5.0; clear, smooth boundary.

C1—34 to 40 inches, brown (10YR 4/3) silt loam; weak, coarse, subangular blocky structure; friable; pH 4.5; clear, smooth boundary.

C2—40 to 50 inches, dark-brown (7.5YR 4/4) silt loam; massive; very friable; pH 4.5; clear, smooth boundary.
IIC3—50 to 53 inches, brown (10YR 4/3) loamy sand; abrupt, smooth boundary.
IIIC4—53 to 63 inches, brown (10YR 4/3) silt loam; contains thin strata of silty clay loam; common, fine, grayish-brown (10YR 5/2) mottles; massive; friable; clear, smooth boundary.
IVC5—63 to 68 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, grayish-brown (10YR 5/2) and strong-brown (7.5YR 5/6) mottles; massive; friable.

Profile of Bosket silt loam, 1.5 miles southwest of Bogota (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 2):

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable (firm, massive plowpan in lowest 2 inches); few fine roots; abrupt, smooth boundary.
B1—7 to 12 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; few fine roots; few fine pores and root holes; clear, smooth boundary.
B21—12 to 18 inches, dark-brown (7.5YR 4/4) silty clay loam; weak, medium, prismatic structure breaking to moderate, medium, angular and subangular blocky structure; friable; common fine roots; common fine pores; gradual, smooth boundary.
B22—18 to 25 inches, dark-brown (7.5YR 4/4) silty clay loam or silt loam; weak, medium, prismatic structure breaking to moderate, medium, angular and subangular blocky structure; friable; common fine roots; common fine pores; clear, smooth boundary.
B3—25 to 30 inches, dark-brown (7.5YR 4/4) silt loam; weak, medium, prismatic structure breaking to weak, medium, angular and subangular blocky structure; friable; few fine roots; few fine pores; gradual, smooth boundary.
IIC1—30 to 40 inches, brown (10YR 4/3) fine sandy loam; massive; friable; clear, smooth boundary.
IIIC2—40 to 52 inches, brown (10YR 4/3) loamy fine sand; massive; very friable; clear, smooth boundary.
C3—52 to 80 inches, brown (10YR 5/3) fine sand; single grained; loose; one-half inch strata of brown (10YR 4/3) loamy fine sand are present.

Range in characteristics.—Bosket sandy loam also occurs in the county. Bosket sandy loam consists mostly of silt loam covered with sandy loam overwash, but in some areas it is sandy throughout most of its profile and has a clay loam or loam subsoil. Its surface layer is slightly acid in places.

Bowdre Series

The soils in this series are neutral or slightly acid and moderately well drained or somewhat poorly drained. They consist of 8 to 20 inches of dark-colored clay over coarser textured sediment. The clay was deposited in broad, flat depressions by still water from the Mississippi River.

Representative profile of Bowdre clay, half a mile south of Chic and a quarter of a mile west of a hard-surface road:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) clay; moderate, medium and fine, granular structure; friable; pH 7.5; abrupt, smooth boundary.
C1—6 to 18 inches, very dark grayish-brown (10YR 3/2) clay; massive; firm; pH 7.5; abrupt, smooth boundary.
IIC2—18 to 36 inches, brown (10YR 4/3) silt loam or silty clay loam; common, fine, very dark grayish-brown (10YR 3/2) mottles; weak, fine, granular structure; friable; pH 7.5; abrupt, smooth boundary.
IIC3g—36 to 48 inches, grayish-brown (10YR 5/2) silt loam or loam; many, fine, gray (10YR 6/1) and yellowish-brown (10YR 5/8) mottles; weak, fine, granular structure; very friable; pH 7.5.

Profile of Bowdre clay, coarse subsoil, a quarter of a mile east of the main levee and 1 mile south of Tennessee Highway No. 20:

A1—0 to 11 inches, very dark gray (10YR 3/1) clay; weak, medium, subangular blocky structure to massive; firm; pH 6.0; abrupt, smooth boundary.
IIC1—11 to 50 inches, dark grayish-brown (10YR 4/2) sand; single grained; loose; pH 6.0.

Range in characteristics.—The main variation in Bowdre soils is in the texture of the underlying sediment. A profile that consists of 8 to 20 inches of clay over silt loam, loam, or sandy loam is ortho for the series. One that has at least an 8-inch layer of sand, a 16-inch layer of loamy sand, or a 12-inch layer of sand and loamy sand combined, and is less than 30 inches deep, is classified as Bowdre clay, coarse subsoil.

Calloway Series

The soils in this series are slightly acid to strongly acid and somewhat poorly drained. They have a fragipan at a depth of about 16 to 24 inches. These soils developed in loess on flat uplands.

Representative profile of Calloway silt loam, about half a mile east of the Illinois Central Railroad and 50 feet south of Hog Waller road:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 5.0; abrupt, smooth boundary.
B2—8 to 16 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; pH 5.0; clear, smooth boundary.
B3—16 to 19 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; friable; pH 5.0; clear, smooth boundary.
A'2x—19 to 24 inches, light yellowish-brown (10YR 6/4) silt loam; common, fine, gray (10YR 6/1) mottles; weak, coarse, columnar structure breaking to weak, fine, granular structure; firm (slightly brittle); pH 5.0; clear, wavy boundary.
Btx1—24 to 34 inches, yellowish-brown (10YR 5/8) silty clay loam; many, coarse, light brownish-gray (10YR 6/2) mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular and angular blocky structure; very firm; pH 5.0; clear, smooth boundary.
Btx2—34 to 42 inches, light brownish-gray (10YR 6/2) silty clay loam; many, coarse, yellowish-brown (10YR 5/8) mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular and angular blocky structure; firm; pH 6.5; clear, smooth boundary.
C—42 to 54 inches, gray (10YR 6/1) silt loam; many, medium, yellowish-brown (10YR 5/6) mottles and common, dark stains; massive; friable; few, small, black concretions; pH 8.0.

Range in characteristics.—Calloway soils are underlain by silt loam that ranges from strongly acid to moderately alkaline and that contains some calcium carbonate concretions in places.

Collins Series

In the Collins series are deep, moderately well drained, young, silty soils. These soils developed on nearly level first bottoms and on strips alongside the streambanks, in medium acid or strongly acid sediments recently washed from the nearby loess hills.

Representative profile of Collins silt loam, 1½ miles southeast of RoEllen:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; pH 6.0; abrupt, smooth boundary.

C1—8 to 19 inches, brown (10YR 5/3) silt loam; few, fine, grayish-brown (10YR 5/2) mottles in lower part; weak, fine, granular structure; very friable; pH 5.5; clear, smooth boundary.

C2—19 to 28 inches, brown (10YR 5/3) silt loam; common, medium, gray (10YR 5/1) and grayish-brown (10YR 5/2) mottles; weak, fine, granular structure; very friable; pH 5.5; gradual, smooth boundary.

C3—28 to 44 inches, grayish-brown (10YR 5/2) silt loam; many, medium, gray (10YR 6/1) and yellowish-brown (10YR 5/4) mottles; massive; friable; pH 5.0; few black concretions; gradual, smooth boundary.

C4—44 to 60 inches, gray (10YR 6/1) silt loam; common, medium, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/4) mottles; massive; friable; few black concretions; pH 5.0.

Range in characteristics.—In places Collins soils are underlain by neutral or mildly alkaline deposits at a depth of about 2 feet to several feet. Depth to the mottled layer ranges from 18 to 30 inches.

Commerce Series

The soils in the Commerce series are moderately well drained and somewhat poorly drained. They are young soils that developed in medium-textured, neutral or slightly acid sediment on the Mississippi River bottoms.

Representative profile of Commerce silty clay loam, a quarter of a mile east of Midway:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam; weak, fine, granular structure; friable; pH 7.3; abrupt, smooth boundary.

C1—6 to 22 inches, very dark grayish-brown (10YR 3/2) silty clay loam; weak, fine, granular structure; friable; pH 7.0; clear, smooth boundary.

C2—22 to 30 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, gray (10YR 5/1) mottles; weak, fine, granular structure; friable; pH 7.0; clear, smooth boundary.

C3—30 to 47 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; pH 7.0; clear, smooth boundary.

C4—47 to 58 inches, dark grayish-brown (10YR 4/2) very fine sandy loam; weak, medium, granular structure; very friable; pH 7.0.

Range in characteristics.—Commerce loam also occurs in the county. The depth to the mottled layer ranges from 18 to 30 inches but commonly is about 18 inches.

Crevasse Series

In the Crevasse series are excessively drained, very sandy soils. These soils formed next to the Mississippi River and next to segments of former river channels in alluvium laid down by fast-moving floodwaters from the river.

Profile of Crevasse loamy sand, 1.7 miles south of Heloise:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) loamy sand; pH 7.0; abrupt, smooth boundary.

C1—7 to 11 inches, dark grayish-brown (10YR 4/2) loamy sand; pH 7.0; abrupt, smooth boundary.

C2—11 to 15 inches, light-gray (10YR 7/1) loose sand; pH 7.0; abrupt, smooth boundary.

C3—15 to 21 inches, grayish-brown (10YR 5/2) loose sand; pH 7.0; abrupt, smooth boundary.

