Issued February 1971

SOIL SURVEY

Pemiscot County, Missouri

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

Major fieldwork for this soil survey was done in the period 1962–65. Soil names and descriptions were approved in 1966. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1965. This survey was made cooperatively by the Soil Conservation Service and the Missouri Agricultural Experiment Station. It is part of the technical assistance furnished to the Pemiscot County Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased, on individual order, from the Cartographic Division, Soil Conservation Service, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Pemiscot County, Missouri, contains information that can be applied in managing farms; in selecting sites for roads, ponds, buildings, or other structures; and in estimating the suitability of tracts of land for agriculture, industry, or recreation.

Locating Soils

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

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

Finding and Using Information

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

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

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

Engineers and builders will find under "Engineering Uses of the Soils" tables that give engineering descriptions of the soils in the county and that name soil features that affect engineering practices and structures.

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

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

Cover: Ricefields on farm near Wardell.

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Issued February 1971

SOIL SURVEY OF PEMISCOT COUNTY, MISSOURI

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SOILS SURVEYED BY KENNETH E. BENHAM, BURTON L. BROWN, JOHN P. FRANCKA, ROBERT J. HELD, BILLY E. SPARKMAN, AND GARY W. STURDEVANT, SOIL CONSERVATION SERVICE

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

PEMISCOT COUNTY is in the extreme southeastern corner of Missouri (fig. 1). The area of the county is 488 square miles, or 312,320 acres. Caruthersville is the county seat. Agriculture is the main enterprise, and cash crops are the major source of farm income. Cotton, soybeans, corn, and wheat are the principal crops.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Pemiscot 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 worked in the county, they observed changes in elevation; location of old stream channels; native plants or crops; kinds of soil material; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

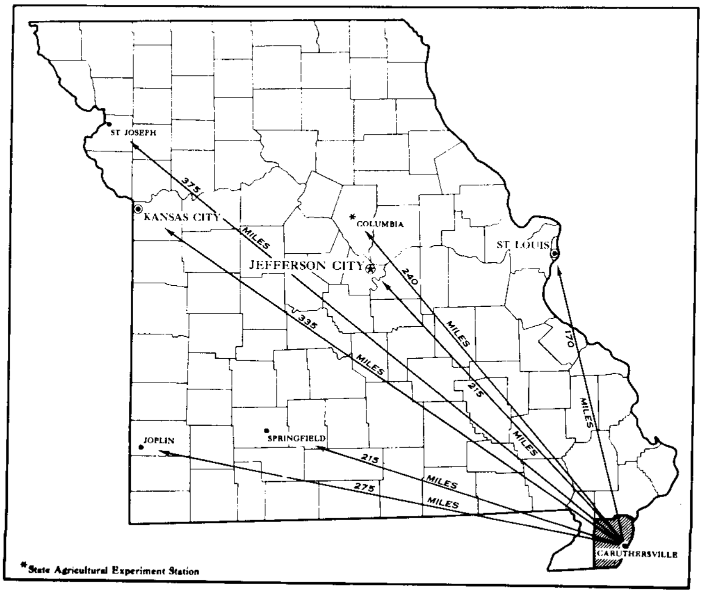

Figure 1.—**Location of Pemiscot County in Missouri.**

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 then classified and named the soils according to nationwide uniform procedures. To use this publication efficiently, it is necessary to know the kinds of groupings they used in 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 soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Sharkey and Hayti, for example, are the names of two soil series. Caruthersville, Cooter, Hayti, Portageville, Steele, and Wardell are all soil series first mapped in Pemiscot County and named after a town near where they were mapped and described.

The soil variant (*8*) [1] is also used in classification. A soil variant has the name of a soil series closely related, but it differs from that series in at least one major characteristic that is significant at the series level of classification. The soil variant is actually a different soil series, but areas of soils in this series are of too small known extent to justify establishing a new series. Crevasse loamy sand, acid variant, is an example in Pemiscot County. It differs from soils of the Crevasse series mainly in having a more acid reaction than is allowable for soils of that series.