C4—21 to 28 inches, dark grayish-brown (10YR 4/2) loamy sand; pH 7.0; abrupt, smooth boundary.

IIC5—28 to 32 inches, dark grayish-brown (10YR 4/2) silt loam; massive; friable; pH 7.3; clear, smooth boundary.

IIC6—32 to 59 inches, dark grayish-brown (10YR 4/2) silty clay loam; massive; friable; pH 7.3.

Range in characteristics.—Two soil types, Crevasse loamy sand and Crevasse sandy loam, are recognized. The very sandy sediment is commonly more than 30 inches thick; it is underlain by sediment that ranges from sand to clay. The areas next to the Mississippi River are neutral in reaction, but those next to former river channels are strongly acid or very strongly acid.

Dekoven Series

The Dekoven soils are neutral or slightly acid and poorly drained or somewhat poorly drained. They are nearly black soils that developed in alluvium from loess in low, flat depressions.

Representative profile of Dekoven silt loam, 1 mile north of Dyersburg and a quarter of a mile southeast of U.S. Highway No. 51 (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 1):

Ap1—0 to 6 inches, very dark gray (10YR 3/1) silt loam; coarse, angular clods breaking to weak, fine, granular structure (weak, fine, granular structure has developed in uppermost 3 inches); friable; pH 6.5; abrupt, smooth boundary.

Ap2—6 to 10 inches, very dark gray (10YR 3/1) silt loam or silty clay loam; few, fine, gray (10YR 6/1) mottles; coarse, angular clods breaking to weak, fine, granular structure; friable; pH 6.5; clear, smooth boundary.

A1b1—10 to 18 inches, black (N 2/0) silty clay loam; moderate, fine, prismatic structure breaking to moderate, medium, subangular blocky structure; friable; few, small, black concretions; pH 7.0; gradual, smooth boundary.

A1b2—18 to 24 inches, very dark gray (10YR 3/1) silty clay loam; few, coarse, yellowish-brown (10YR 5/4) mottles; moderate, medium, prismatic structure breaking to moderate, medium, subangular blocky structure; friable; few, small, black concretions; pH 7.0; clear, smooth boundary.

C1g—24 to 39 inches, dark-gray (10YR 4/1) silt loam; many, coarse, light olive-brown (2.5Y 5/4) mottles; weak, coarse, prismatic structure; friable; pH 7.0; clear, smooth boundary.

C2g—39 to 56 inches, gray (5Y 5/1) silt loam; many, medium, light olive-brown (2.5Y 5/4) mottles; weak, very coarse, prismatic structure; friable; pH 7.0.

Profile of Dekoven silt loam, 2 miles southwest of RoEllen (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 2):

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; common fine roots; abrupt, smooth boundary.

A1b1—8 to 15 inches, black (10YR 2/1) silty clay loam; weak, fine, prismatic structure breaking to weak, medium, subangular blocky structure; friable; common fine roots; thin, patchy clay films on vertical ped faces; few fine pores; clear, smooth boundary.

A1b2—15 to 20 inches, very dark gray (10YR 3/1) silty clay loam; weak, fine, prismatic structure breaking to weak, medium, subangular blocky structure; friable; thin, patchy clay films on vertical ped faces; few very fine pores; common, small, black concretions; clear, wavy boundary.

C1g—20 to 37 inches, gray (10YR 5/1) silty clay loam; common, coarse and medium, distinct, light olive-brown (2.5Y 5/4) mottles; weak, medium and coarse, prismatic structure; friable; common fine roots; common fine pores and root holes; clear, wavy boundary.

C2g—37 to 55 inches, gray (5Y 5/1) silt loam; many, coarse, distinct, light olive-brown (2.5Y 5/6) mottles; massive; friable; few fine pores and root holes; few, small, black concretions; clear, wavy boundary.
C3g—55 to 63 inches, gray (5Y 5/1) silt loam; common, coarse, distinct, light olive-brown (2.5Y 5/6) mottles; massive; friable; common medium pores or root holes; common, small, black concretions.
63 inches, water.

Range in characteristics.—In places 7 to 15 inches of dark grayish-brown silt loam overwash covers the Dekoven soils. The material at a depth of about 2 feet is commonly silty clay loam, but it ranges from silt loam in some areas to clay in a very few areas.

Dubbs Series

The Dubbs series consists of moderately well drained, strongly acid and medium acid soils. These soils developed in silty and loamy sediment along former channels of the Mississippi River and on alluvial fans near the Obion and Forked Deer Rivers. These alluvial fans are in areas where floodwaters from the Obion and the Forked Deer Rivers spread over the flat Mississippi River bottoms.

Representative profile of Dubbs silt loam, half a mile southeast of Bogota:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; pH 5.5; abrupt, smooth boundary.
B1t—8 to 14 inches, brown (10YR 4/3) silty clay loam or silt loam; few, fine, pale-brown (10YR 6/3) mottles; moderate, fine and medium, granular structure; friable; pH 5.5; clear, smooth boundary.
B2t—14 to 28 inches, dark yellowish-brown (10YR 4/4) silty clay loam or silt loam; few, fine, gray (10YR 5/1) mottles and very dark grayish-brown (10YR 3/2) ped surfaces; moderate, medium, subangular blocky and angular blocky structure; friable; pH 5.5; clear, smooth boundary.
B3t—28 to 38 inches, dark grayish-brown (10YR 4/2) silty clay loam or silt loam; many, fine, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure to massive; friable; pH 4.5; clear, smooth boundary.
C1—38 to 44 inches, yellowish-brown (10YR 5/4) clay loam; common, medium, light brownish-gray (10YR 6/2) mottles; massive; friable; pH 5.0; clear, smooth boundary.
C2—44 to 54 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; common, medium, dark grayish-brown (10YR 4/2) and few, fine, gray (10YR 6/1) mottles; weak, fine, granular structure; very friable; pH 4.5.

Range in characteristics.—The depth to the gray mottles ranges from 14 inches to nearly 30 inches.

Dundee Series

The Dundee series consists of somewhat poorly drained soils that are strongly acid or medium acid. These soils developed in medium-textured and moderately fine textured sediment near former channels of the Mississippi River and on alluvial fans near the Obion and the Forked Deer Rivers. The alluvial fans are in areas where floodwaters from the Obion and the Forked Deer Rivers spread over the flat Mississippi River bottoms.

Representative profile of Dundee loam, 1 mile west of Richwood and 150 feet north of Midway road:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) loam; weak, fine, granular structure; pH 6.0; abrupt, smooth boundary.
B2t—6 to 22 inches, yellowish-brown (10YR 5/4) clay loam or loam; few, coarse, light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; friable; pH 5.0; clear, smooth boundary.
B3t—22 to 36 inches, yellowish-brown (10YR 5/4) clay loam or loam; common, coarse, light brownish-gray (10YR 6/2) mottles and common, fine, black stains; weak, medium and coarse, granular structure; friable; pH 5.0; clear, smooth boundary.
C1—36 to 44 inches, yellowish-brown (10YR 5/6) loam; common, medium, light brownish-gray (10YR 6/2) mottles; weak, fine and medium, granular structure; friable; pH 5.0; abrupt, smooth boundary.
C2—44 to 54 inches, yellowish-brown (10YR 5/4) fine sandy loam; few, medium, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure to single grained; very friable; pH 4.5.

Range in characteristics.—Loam, clay loam, and silt loam types are recognized. The subsoil is clay loam or silty clay loam.

Falaya Series

Falaya soils are young, silty, and somewhat poorly drained. They developed on flat first bottoms in medium acid or strongly acid sediment that recently washed from the nearby loess hills.

Representative profile of Falaya silt loam, 3¼ miles southwest of Newbern and a quarter of a mile southeast of railroad near Jones Creek:

Ap—0 to 8 inches, brown (10YR 4/3) or dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 5.0; abrupt, smooth boundary.
C1—8 to 18 inches, dark grayish-brown (10YR 4/2) silt loam; common, coarse, gray (10YR 5/1) and light brownish-gray (10YR 6/2) mottles; weak, medium and fine, granular structure; friable; pH 5.5; clear, smooth boundary.
C2g—18 to 34 inches, grayish-brown (2.5Y 5/2) silt loam; common, coarse, gray (10YR 5/1) mottles and dark stains; massive; friable; pH 5.0; clear, smooth boundary.
C3g—34 to 54 inches, dark-gray (10YR 4/1) silt loam; massive; friable; pH 5.0.

Range in characteristics.—The color of the surface layer ranges from dark grayish brown to brown. The depth to mottling ranges from 12 to nearly 18 inches.

Forestdale Series

The soils in the Forestdale series are poorly drained and strongly acid to slightly acid. They developed in medium-textured and moderately fine textured sediment in flat or depressed areas near old channels of the Mississippi River and on flat alluvial fans near the Obion and the Forked Deer Rivers. The alluvial fans are in areas where floodwaters from the Obion and the Forked Deer Rivers spread over the Mississippi River bottoms.

Representative profile of Forestdale silt loam, 3 miles southwest of Bogota (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 1):

Ap—0 to 8 inches, dark-gray (10YR 4/1) silt loam; weak, medium, granular structure (massive, firm plowpan in lowest 3 inches); few fine roots; pH 5.0; abrupt, smooth boundary.
B1tg—8 to 16 inches, gray (5Y 5/1) silty clay loam; common, medium, dark-brown (7.5YR 4/4) and dark grayish-brown (10YR 4/2) mottles; moderate, medium, subangular blocky structure; firm; pH 5.0; clear, smooth boundary.
B2tg—16 to 27 inches, gray (10YR 5/1) silty clay; common, medium, dark-brown (7.5YR 4/4) and very dark grayish-brown (10YR 3/2) mottles; weak, medium, prismatic structure breaking to moderate, medium, angular blocky structure; firm; sand coats on some vertical

ped faces (possibly worked down through cracks in dry soil); pH 5.0; clear, smooth boundary.

B3tg—27 to 35 inches, gray (10YR 5/1) silty clay loam or clay loam; common, coarse, dark-brown (7.5YR 4/4) mottles and few, fine, pale-brown (10YR 6/3) mottles; weak, medium prismatic structure breaking to weak, medium, subangular blocky structure; firm; pH 5.0; gradual, smooth boundary.

C1g—35 to 45 inches, gray (10YR 5/1) silty clay loam or clay loam; many, coarse, brown (10YR 4/3) mottles; very weak, coarse, prismatic structure to massive; firm; pH 5.0; abrupt, smooth boundary.

IIC2—45 to 51 inches, brown (10YR 4/3) loamy sand or sand; massive; very friable; few one-half inch strata of brown (10YR 4/3) sandy loam; pH 5.0; gradual, smooth boundary.

C3—51 to 69 inches, brown (10YR 4/3) loose sand; few one-half inch strata of brown (10YR 4/3) loamy sand; pH 5.0.

Profile of Forestdale silt loam, 3 miles southwest of Bogota and a quarter of a mile north of the Obion River (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 2):

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; common fine roots and few coarse roots; few fine concretions; abrupt, wavy boundary.

A21g—8 to 12 inches, grayish-brown (10YR 5/2) silt loam; common, fine, faint, yellowish-brown (10YR 5/4) and gray (10YR 6/1) mottles; massive; firm; few concretions; few fine roots; clear, smooth boundary.

A22g—12 to 16 inches, pale-brown (10YR 6/3) silt loam; few, fine, faint, yellowish-brown (10YR 5/4) mottles; weak, fine, granular structure; friable; common fine roots; few fine pores; few concretions; clear, smooth boundary.

B21g—16 to 22 inches, gray (10YR 5/1) silty clay loam or silt loam; many, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular blocky structure; firm to friable; common fine roots; common fine pores; few concretions; clear, smooth boundary.

B22g—22 to 29 inches, gray (5Y 5/1) silty clay; few, medium, distinct, dark-brown (7.5YR 4/4) mottles (prism faces have light brownish-gray (10YR 6/2) coatings); weak, coarse, prismatic structure breaking to moderate, medium, subangular blocky structure; firm; few roots; few concretions; clear, smooth boundary.

B3—29 to 35 inches, dark yellowish-brown (10YR 4/4) silty clay loam; common, medium, distinct, gray (5Y 5/1 and 10YR 5/1) mottles and few, fine, faint, dark-brown (7.5YR 4/4) mottles; weak, coarse, prismatic structure breaking to weak, coarse, subangular blocky structure; firm; few fine roots; few soft concretions; clear, smooth boundary.

C1—35 to 53 inches, dark-brown (7.5YR 4/4) silty clay loam; many, medium, distinct, pale-brown (10YR 6/3) and gray (10YR 5/1) mottles; massive; firm; few fine roots; clear, smooth boundary.

IIc2—53 to 59 inches, brown (10YR 4/3) fine sandy loam; common, coarse, distinct, black (N 2/0) stains; massive; friable; few fine roots; few fine concretions; clear, smooth boundary.

C3—59 to 80 inches, brown (10YR 4/3) fine sandy loam; massive; very friable; few fine roots.

Range in characteristics.—Although Forestdale soils are mostly strongly acid, the plow layer in a few areas is medium acid or slightly acid. In places a leached layer of gray silt loam (A2) is between the plow layer and the clayey subsoil.

Grenada Series

Grenada soils are moderately well drained and strongly acid or medium acid. They developed in loess and have a fragipan at a depth of 20 to 26 inches. The slope range is 2 to 12 percent.

Representative profile of Grenada silt loam, 2 to 5 percent slopes, on the bank of a gravel road 2 miles north of Newbern:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; pH 6.0; abrupt, smooth boundary.

B2—6 to 18 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, pale-brown (10YR 6/3) mottles and black stains; weak, medium, subangular blocky structure; friable; pH 5.5; clear, smooth boundary.

A'2x—18 to 22 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, yellowish-brown (10YR 5/4) mottles and common, fine, black stains; weak, medium, subangular and angular blocky structure; firm; common, small, black concretions; pH 5.1; clear, wavy boundary.

Btx1—22 to 34 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, light brownish-gray (10YR 6/2) mottles and few, fine, dark-brown (7.5YR 4/4) mottles and common, black stains; weak, medium, subangular and angular blocky structure; very firm; common, soft, black concretions; pH 5.1; clear, smooth boundary.

Btx2—34 to 44 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, light brownish-gray (10YR 6/2) and dark-brown (7.5YR 4/4) mottles and common black stains; weak, medium, subangular blocky structure; firm; pH 5.1; clear, smooth boundary.

C—44 to 60 inches, dark yellowish-brown (10YR 4/4) to yellowish-brown (10YR 5/4) silt loam; many, medium light brownish-gray (10YR 6/2) mottles and many fine, black stains; massive; friable; pH 5.1.

Range in characteristics.—Grenada soils are commonly strongly acid or medium acid, but the plow layer in a few areas is slightly acid. Where these soils are severely eroded, the depth to the fragipan ranges from 12 to 20 inches.

Loring Series

The Loring series consists of well drained and moderately well drained, medium acid to strongly acid soils that developed from loess. They have a weak fragipan at a depth of about 30 inches. The slope range is 2 to 20 percent.

Representative profile of Loring silt loam, 2 to 5 percent slopes, at a site in Churchton:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; pH 5.4; abrupt, smooth boundary.

B2t—6 to 24 inches, dark-brown (7.5YR 4/4) silty clay loam or silt loam; moderate, medium, subangular blocky structure; friable; many clay films; pH 5.4; clear, smooth boundary.

B3t—24 to 28 inches, brown (10YR 4/3) silt loam with many, medium, light brownish-gray mottles; moderate, medium, subangular blocky structure; friable; many dark-brown (7.5YR 4/4) clay films; pH 5.4; clear, smooth boundary.

Bx1—28 to 34 inches, yellowish-brown (10YR 5/4) silt loam; many, coarse, pale-brown (10YR 6/3) mottles and common dark stains; weak, coarse, columnar structure to weak, medium, subangular blocky structure; firm; pH 5.1; clear, smooth boundary.

Bx2—34 to 48 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, pale-brown (10YR 6/3) mottles and dark-brown stains; weak, coarse, columnar structure; continuous, pale-brown (10YR 6/3) coatings on peds; firm; pH 5.1; clear, smooth boundary.

C—48 to 60 inches, brown (10YR 4/3) silt loam; common, medium, pale-brown (10YR 6/3) mottles; massive; friable; pH 5.4.

Range in characteristics.—The depth to the weakly developed fragipan ranges from 20 inches in severely eroded areas to 30 inches in moderately eroded areas.

Memphis Series

The soils in the Memphis series are deep, well drained, and slightly acid to strongly acid. They developed on the uplands from loess. The slope range is 2 to 50 percent.

Representative profile of Memphis silt loam, 2 to 5 percent slopes, 3½ miles south of Dyersburg:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; pH 5.5; abrupt, smooth boundary.
B21t—6 to 17 inches, brown (10YR 4/3) or dark-brown (7.5YR 4/4) silty clay loam; dark-brown (7.5YR 4/4) ped surfaces; moderate to strong, medium, subangular blocky structure; friable; almost continuous clay films; pH 6.0; clear, smooth boundary.
B22t—17 to 31 inches, brown (10YR 4/3) or dark-brown (7.5YR 4/4) silty clay loam or silt loam; dark-brown (7.5YR 4/4) ped surfaces; moderate, medium, subangular blocky structure; friable; almost continuous clay films; pH 5.1; clear, smooth boundary.
B3t—31 to 42 inches, dark-brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; pH 5.1; clear, smooth boundary.
C—42 to 75 inches, dark-brown (7.5YR 4/4) silt loam; few, medium, gray (10YR 6/1) mottles; massive; friable to very friable; common fine pores; pH 5.1.

Range in characteristics.—In some areas there are a few fine mottles at a depth of about 30 inches, and mottling increases with depth in places. Gray or yellowish-brown, alkaline silt underlies the soils in a few areas, mostly on the steeper slopes. The B21t layer ranges from silty clay loam to silt loam.

Morganfield Series

Soils in the Morganfield series are young, silty, deep, and well drained. They formed on nearly level first bottoms in neutral sediment that was recently washed from the steep loess hills.