Soil series are divided into phases according to characteristics and qualities that affect their management. Many soil series in this county were divided because of differences in texture of the surface layer. Sharkey clay and Sharkey silty clay loam, for example, are two soils in the Sharkey series that have differences in texture of their surface layer. Many factors other than texture of the surface layer, including slope and degree of erosion, affect management and can be used to divide soil series. In this county, however, variation in texture is the dominant reason for separation.

[1] Italic numbers in parentheses refer to Literature Cited, p. 45.

In mapping some areas, soil scientists find two or more kinds of soil so intricately mixed that it is not practical to show them separately on a map of the scale used. They show such a mixture of soils together on the detailed map and call it a soil complex. A soil complex is generally named for the major kinds of soils in it; for example, the Sharkey-Crevasse complex. The proportionate extent of each kind of soil is mentioned in describing a soil complex. Also, in some places two or more soils are mapped in a single unit, called an undifferentiated soil group or undifferentiated unit, if the differences between the soils are too small to justify separation, though these soils occur separately. An example of such a unit is Cooter and Crevasse silty clay loams.

In most mapping, it is necessary to show areas where the soils have been disturbed or where the material is so variable or unstable that it cannot be classified by soil series. These areas are shown on the map like soils of a named series but are given descriptive names, as Borrow pits and Sandy alluvial land, and are called miscellaneous land types.

Soils are classified in soil series and phases according to procedures just described and are delineated on the map. The areas shown on a soil map are called mapping units. Each kind of mapping unit is identified by symbol on the soil map. All areas of Crevasse loamy sand, for example, are identified by the symbol "Cu." Almost all mapping units contain small, scattered bits of soil of some other kind, because it is not practical to show these small spots separately on the soil map. If these included small areas significantly affect management, they are mentioned in describing the mapping unit.

Describing soils and delineating them on the soil map are basic parts of the process, but observing each kind of soil under use and in its natural state is also essential. For example, in this county, data were assembled on yields of farm crops under defined management, and on behavior of the soil when used as material for foundation of roads or other engineering structures.

The information the soil scientists gather is organized in a way that is readily useful to the main groups of readers. Grouping the soils similar in suitability for each specified use is the method commonly used in soil surveys. On the basis of yield and practice tables and other data, the soil scientists set up trial groups, and then test the groups by further study and by consultation with farmers, agronomists, engineers, and others. Then, they adjust the groups so that they reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

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

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The five soil associations in Pemiscot County are described in this section. More detailed information about the individual soils in each association can be obtained by studying the detailed map and by reading the section "Descriptions of the Soils."

1. Wardell-Sharkey Association

Level to very gently undulating, poorly drained soils on low natural levees in the northwestern part of the county

This soil association occupies all of the area west of the Little River drainage system, and it extends to the east along the northern county boundary. Most of the year the water table is near the surface and the depressions are covered with shallow water. The native vegetation was oak, gum, and cypress trees. This association makes up about 6 percent of the total acreage of the county.

Poorly drained Wardell soils make up nearly 75 percent of this association. They developed in moderately fine textured alluvium on old natural levees. Typically, they have a loam or sandy clay loam surface layer and loam to clay loam subsoil. The subsoil has a medium acid reaction.

Poorly drained Sharkey soils make up about 10 percent of this association. They developed in deep clay in low slack water areas. The dark surface layer is mainly clay loam or clay, less than 10 inches thick, over a thick layer of clay. This soil ranges from medium acid to neutral and has a dark surface layer less than 10 inches thick.

The remaining 15 percent of the soils in the association are Dundee soils and Crevasse loamy sand, acid variant.

All this area is cleared. It is used mainly for soybeans and cotton, but to some extent, small grain, especially wheat, and corn are grown. The average farm is about 350 acres in size.

2. Sharkey Association

Level and nearly level, poorly drained soils on the broad slack water area of the Little River flood plain

This soil association occupies the area from the southwestern corner through the central part of the county into New Madrid County north of Wardell; it averages 6 to 7 miles in width and extends the full length of the county. It is the largest soil association in the county and occupies 34 percent of the total acreage. The native vegetation was cypress and water tolerant species of gum and oak.