Representative profile of Morganfield silt loam, three-quarters of a mile north of Big Boy Junction and 300 yards west of Lenox road:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.
C1—8 to 18 inches, brown (10YR 4/3) silt loam; weak, fine and medium, granular structure; very friable; pH 7.3; diffuse, smooth boundary.
C2—18 to 30 inches, brown (10YR 5/3) silt loam; weak, medium and fine, granular structure; very friable; pH 7.3; clear, smooth boundary.
C3—30 to 50 inches, brown (10YR 5/3) silt loam; many, fine, pale-brown (10YR 6/3) and dark-brown (7.5YR 4/4) mottles; weak, medium, granular structure; very friable; pH 7.3.

Range in characteristics.—These soils are in silty alluvium that is 4 feet or more thick and overlies old alluvium from the Mississippi River.

Robinsonville Series

Robinsonville soils are well drained; they consist of neutral, loamy sediment recently deposited by the Mississippi River on flat, young, natural levees alongside the river.

Representative profile of Robinsonville loam, half a mile east of Chic:

Ap—0 to 6 inches, dark-brown (10YR 4/3) loam; moderate, medium, granular structure; very friable; pH 7.3; clear, smooth boundary.
C1—6 to 18 inches, brown (10YR 5/3) loam or very fine sandy loam; weak, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.
C2—18 to 25 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.
C3—25 to 28 inches, grayish-brown (10YR 5/2) very fine sandy loam; dark-brown (10YR 4/3) mottles; weak, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.
C4—28 to 42 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.
C5—42 to 84 inches, dark grayish-brown (10YR 4/2) stratified silt loam and loam; common, coarse, light-gray (10YR 6/1) mottles; pH 7.3.

Range in characteristics.—A fine sandy loam type is also recognized. it commonly consists of 12- to 24-inch layers of loam, fine sandy loam, and silt loam.

Routon Series

The Routon series consists of gray, poorly drained soils that developed in loess on low, flat uplands. These soils are slightly acid to strongly acid in the uppermost 1 to 2 feet, but they are neutral in the lower part.

Representative profile of Routon silt loam, 1¼ miles southeast of South Dyersburg:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; few black concretions; pH 6.3; abrupt, smooth boundary.
A2g—8 to 18 inches, gray (10YR 6/1) silt loam; common, fine, brown (10YR 5/3) mottles and black stains; weak, fine, granular structure; friable; common, small, black concretions; pH 5.5; abrupt, wavy boundary.
B21tg—18 to 36 inches, grayish-brown (10YR 5/2) silty clay loam; common, fine, yellowish-brown (10YR 5/4) mottles and few, medium, gray (10YR 6/1) mottles and few black stains; moderate, coarse, columnar structure breaking to weak, coarse, subangular and angular blocky structure; very firm; common, fine, black concretions; pH 6.5; clear, smooth boundary.
B22tg—36 to 56 inches, grayish-brown (2.5Y 5/2) or dark grayish-brown (2.5Y 4/2) silty clay loam; many, fine, yellowish-brown (10YR 5/4 and 5/6) mottles; moderate, coarse, columnar structure breaking to subangular and angular blocky structure; very firm; many, small, black concretions; pH 7.3; diffuse, smooth boundary.
C—56 to 86 inches, yellowish-brown (10YR 5/4) silt loam; many, fine and medium, olive-gray (5Y 5/2) mottles; massive; friable; few concretions of calcium carbonate up to 2 inches in diameter; pH 8.2.

Range in characteristics.—In a few ponded depressions, the upper part of the profile is neutral. In other small areas, on slight knolls or ridges, this soil is acid to a depth of 5 feet or more.

Sharkey Series

The Sharkey series consists of poorly drained and somewhat poorly drained soils that are neutral in reaction. These soils are in 30 inches or more of clayey sediment that was deposited under ponded conditions by the Mississippi River. They are in low, wide, flat depressions on the Mississippi River bottoms.

Representative profile of Sharkey clay, 20 feet west of a hard-surface road and about three-quarters of a mile north of Miston:

Ap—0 to 4 inches, dark-gray (10YR 4/1) or very dark gray (10YR 3/1) clay; weak, fine, granular structure; very plastic; pH 7.0; abrupt, smooth boundary.
C1g—4 to 14 inches, dark-gray (N 4/0) clay; many, medium, yellowish-brown (10YR 5/4) mottles; massive; very plastic; pH 7.0; gradual, smooth boundary.
C2g—14 to 40 inches, dark-gray (N 4/0) clay; many, fine, dark yellowish-brown (10YR 4/4) mottles and few, fine, dark reddish-brown (5YR 3/4) mottles; massive; very plastic; pH 7.0; abrupt, smooth boundary.
C3g—40 to 60 inches, dark-gray (N 4/0) clay; many, medium, dark yellowish-brown (10YR 4/4) mottles; massive; very plastic; common, round, calcium carbonate concretions 3 to 6 millimeters in diameter; pH 7.3.

Range in characteristics.—Clay and silty clay loam types are recognized. In places these soils are mildly alkaline and contain calcium carbonate concretions at a depth of 3 feet and below. The soil material below a depth of 30 inches is variable but is commonly clay to a depth of about 6 feet.

Tunica Series

Tunica soils are somewhat poorly drained and moderately well drained; they are neutral in reaction. They occur in low, broad, flat depressions on the Mississippi River bottoms and consist of 20 to 30 inches of clayey sediment over coarser textured sediment. The clayey sediment was deposited by ponded water from the Mississippi River.

Representative profile of Tunica clay, 80 feet west of the Obion River bridge and half a mile north of Midway-Richwood road (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 1):

Ap—0 to 5 inches, very dark grayish-brown (10YR 3/2) clay; moderate, fine, granular structure; friable (lowest 2 inches is a massive, firm plowpan); pH 7.0; abrupt, smooth boundary.
C1g—5 to 19 inches, dark-gray (5Y 4/1) clay; common, medium, brown (10YR 4/3) mottles; moderate, coarse, prismatic structure breaking to moderate, medium, subangular blocky structure; firm; common coatings (possibly clay films) on vertical ped faces; pH 7.0; clear, smooth boundary.
C2g—19 to 25 inches, gray (5Y 5/1) clay; common, fine, brown (10YR 4/3) and gray (N 5/0) mottles; moderate, coarse, prismatic structure breaking to moderate, medium, subangular blocky structure; firm; common coatings (possibly clay films) on vertical ped faces; pH 7.0; abrupt, smooth boundary.
IIC3—25 to 32 inches, dark grayish-brown (10YR 4/2) fine sandy loam; few, medium, yellowish-brown (10YR 5/4) mottles; massive; friable; pH 7.3; abrupt, smooth boundary.
C4—32 to 44 inches, yellowish-brown (10YR 5/4) fine sandy loam; gray (N 5/0) coatings on clods; massive; friable; calcareous (effervesces slightly with HCl); ½-inch layer of gray clay at depth of 38 inches; pH 7.3; abrupt, smooth boundary.
IIIC5g—44 to 46 inches, dark-gray (N 4/0) to gray (N 5/0) clay; few, fine, yellowish-brown (10YR 5/4) mottles; massive; firm; calcareous (effervesces slightly with HCl); common calcium concretions; pH 8.0; abrupt, smooth boundary.
IVC6g—46 to 52 inches, dark-gray (N 4/0) silt loam or loam; many, coarse, dark yellowish-brown (10YR 4/4) and black (N 2/0) mottles; massive; friable; calcareous (effervesces slightly with HCl); pH 8.0; abrupt, smooth boundary.
VC7g—52 to 55 inches, gray (N 5/0) to dark-gray (N 4/0) clay; massive; firm; calcareous (effervesces violently with HCl); many concretions of calcium carbonate; pH 8.0; abrupt, smooth boundary.
VIC8g—55 to 65 inches, gray (10YR 5/1) clay or silty clay; common, coarse, black (N 2/0) and reddish-brown (5YR 4/4) mottles; massive; firm; calcareous (effervesces slightly with HCl); common concretions of calcium carbonate; pH 7.5 to 8.0.

Profile of Tunica clay, 0.2 mile west of main levee on Midway road, 0.7 mile south by house site on field road (laboratory data for this profile are given in tables 14 and 15; the profile is that at site 2):

Ap—9 to 7 inches, very dark grayish-brown (10YR 3/2) clay that has moderate, medium, granular structure in the uppermost 4 inches and is massive below a depth of 4 inches; friable; firm to very firm plowpan; many fine roots; clear, smooth boundary.
C1—7 to 25 inches, very dark grayish-brown (10YR 3/2) silty clay; few, fine, distinct, yellowish-brown (10YR 5/6) and strong-brown (7.5YR 5/6) mottles; moderate, medium, prismatic structure breaking to moderate, medium, subangular blocky structure; firm; few fine roots; thin clay films on vertical ped faces; abrupt, smooth boundary.
IIC2—25 to 29 inches, dark grayish-brown (10YR 4/2) fine sandy loam; massive; friable; clear, smooth boundary.
IIIC3—29 to 38 inches, pale-brown (10YR 6/3) fine sand; single grained; loose; abrupt, smooth boundary.
IVC4—38 to 40 inches, dark grayish-brown (10YR 4/2) fine sandy loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; very friable; abrupt, smooth boundary.
VC5—40 to 55 inches, pale-brown (10YR 6/3) fine sand; single grained; loose; clear, wavy boundary.
VC6—55 to 72 inches, pale-brown (10YR 6/3) fine sand or loamy fine sand; common, medium, faint, yellowish-brown (10YR 5/4) mottles; single grained; loose; abrupt, smooth boundary.
VIC7—72 to 86 inches, dark-gray (10YR 4/1) silty clay loam; many, coarse, prominent, dark reddish-brown (5YR 3/4) and dark grayish-brown (10YR 4/2) mottles; massive; firm; many fine pores; abrupt, smooth boundary.

Range in characteristics.—The soil material at a depth of 20 to 30 inches is commonly loamy or sandy; it ranges from sand to silty clay loam in texture.

Wakeland Series

The Wakeland series consists of somewhat poorly drained, young, silty soils on flat first bottoms. These soils are in neutral sediment recently washed from the steep loess hills.

Representative profile of Wakeland silt loam, three-eighths of a mile east of Finley and three-fourths of a mile south of Tennessee Highway No. 20:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 7.3; abrupt, smooth boundary.
C1—8 to 13 inches, dark grayish-brown (10YR 4/2) silt loam; few, medium, light brownish-gray (10YR 6/2) mottles; weak, medium, granular structure; very friable; pH 7.3; clear, smooth boundary.
C2—13 to 28 inches, mottled dark grayish-brown (10YR 4/2) and light brownish-gray (10YR 6/2) silt loam; weak, medium, granular structure; friable; pH 7.3; gradual, smooth boundary.
C3g—28 to 50 inches, light brownish-gray (10YR 6/2) silt loam; common, coarse, dark grayish-brown (10YR 4/2) mottles and black stains; massive; friable; common, medium, soft, black concretions; pH 7.0.

Range in characteristics.—The depth to the gray mottles ranges from 12 to nearly 18 inches. In places old alluvium from the Mississippi River underlies these soils at a depth of 3 feet or more.

Waverly Series

The Waverly series consists of poorly drained, young, silty soils on low, broad, flat first bottoms. These soils are in medium acid and strongly acid sediment that recently washed from the loess uplands.

Representative profile of Waverly silt loam, half a mile north of Tennessee Highway No. 104 and 300 feet east of Lewis Creek:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) to grayish-brown (10YR 5/2) silt loam; many, fine, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; very friable; pH 5.5; abrupt, smooth boundary.

C1g—8 to 24 inches, gray (10YR 6/1) silt loam; common, medium, yellowish-brown (10YR 5/4) mottles; weak, medium and fine, granular structure; friable; pH 6.0; gradual, smooth boundary.

C2g—24 to 54 inches, gray (10YR 6/1) silt loam; many, fine, yellowish-brown (10YR 5/6) mottles; weak, medium, granular structure; friable; pH 5.5; few, small, black concretions.

Range in characteristics.—In places the Waverly soils are underlain by black, neutral silt loam or silty clay loam

TABLE 14.—*Chemical characteristics*

[Analyses by the Soil Survey Laboratory,

Soil, site, and survey number	Horizon	Depth	Reaction (1:1)	Cation-exchange capacity (NH_4OAc)	Extractable cations (Milliequivalents per 100 grams of soil)				
					Ca	Mg	H	Na	K
Bosket silt loam:		*In.*	*pH*	*Meq./100 gm.*					
Site 1; samples nos. S61–Tenn–23–12–(1–6).	Ap	0 to 6	5.5	8.7	4.9	1.6	4.2	[1]	0.2
	B21t	6 to 14	4.8	13.6	4.8	2.2	10.3	0.1	.3
	B22t	14 to 24	4.8	14.2	5.1	2.5	10.3	.1	.3
	B3t	24 to 34	4.9	13.8	5.7	2.6	8.5	.1	.3
	C1	34 to 40	4.9	14.9	6.7	3.0	8.0	.1	.3
	C2	40 to 50	4.6	12.7	5.9	2.8	6.8	.1	.2
Site 2; samples nos. S61–Tenn–23–13–(1–7).	Ap	0 to 7	5.8	5.1	3.0	.6	5.6	[1]	.2
	B1	7 to 12	5.4	10.8	6.6	1.6	4.7	[1]	.3
	B21	12 to 18	5.3	17.0	10.5	3.4	6.8	.1	.4
	B22	18 to 25	5.0	17.5	8.8	3.4	8.5	.2	.4
	B3	25 to 30	4.3	15.2	6.2	2.8	9.4	.1	.3
	IIC1	30 to 40	4.5	11.0	3.6	2.0	7.5	.1	.2
	IIIC2	40 to 52	5.1	3.7	1.6	.7	2.1	[1]	.1
Dekoven silt loam:									
Site 1; samples nos. S61–Tenn–23–8–(1–6).	Ap1	0 to 6	6.2	21.7	15.6	6.0	5.4	[1]	.2
	Ap2	6 to 10	6.3	21.8	14.9	6.7	4.7	.1	.3
	A1b1	10 to 18	6.6	24.7	16.8	8.4	4.0	.1	.4
	A1b2	18 to 24	6.6	23.4	15.6	8.5	3.6	.1	.3
	C1g	24 to 39	7.0	20.8	13.3	7.9	2.6	.1	.4
	C2g	39 to 56	7.1	19.6	12.0	7.3	2.4	.1	.4
Site 2; samples nos. S61–Tenn–23–9–(1–6).	Ap	0 to 8	6.1	19.4	12.2	5.5	5.9	.1	.2
	A1b1	8 to 15	6.7	24.7	16.3	8.7	3.8	.1	.3
	A1b2	15 to 20	6.9	22.2	14.5	8.4	3.3	.1	.3
	C1g	20 to 37	7.1	22.1	14.1	9.2	2.4	.1	.4
	C2g	37 to 55	7.2	20.8	12.8	8.7	1.9	.1	.3
	C3g	55 to 63	7.2	16.5	10.1	7.0	2.1	.1	.3
Forestdale silt loam:									
Site 1; samples nos. S61–Tenn–23–14–(1–7).	Ap	0 to 8	4.5	15.4	6.5	2.2	11.5	[1]	.3
	B1tg	8 to 16	4.2	18.0	5.2	2.8	13.5	.1	.4
	B2tg	16 to 27	4.0	18.4	3.8	3.8	14.6	.1	.4
	B3tg	27 to 35	3.8	17.2	3.3	4.0	12.5	.1	.3
	C1g	35 to 45	3.8	15.2	3.0	4.0	10.6	.1	.3
	IIC2	45 to 51	4.6	5.2	1.1	1.2	3.5	.1	.1
	C3	51 to 69	4.6	5.4	1.7	1.6	2.3	[1]	.2
Site 2; samples nos. S61–Tenn–23–15–(1–9).	Ap	0 to 8	4.5	14.9	7.1	2.2	10.1	[1]	.2
	A21g	8 to 12	4.1	13.8	3.7	1.6	11.3	.1	.3
	A22g	12 to 16	4.1	12.2	2.3	1.5	10.3	.2	.2
	B21g	16 to 22	3.8	17.2	2.4	2.7	15.1	.5	.4
	B22g	22 to 29	4.0	21.4	3.0	3.8	17.3	.9	.5
	B3	29 to 35	4.4	20.6	3.6	4.4	15.4	1.4	.4
	C1	35 to 53	4.9	20.9	5.0	5.7	11.8	2.1	.4
	IIC2	53 to 59	5.1	11.7	4.6	4.1	3.7	1.7	.2
	C3	59 to 80	6.0	8.5	4.2	3.0	1.9	.9	.2

See footnotes at end of table.

at a depth of 18 inches to several feet. The surface layer in the lower areas is more clayey than is normal for a silt loam.

Laboratory Data

The results of laboratory analyses of two profiles each of Bosket, Dekoven, Forestdale, and Tunica soils are given in tables 14 and 15. Table 14 gives chemical characteristics, and table 15 gives physical characteristics. The data in the tables are useful to soil scientists in classifying soils and in developing concepts of soil genesis. They are also helpful in estimating available water capacity, fertility, and other soil characteristics that affect management needs.

The samples analyzed were collected in 1961 from pits at different locations in Dyer County. The analyses were made by the Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebr. The profiles that were analyzed are described in the section preceding this one, under the heading "The series."

Laboratory methods

Standard methods of the Soil Survey Laboratory were used to obtain the data. The analyses are reported on an air-dry basis and are of material that has been air dried,

of some representative soils

Soil Conservation Service, Lincoln, Nebr.]