The Sharkey soils make up about 85 percent of this association. They are nearly neutral in reaction. The soils have mainly a silty clay loam or clay surface layer over clayey material, but the amount of clay is quite variable. Gleying has altered the soil material.

Dundee, Cooter, Crevasse, acid variant, and Hayti soils make up the remaining 15 percent of the association.

Most of the area is cleared and used to produce cotton and soybeans. Some rice is also grown. The average farm is 170 acres in size.

3. Dundee Association

Level to very gently undulating, somewhat poorly drained soils on old natural levees mainly along Portage Open Bay

This soil association occupies the area bordering Portage Open Bay and branches out to Wardell, Pascola, and Hayti. Intermittent areas occur south to the State line. This association occupies about 16 percent of the county. The native vegetation was mainly oak and hickory.

The Dundee soils make up about 85 percent of this association. They developed in moderately fine textured alluvium. The surface layer is silty clay loam, silt loam, or sandy loam. The subsoil typically is silty clay loam and is medium acid to very strongly acid.

Reelfoot, Tiptonville, and Crevasse soils and small areas of Wardell, Sharkey, and Crevasse, acid variant, make up the other 15 percent of the soils in the association.

Most of the area is cleared and used to produce soybeans, cotton, corn, and small grains. A small acreage, principally near Pascola, is used for pasture and hay. The average farm is 115 acres in size.

4. Hayti-Portageville-Cooter Association

Undulating to depressional, very poorly drained to moderately well drained soils on areas recently flooded by the Mississippi River

This association occupies an area on the west side of the recent Mississippi River flood plain. The area is narrow in the northeastern part but wider in the southern part. Most of the area is protected from overflow, but 5,000 acres in the Big Lake area northeast of Hayti is not protected. This association occupies about 19 percent of the county. Overflows from the Mississippi River periodically cover with shallow water the area not protected by levee. The native vegetation was cypress and other water-tolerant trees.

The poorly drained Hayti soils account for more than 50 percent of this association. These soils have developed in alluvium and have a surface layer ranging from clay to sandy loam. The subsoil is typically silty clay loam.

The Portageville soils account for about 25 percent of the association. They are poorly drained to very poorly drained, dark-colored calcareous clays in deep depressional areas left by former natural lakes. Deep water stood on these areas the year round.

The moderately well drained Cooter soils make up about 10 percent of the association. They were developed in shallow clayey material over sandy alluvium.

The rest of the association is made up chiefly of Crevasse soils. All this soil association is cleared. It is used mainly for cotton and soybeans. The average farm is about 160 acres in size.

5. Commerce-Crevasse-Caruthersville Association

Nearly level and very gently undulating, somewhat poorly drained to excessively drained soils on natural levees adjacent to the Mississippi River

This soil association occupies an area 2 to 4 miles in width that borders the Mississippi River; it also occupies areas bordering the Pemiscot Bayou and similar overflow channels on the flood plain. It makes up about 25 percent of the total acreage and includes the most productive areas of the county. A large part of the association is unprotected by levees and subject to seasonal overflow. This hazard limits soil use, makes the area unsuitable for building sites, and subjects the soils to alternate deposition and scouring and to wetness. The native vegetation was willow, cottonwood, elm, and related species.

The somewhat poorly drained Commerce soils occupy about 65 percent of the association. These soils formed in medium and moderately fine textured alluvium. They have a surface layer of sandy loam, silt loam, or silty clay loam and a subsoil of silty clay loam to silt loam. They are neutral in reaction.

The excessively drained Crevasse soils occupy about 15 percent of the association. These soils are formed in coarse alluvium and commonly are sandy throughout, but the surface layer ranges from loamy sand to silty clay loam. These soils ordinarily are slightly acid. They rarely occur in areas large enough to be farmed separately.