Base saturation		Extractable aluminum	Extractable iron	Organic matter		
Exchangeable NH_4OAc	Sum of extractable bases plus hydrogen			Organic carbon	Nitrogen	C/N ratio
Pct.	*Pct.*	*Meq./100 gm.*	*Pct.*	*Pct.*	*Pct.*	
77	61	0.1	0.7	0.51	0.056	9
54	42	3.0	1.1	.32	.044	7
56	44	2.7	1.3	.19	.037	5
63	50	1.9	1.3	.16	[2]	[2]
68	56	1.6	1.2	.10	[2]	[2]
71	57	1.5	1.0	.10	[2]	[2]
74	40	[1]	.5	.50	.050	10
79	64	.1	1.0	.26	.047	6
85	68	.3	1.5	.26	.047	6
73	60	1.5	1.5	.19	.041	5
62	50	3.0	1.4	.19	[2]	[2]
54	44	2.5	1.1	.10	[2]	[2]
65	53	.2	.7	.02	[2]	[2]
100	80	[2]	.8	2.06	.167	12
101	82	[2]	.7	1.18	.100	12
104	86	[2]	.8	1.02	.080	13
105	87	[2]	.8	.78	.065	12
104	89	[2]	.8	.37	[2]	[2]
101	89	[2]	.8	.13	[2]	[2]
93	75	[2]	.9	1.18	.114	10
103	87	[2]	.6	1.11	.083	13
105	88	[2]	.8	.75	.066	11
108	91	[2]	.9	.36	.040	9
105	92	[2]	.8	.17	[2]	[2]
106	89	[2]	2.4	.14	[2]	[2]
58	44	2.3	1.0	.72	.080	9
47	39	6.4	1.0	.23	.052	4
44	36	7.9	1.1	.14	.039	4
45	38	5.9	1.2	.14	[2]	[2]
49	41	4.6	1.0	.06	[2]	[2]
48	42	1.3	.6	.02	[2]	[2]
65	60	.6	.6	.02	[2]	[2]
64	48	.5	1.2	1.23	.114	11
41	34	4.8	1.1	.25	.041	6
34	29	5.3	1.0	.14	.033	4
35	28	8.9	1.0	.14	.037	4
38	32	9.7	1.0	.18	.039	5
48	39	7.9	1.2	.12	[2]	[2]
63	53	4.6	1.4	.10	[2]	[2]
90	74	.2	.8	.10	[2]	[2]
98	81	[2]	.8	.06	[2]	[2]

TABLE 14.—*Chemical characteristics*

Soil, site, and survey number	Horizon	Depth	Reaction (1:1)	Cation-exchange capacity (NH_4OAc)	Extractable cations (Milliequivalents per 100 grams of soil)				
					Ca	Mg	H	Na	K
Tunica clay:		*In.*	*pH*	*Meq./100 gm.*					
Site 1; samples nos. S61–Tenn–23–10–(1–9).	Ap	0 to 5	6.5	34.9	27.6	8.0	7.4	.1	.9
	C1g	5 to 19	6.8	30.2	24.0	7.6	4.8	.1	.7
	C2g	19 to 25	7.0	28.3	22.1	7.6	2.9	.1	.7
	IIC3	25 to 32	7.6	8.7	([2])	([2])	([2])	.1	.2
	C4	32 to 44	7.8	8.5	([2])	([2])	([2])	([1])	.2
	IIIC5g	44 to 46	7.8	20.8	([2])	([2])	([2])	.2	.6
	IVC6g	46 to 52	7.8	14.5	([2])	([2])	([2])	.1	.4
	VC7g	52 to 55	7.7	26.1	([2])	([2])	([2])	.2	.8
	VIC8g	55 to 65	7.8	18.6	([2])	([2])	([2])	.1	.6
Site 2; samples nos. S61–Tenn–23–11–(1–8).	Ap	0 to 7	6.5	31.8	25.3	7.5	6.9	.1	1.1
	C1	7 to 25	6.8	30.5	25.3	7.1	4.8	.1	.9
	IIC2	25 to 29	7.1	7.7	5.9	1.4	1.4	([1])	.2
	IIIC3	29 to 38	7.4	4.1	3.1	.9	.7	([1])	.2
	IVC4	38 to 40	7.6	8.8	([2])	([2])	([2])	([1])	.2
	VC5	40 to 55	8.2	4.4	([2])	([2])	([2])	([1])	.2
	VC6	55 to 72	8.1	3.5	([2])	([2])	([2])	([1])	.1
	VIC7	72 to 86	7.1	32.2	23.7	7.8	3.8	.1	.8

[1] Trace.
[2] Data not available.

TABLE 15.—*Physical characteristics*

[Analyses by the Soil Survey Laboratory,

Soil, site, and survey number	Horizon	Depth	Particle size distribution						
			Very coarse sand (2.0–1.0 mm.)	Coarse sand (1.0–0.5 mm.)	Medium sand (0.5–0.25 mm.)	Fine sand (0.25–0.10 mm.)	Very fine sand (0.10–0.05 mm.)	Silt (0.05–(0.002 mm.)	Clay (less than (0.002 mm.)
Bosket silt loam:		*In.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
Site 1; samples nos. S61–Tenn–23–12–(1–6).	Ap	0 to 6	([1])	[2] 0.3	[2] 0.4	2.9	17.8	64.9	13.7
	B21t	6 to 14	([1])	([3])	([3])	1.5	21.3	35.2	24.0
	B22t	14 to 24	([1])	([1])	([3])	.9	16.4	59.8	22.9
	B3t	24 to 34	([1])	([1])	([3]) ([4])	[2] .4	[2] 6.7	74.1	18.8
	C1	34 to 40	([1])	([3]) ([4])	[4] .1	[2] 1.1	8.6	70.5	19.7
	C2	40 to 50	([1])	([1])	[4] .1	5.3	21.4	58.4	14.8
Site 2; samples nos. S61–Tenn–23–13–(1–7).	Ap	0 to 7	([3])	1.0	3.8	12.1	9.1	65.7	8.3
	B1	7 to 12	([3])	.4	1.8	7.4	8.0	60.4	22.0
	B21	12 to 18	([1])	.1	.8	5.5	12.0	49.8	31.8
	B22	18 to 25	([1])	.1	.6	5.5	17.2	47.6	29.0
	B3	25 to 30	([1])	.1	.6	5.4	16.5	52.6	24.8
	IIC1	30 to 40	([1])	.1	1.9	18.6	16.6	44.2	18.6
	IIIC2	40 to 52	([3])	1.0	6.3	58.0	21.8	9.1	3.8
Dekoven silt loam:									
Site 1; samples nos. S61–Tenn–23–8–(1–6).	Ap1	0 to 6	[4] .1	[4] .2	([3]) ([4])	[4] .1	[2] 1.2	75.3	23.1
	Ap2	6 to 10	[4] .1	[4] .1	[4] .1	[4] .2	[4] 1.0	73.1	25.4
	A1b1	10 to 18	[4] .5	[4] .4	[4] .2	[4] .2	[2] .9	68.3	29.5
	A1b2	18 to 24	[4] .5	[4] .5	[4] .2	[4] .2	[4] 1.0	69.4	28.2
	C1g	24 to 39	[4] .2	[4] .2	[4] .1	[4] .2	[2] .8	73.4	25.1
	C2g	39 to 56	[4] .2	[4] .3	[4] .1	[4] .2	[5] 1.4	76.3	21.5

See footnotes at end of table.

of some representative soils—Continued

Base saturation: Exchangeable NH_4OAc	Base saturation: Sum of extractable bases plus hydrogen	Extractable aluminum	Extractable iron	Organic matter: Organic carbon	Organic matter: Nitrogen	Organic matter: C/N ratio
Pct.	*Pct.*	*Meq./100 gm.*	*Pct.*	*Pct.*	*Pct.*	
105	83	(2)	1. 8	2. 57	. 189	14
107	87	(2)	1. 3	1. 06	. 103	10
108	91	(2)	1. 1	. 79	. 082	10
(2)	(2)	(2)	. 6	. 22	(2)	(2)
(2)	(2)	(2)	. 6	. 24	(2)	(2)
(2)	(2)	(2)	. 9	. 54	(2)	(2)
(2)	(2)	(2)	. 9	. 50	(2)	(2)
(2)	(2)	(2)	. 8	. 68	(2)	(2)
(2)	(2)	(2)	1. 0	. 54	(2)	(2)
107	83	(3)	1. 6	2. 10	. 171	12
110	87	(3)	1. 5	1. 33	. 124	11
97	84	(2)	. 5	. 22	(2)	(2)
102	86	(3)	. 4	. 09	(2)	(2)
(2)	(2)	(2)	. 6	. 34	(2)	(2)
(2)	(2)	(2)	. 4	. 06	(2)	(2)
(2)	(2)	(2)	. 4	. 09	(2)	(2)
99	89	(2)	1. 3	. 94	(2)	(2)

[3] Value is practically zero.

of some representative soils
Soil Conservation Service, Lincoln, Nebr.]

Textural class	Bulk density: Field moisture		Bulk density: 30 cm. tension		Bulk density: Air dry	Moisture held at tension of—: 1/3 atmosphere	Moisture held at tension of—: 15 atmospheres	Difference: moisture at 1/3 atmosphere minus moisture at 15 atmospheres
	Pct.	*Gm./cc.*	*Pct.*	*Gm./cc.*	*Gm./cc.*	*Pct.*	*Pct.*	*In./in. of soil*
Silt loam	7. 8	1. 50	11. 4	1. 42	1. 49	13. 6	6. 9	0. 10
Silt loam	13. 1	1. 58	22. 4	1. 52	1. 59	20. 1	10. 7	. 14
Silt loam	15. 3	1. 57	24. 1	1. 52	1. 59	23. 2	11. 1	. 18
Silt loam	16. 0	1. 50	26. 7	1. 46	1. 52	24. 2	10. 1	. 20
Silt loam	15. 9	1. 50	26. 6	1. 46	1. 53	25. 1	10. 4	. 21
Silt loam	12. 2	1. 48	26. 5	1. 44	1. 50	19. 7	8. 5	. 16
Silt loam	2. 9	1. 57	21. 1	1. 51	1. 55	12. 8	3. 5	. 14
Silt loam	8. 2	1. 60	19. 4	1. 49	1. 58	16. 7	9. 2	. 11
Silty clay loam or clay loam	11. 5	1. 65	22. 0	1. 52	1. 67	18. 4	14. 0	. 07
Clay loam	11. 8	1. 62	21. 8	1. 52	1. 63	23. 8	13. 4	. 16
Silt loam	9. 6	1. 62	23. 6	1. 53	1. 63	22. 4	11. 7	. 16
Loam	6. 9	1. 68	19. 3	1. 62	1. 67	14. 4	8. 6	. 09
Fine sand or loamy fine sand	(5)	(5)	(5)	(5)	(5)	(5)	2. 4	(5)
Silt loam	18. 8	1. 50	27. 9	1. 40	1. 60	25. 1	11. 7	. 19
Silt loam	16. 9	1. 53	28. 6	1. 40	1. 60	24. 9	12. 1	. 18
Silty clay loam or silt loam	17. 6	1. 57	27. 0	1. 44	1. 65	26. 5	14. 7	. 17
Silty clay loam	17. 5	1. 58	27. 8	1. 43	1. 67	26. 8	14. 3	. 18
Silt loam	19. 8	1. 56	27. 8	1. 46	1. 65	26. 6	12. 1	. 21
Silt loam	20. 3	1. 57	28. 3	1. 46	1. 65	25. 7	11. 3	. 21

TABLE 15.—*Physical characteristics*

Soil, site, and survey number	Horizon	Depth	Particle size distribution						
			Very coarse sand (2.0–1.0 mm.)	Coarse sand (1.0–0.5 mm.)	Medium sand (0.5–0.25 mm.)	Fine sand (0.25–0.10 mm.)	Very fine sand (0.10–0.05 mm.)	Silt (0.05–(0.002 mm.)	Clay (less than (0.002 mm.)
		In.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
Dekoven silt loam—Continued									
Site 2; samples nos. S61–Tenn–23–9–(1–6).	Ap	0 to 8	[4] .1	[4] .1	[4] .2	[4] .6	[2] .5	74.7	23.8
	A1b1	8 to 15	[4] .2	[4] .3	[4] .1	[4] .2	[2] .6	70.6	28.0
	A1b2	15 to 20	[4] .3	[4] .7	[4] .3	[4] .3	[4] .5	71.0	26.9
	C1g	20 to 37	[4] .1	[4] .3	[4] .1	[4] .2	[2] .6	72.3	26.4
	C2g	37 to 55	[4] .3	[4] .3	[4] .1	[4] .2	[6] .8	75.7	22.6
	C3g	55 to 63	[4] .4	[4] .6	[4] .1	[4] .2	[6] 1.0	77.9	19.8
Forestdale silt loam:									
Site 1; samples nos. S61–Tenn–23–14–(1–7).	Ap	0 to 8	[4] .4	[4] 1.5	[2] 1.9	12.6	6.8	45.5	31.3
	B1tg	8 to 16	[4] .3	[4] .4	[2] 1.3	14.0	7.8	41.5	34.7
	B2tg	16 to 27	[4] .1	[4] .3	[2] 1.0	12.7	10.4	42.8	32.7
	B3tg	27 to 35	([1])	[4] .1	.6	14.2	18.8	39.3	27.0
	C1g	35 to 45	([1])	([3])	.7	26.1	17.4	34.1	21.7
	IIc2	45 to 51	([1])	([3])	2.3	72.1	9.4	9.4	6.8
	C3	51 to 69	([1])	.1	5.7	71.0	8.8	8.1	6.2
Site 2; samples nos. S61–Tenn–23–15–(1–9).	Ap	0 to 8	[4] .5	[4] .9	[4] .7	[2] 3.3	15.5	55.2	23.9
	A21g	8 to 12	[4] .3	[4] .8	[4] .5	[2] 2.5	13.6	55.2	27.1
	A22g	12 to 16	[4] .4	[4] .6	[4] .4	[2] 2.4	15.0	56.4	24.8
	B21g	16 to 22	[4] .2	[4] .4	[4] .3	[2] 1.9	14.0	51.0	32.2
	B22g	22 to 29	[4] .2	[4] .3	[4] .2	[2] 1.7	15.4	45.3	36.9
	B3	29 to 35	[4] .1	[4] .1	[4] .2	[2] 1.5	16.1	49.5	32.5
	C1	35 to 53	([1])	([3]) ([4])	[4] .1	[2] 1.2	9.3	60.4	29.0
	IIC2	53 to 59	([1])	([1])	.2	9.3	47.1	29.0	14.4
	C3	59 to 80	([1])	([1])	1.0	12.0	52.5	25.8	8.7
Tunica clay:									
Site 1; samples nos. S61–Tenn–23–10–(1–9).	Ap	0 to 5	([1])	([1])	([1])	[4] .3	[2] 2.7	37.4	59.6
	C1g	5 to 19	([1])	([1])	([1])	[4] .2	[2] 1.9	55.9	42.0
	C2g	19 to 25	([1])	([1])	([1])	[4] .3	[4] 4.9	70.1	24.7
	IIC3	25 to 32	([1])	[2] .3	[2] .2	[2] 7.3	[2] 53.9	30.6	7.7
	C4	32 to 44	([1])	[2] .1	[2] .1	[2] 5.6	[2] 53.0	33.1	8.1
	IIIC5g	44 to 46	([1])	[7] .2	[7] .2	[8] .5	[2] 11.9	56.0	31.2
	IVC6g	46 to 52	([1])	[8] .1	[8] .3	[8] .9	[2] 17.3	63.4	18.0
	VC7g	52 to 55	([1])	[7] .1	[7] .3	[7] .4	[8] .9	58.8	39.5
	VIC8g	55 to 65	([1])	[8] .1	[8] .2	[8] .5	[2] 3.4	72.0	23.8
Site 2; samples nos. S61–Tenn–23–11–(1–8).	Ap	0 to 7	([1])	([1])	[2] .2	[2] .4	[2] .3	43.2	55.9
	C1	7 to 25	([1])	([1])	[2] .2	[2] 2.1	[2] 3.2	45.7	48.8
	IIC2	25 to 29	([1])	.3	2.3	59.1	12.5	17.4	8.4
	IIIC3	29 to 38	([1])	.4	8.2	51.3	22.7	13.5	3.9
	IVC4	38 to 40	([3])	.2	2.7	24.3	42.5	22.6	7.7
	VC5	40 to 55	([3])	.2	1.6	45.5	33.7	15.9	3.1
	C6	55 to 72	([3])	1.1	10.6	50.9	24.4	10.4	2.6
	VIC7	72 to 86	([3]) ([4])	([3]) ([4])	([3]) ([4])	[4] .2	[4] 1.1	56.1	42.6

[1] Value is practically zero.
[2] Contains few aggregates of iron and manganese.
[3] Trace.
[4] Contains common to many aggregates of iron and manganese.
[5] Data not available.