The moderately well drained Caruthersville soils occupy about 10 percent of the association. These soils are calcareous and have formed in medium-textured sediment made up mostly of very fine sand. The Caruthersville soils are the most productive soils in the county. Cooter and Hayti soils make up the rest of the association. Most of the area has been cleared and is used for row crops. Some trees are grown between the levees and the Mississippi River, and some cattle are raised along the St. Francis Levee. Cotton, soybeans, and corn are the principal crops, and some alfalfa is grown in the southern part of the county. In areas protected from overflow by levees, the average farm is 100 acres in size. Where soils are not protected, the farms average 500 acres.

Descriptions of the Soils

Described in this section are the soil series and mapping units of Pemiscot County. The procedure is first to describe a soil series, and then the mapping units in that series. Thus, to get full information on any mapping unit, it is necessary to read the description of that unit and also the description of the soil series to which it belongs. As mentioned in the section "How This Survey Was Made," not all mapping units are members of the soil series. Borrow pits and Sandy alluvial land for example, are miscellaneous land types that do not belong to a soil series. They are listed, nevertheless, in alphabetic order along with the soil series.

In comparing a mapping unit with a soil series, many will prefer to read the short description of the soil series that is in paragraph form and that precedes the detailed technical description set in smaller print. The detailed profile description is intended for use of scientists and engineers in making highly technical interpretations.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit in which it has been placed. Readers who have located an area on the detailed map can readily locate a description of the mapping unit by using the Guide to Mapping Units at the back of the survey. Many terms used in this survey are defined in the Glossary. Acreage and extent of each mapping unit are shown in table 1.

Borrow Pits

Borrow pits (Bp) is a miscellaneous land type from which soil material has been removed to build levees and highways. These pits occur on the river side of the levee along the Mississippi River and run the length of the levee. Some areas are adjacent to highways. The pits are 3 to 10 feet deep and fill with water during heavy rains. They constitute about 0.4 percent of the total acreage of the county. Most of the pits are below drainage ditch levels and are not adequately drained.

Some of the borrow pits never dry up and are used for fishing and hunting. The pits that dry up are planted to late crops or grazed by livestock. Willows and cottonwoods have grown on many of the pits. (Borrow pits is not classified in a capability unit)

Caruthersville Series

The Caruthersville series consists of deep, light-colored, moderately well drained soils. These very friable, weakly calcareous soils occur on the highest parts of the young natural levees.

In a typical profile the surface layer is dark grayish-brown very fine sandy loam 11 inches thick. The normally stratified underlying material is dark grayish-brown, brown, or grayish-brown silt loam or very fine sandy loam. It is calcareous, friable, and mottled.

Permeability is moderate, and the available moisture capacity is very high. Most areas are subject to overflow or a seasonal high water table during spring flooding. The soil is naturally fertile.

Almost all the acreage has been cleared and is used for growing cotton, soybeans, and corn. Sugar beets, alfalfa, grasses, fruits, and trees are also grown. The native vegetation was mixed hardwoods and an undergrowth of vines and canes.

Profile of Caruthersville very fine sandy loam 85 feet west of the St. Francis Levee and 50 feet south of gravel road, about 3 miles southeast of Caruthersville, NE¼NW¼ sec. 2, T. 17 N., R. 13 E.:

Ap—0 to 11 inches, dark grayish-brown (2.5Y 4/2) very fine sandy loam; weak, fine, granular structure; very friable; common worm casts; pH 7.5; weakly calcareous; clear, smooth boundary.

AC—11 to 17 inches, dark grayish-brown (10YR 4/2) very fine sandy loam with few, fine, faint, grayish-brown (10YR 5/2) mottles; weak, fine, subangular blocky structure; very friable; few fine roots; common worm casts and fine pores; pH 7.5; weakly calcareous; clear, smooth boundary.

C1—17 to 24 inches, brown (10YR 4/3) to dark grayish-brown (2.5Y 4/2) very fine sandy loam; few, fine, faint, dark-brown (7.5YR 4/4) and grayish-brown (10YR 5/2) mottles; structureless with evident bedding planes; few fine roots; common fine pores and worm casts; pH 7.5; weakly calcareous; clear, smooth boundary.