of some representative soils—Continued

Textural class	Bulk density					Moisture held at tension of—		Difference: moisture at ⅓ atmosphere minus moisture at 15 atmospheres
	Field moisture		30 cm. tension		Air dry	⅓ atmosphere	15 atmospheres	
	Pct.	*Gm./cc.*	*Pct.*	*Gm./cc.*	*Gm./cc.*	*Pct.*	*Pct.*	*In./in. of soil*
Silt loam	16. 2	1. 59	26. 5	1. 48	1. 64	25. 0	11. 0	. 21
Silty clay loam or silt loam	19. 4	1. 54	28. 7	1. 40	1. 65	27. 1	14. 1	. 18
Silt loam or silty clay loam	22. 6	1. 46	29. 7	1. 38	1. 59	25. 9	13. 8	. 17
Silt loam or silty clay loam	18. 6	1. 56	28. 2	1. 44	1. 64	26. 8	13. 8	. 19
Silt loam	20. 2	1. 58	26. 7	1. 47	1. 66	27. 1	12. 5	. 21
Silt loam	(5)	(5)	(5)	(5)	(5)	(5)	11. 4	(5)
Clay loam	12. 4	1. 64	19. 5	1. 55	1. 66	20. 9	12. 1	. 14
Clay loam	11. 3	1. 69	(5)	(5)	1. 70	22. 7	14. 2	. 13
Clay loam	12. 2	1. 66	(5)	(5)	1. 68	22. 6	14. 0	. 13
Loam or clay loam	12. 9	1. 65	23. 0	1. 57	1. 69	21. 3	12. 3	. 14
Loam	13. 9	1. 67	19. 2	1. 62	1. 72	21. 4	10. 2	. 18
Loamy fine sand	(5)	(5)	(5)	(5)	(5)	(5)	3. 6	(5)
Loamy fine sand	(5)	(5)	(5)	(5)	(5)	(5)	3. 7	(5)
Silt loam	12. 6	1. 56	21. 4	1. 50	1. 57	21. 4	10. 6	. 16
Silt loam or silty clay loam	11. 1	1. 59	22. 0	1. 56	1. 59	22. 1	10. 8	. 18
Silt loam	10. 5	1. 68	19. 0	1. 61	1. 68	21. 6	9. 9	. 19
Silty clay loam	14. 0	1. 64	20. 4	1. 57	1. 66	23. 4	13. 7	. 15
Silty clay loam	16. 3	1. 63	20. 1	1. 54	1. 68	28. 0	15. 9	. 19
Silty clay loam	15. 5	1. 60	23. 2	1. 50	1. 63	25. 6	15. 7	. 15
Silty clay loam	15. 5	1. 58	24. 4	1. 50	1. 61	26. 8	15. 0	. 18
Very fine sandy loam	(5)	(5)	(5)	(5)	(5)	(5)	8. 6	(5)
Very fine sandy loam	(5)	(5)	(5)	(5)	(5)	(5)	5. 9	(5)
Clay	25. 2	1. 17	(5)	(5)	1. 36	33. 1	23. 9	. 11
Silty clay	27. 8	1. 38	(5)	(5)	1. 65	33. 5	22. 4	. 16
Silt loam	25. 8	1. 40	(5)	(5)	1. 61	32. 4	19. 5	. 17
Very fine sandy loam	9. 9	1. 40	(5)	(5)	1. 38	(5)	5. 0	(5)
Very fine sandy loam	17. 3	1. 40	(5)	(5)	1. 41	(5)	4. 8	(5)
Silty clay loam	28. 0	1. 34	37. 7	1. 22	1. 60	37. 3	14. 4	. 28
Silt loam	26. 8	1. 38	35. 3	1. 32	1. 44	27. 9	10. 0	. 24
Silty clay loam or silty clay	26. 9	1. 39	28. 5	1. 36	1. 60	32. 5	19. 8	. 17
Silt loam	26. 2	1. 45	33. 2	1. 35	1. 57	30. 5	13. 1	. 23
Clay	13. 5	1. 38	26. 7	1. 20	1. 42	(5)	19. 6	(5)
Clay	22. 5	1. 50	28. 3	1. 36	1. 65	34. 0	23. 7	. 14
Fine sandy loam	4. 2	1. 51	18. 6	1. 41	1. 47	(5)	4. 6	(5)
Loamy fine sand	(5)	(5)	(5)	(5)	[9] 1. 52	(5)	2. 2	(5)
Very fine sandy loam	(5)	(5)	(5)	(5)	(5)	(5)	4. 0	(5)
Loamy fine sand	(5)	(5)	(5)	(5)	[9] 1. 39	(5)	2. 2	(5)
Fine sand or loamy fine sand	(5)	(5)	(5)	(5)	[9] 1. 55	(5)	1. 7	(5)
Silty clay	28. 6	1. 32	(5)	(5)	1. 58	31. 0	22. 2	. 12

[6] Contains a trace of iron and manganese aggregates.
[7] Contains few aggregates of iron and manganese and many carbonate modules.
[8] Contains few to many aggregates of iron and manganese and few carbonate modules.
[9] Measurement on single clod.

rolled, crushed, and passed through a 2-millimeter, square-holed sieve.

The pH values were determined by the glass electrode method using a soil-water ratio of 1:1. Carbonate as calcium carbonate was determined by gravimetric loss of carbon dioxide upon treatment with concentrated hydrochloric acid (*3*). Organic carbon was determined by wet combustion using a modification of the Walkley-Black method (*11*). Nitrogen was determined by means of a modified procedure of the Association of Official Agricultural Chemists (*2*). The cation-exchange capacity was determined by direct distillation of adsorbed ammonia (*11*). To determine the extractable calcium and magnesium, calcium was separated as calcium oxalate and magnesium as magnesium ammonium phosphate (*11*). The triethanolamine method was used to determine extractable hydrogen (*11*). Extractable sodium and potassium were determined by using the Beckman DU flame spectrophotometer (*11*) on original extracts of ammonium acetate. Extractable aluminum was determined by using a modification of the "Aluminon" reagent method (*4*) on potassium chloride extracts. Extractable iron was extracted with sodium hydrosulfite and determined by titration with standard potassium dichromate (*7*).

Clay content was determined by the pipette method (*8, 9, 10*). Bulk density measurements were made on clods at three different moisture levels—at field moisture (the moisture content of the clods when received in the laboratory), at 30 centimeters water tension (the adsorbed moisture content of clods subjected to 30 centimeters water tension on a sand capillary column), and finally, at air dryness. The volume was measured by displacement in water; the air-dry weight was used to calculate the bulk density. Water retention measurements were made on soil pieces and sieved samples by pressure-plate and pressure-membrane apparatus (*12, 18*).

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Glossary

Acidity. See Reaction.

Aggregate (soil structure). Many fine soil particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

Alluvium. Sand, mud, and other fine material that has been deposited on land by streams.

Available water capacity. The capacity of a soil to take in and hold moisture in a form available to most plants. Amount of moisture held in soil between field capacity, or about one-third atmosphere of tension, and the wilting coefficient, or about 15 atmospheres of tension.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Firm. Soil material, when moist, can be crushed under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Friable. Soil material, when moist, can be crushed easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Hard. Soil material, when dry is moderately resistant to pressure. It can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.

Loose. Soil material, when moist or dry, will not hold together in a mass.

Plastic. Soil material, when wet, is readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky. Soil material, when wet, adheres to other material; tends to stretch somewhat and pull apart rather than to pull free from other material.

Compact. Dense (a combination of firm consistence and close packing or arrangement of soil particles).

Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are referred to as eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by moving water, wind, or other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other factors, such as light, moisture, temperature, and the physical condition (or tilth) of soil, are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land, consisting of stream sediment, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon, very low in organic matter and clay but rich in silt or very fine sand. A fragipan is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above. When moist, it tends to rupture suddenly if pressure is applied, rather than to deform slowly. It is generally mottled, is slowly or very slowly permeable to water, and has few to many bleached fracture planes that form polygons. A fragipan may be from a few inches to several feet thick; it is generally below the B horizon, 15 to 40 inches below the surface.

Genesis, soil. The mode of origin of the soil, with special reference to the processes responsible for the development of the solum, or true soil, from the unconsolidated parent material.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material and organic matter removed from horizons above. Since part of the fine clay in the B horizon (or subsoil) of many soils has moved into the B horizon from the A horizon above, the B horizon is called an illuvial horizon.

Leaching. The removal of soluble materials from soils or other material by percolating water.

Loess. Geologic deposit of relatively uniform, fine material, mostly silt, presumably transported by wind.

Morphology, soil. The physical constitution of the soil expressed in the kinds of horizons, their thickness and arrrangement in the profile, and their color, texture, structure, consistence, and chemical and biological properties.

Mottles, soil. Irregular spots or patches of different colors, usually indicating poor aeration and lack of drainage. The pattern of mottles is described as to abundance, size, and contrast. Descriptive terms are as follows: Abundance—*few*, *common*, and *many;* size—*fine*, *medium*, and *coarse;* contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, 5 to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Permeability. The quality of a soil that enables water and air to move through it; can be measured in terms of rate of flow of water through a unit cross section of saturated soil in unit time. Rates are expressed in inches per hour, as follows:

	Inches per hour
Slow	Less than 0.2
Moderately slow	0.2 to 0.8
Moderate	0.8 to 2.5
Moderately rapid	2.5 to 5.0
Rapid	More than 5.0

Profile, soil. A vertical section of a soil through all of its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values or in words as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of the land surface, considered collectively.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz, but sand may be of any mineral composition. As a textural class, soil material that is 85 percent or more sand and not more than 10 perecnt clay.

Second bottom. The first terrace level above the flood plain, rarely or never flooded.

Silt. As a soil separate, individual mineral patricles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a textural class, soil material that is 80 percent or more silt and less than 12 percent clay.

Slope. The rise or fall, in feet, for each 100 feet of horizontal distance. It is normally expressed as a percentage.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering without any regular cleavage, as in many claypans and hardpans).

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

Substratum. Any layer beneath the solum, or true soil; applies to both parent material and other layers unlike the parent material below the B horizon.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness.

Terrace (agricultural). An embankment or ridge constructed across sloping soils on the contour or at a slight angle to the contour. A terrace intercepts surplus runoff so that it will soak into the soil or flow slowly to a prepared outlet without harm.

Terrace (geological). An old alluvial plain, usually flat or undulating, bordering a stream; frequently called a second bottom, as contrasted to a first bottom or flood plain; seldom subject to overflow.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. A coarse-textured soil has a high content of sand; a fine-textured soil has a high content of clay. The basic textural classes, in order of increasing proportions of fine particles, are as follows: sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of a soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Tongue. A narrow, vertical, wedgelike extension of one horizon into or through underlying horizons.

Topsoil. A presumed fertile soil or soil material, generally rich in organic matter, used to topdress roadbanks, lawns, and gardens.

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

Waterlogged. Saturated with water.

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