C2—24 to 49 inches, thinly stratified brown (10YR 4/3) to dark grayish-brown (2.5Y 4/2) very fine sandy loam; few, fine, faint, dark-brown (7.5YR 4/2) and grayish-brown (10YR 5/2) mottles; thin, platy bedding planes; very friable; few fine roots and pores; a thin lens (less than 1 inch thick) of fine sand occurs at 46 inches; pH 7.5; weakly calcareous; abrupt, smooth boundary.

C3—49 to 53 inches, brown (10YR 5/3) fine sand; massive in place, but breaks to single grain; very friable to loose; pH 7.5; weakly calcareous; abrupt, smooth boundary.

C4g—53 to 60 inches, gray (5Y 5/1) to dark-gray (5Y 4/1) very fine sandy loam with common, fine, distinct, dark-brown (7.5YR 4/4) mottles; stratified; thin, platy bedding planes; very friable; pH 8.5; strongly calcareous; clear, smooth boundary.

C5g—60 to 120 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, distinct, gray (N 5/0) mottles; stratified; thin, platy bedding planes; friable; strongly calcareous.

In the A horizon the most common range in texture is very fine sandy loam to silt loam, but the full range is from fine sandy loam to heavy silt loam. This horizon ranges from 10YR to 2.5Y in hue and has values of 3 to 5 and a chroma of 2. The value is 6 or more when the soil is dry. The AC horizon is absent in some places.

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

Soil name	Area	Extent	Soil name	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Borrow pits	1, 142	0. 4	Portageville clay	10, 117	3. 3
Caruthersville very fine sandy loam	6, 235	2. 0	Portageville silty clay loam	4, 361	1. 3
Caruthersville very fine sandy loam, sandy substratum variant	1, 501	. 5	Reelfoot loam	732	. 2
Commerce sandy loam	4, 095	1. 3	Reelfoot sandy loam, overwash	809	. 3
Commerce silt loam	42, 142	13. 5	Sandy alluvial land	1, 444	. 5
Commerce silty clay loam	16, 835	5. 4	Sharkey clay	14, 674	4. 7
Cooter and Crevasse silty clay loams	11, 017	3. 5	Sharkey sandy loam, overwash	2, 832	. 9
Crevasse loamy sand	6, 291	2. 0	Sharkey silty clay loam	87, 926	28. 0
Crevasse loamy sand, acid variant	597	. 2	Sharkey-Crevasse complex	1, 984	. 7
Crevasse silt loam	2, 724	. 9	Steele sandy loam	5, 409	1. 7
Dubbs silt loam	2, 011	. 7	Tiptonville silt loam	2, 061	. 7
Dundee sandy loam	2, 877	. 9	Wardell loam	5, 741	1. 8
Dundee silt loam	15, 170	4. 9	Wardell sandy clay loam	7, 480	2. 4
Dundee silt loam, thick surface variant	2, 133	. 7	Levees	1, 321	. 4
Dundee silty clay loam	14, 434	4. 6	Little River drainage ditches and spoil banks	1, 941	. 6
Hayti sandy loam, overwash	975	. 3	Water areas	802	. 3
Hayti silty clay	2, 580	. 8	Total	312, 320	100. 0
Hayti silty clay loam	29, 927	9. 6			

At a depth between 10 and 40 inches, these soils have a clay content of 10 to 18 percent. The sand fraction is dominated by very fine sand; less than 15 percent of the sand has coarser texture. The C1 horizon ranges from 10YR to 2.5Y in hue and has a value of 4 to 6 and a chroma of 2 to 4. In 10YR to 2.5Y hues a few mottles having a chroma of 2 or less are usually present, and in most 10YR or redder hues a few mottles having a chroma of 3 or higher are present. The C2 horizon is similar to the C1 horizon in texture and color but is distinctly stratified. This stratification becomes more prominent with depth. At depths of 36 inches to more than 53 inches, distinct gleying occurs.

These soils range from slightly acid to strongly calcareous in the A and AC horizons, and from weakly to strongly calcareous in the C horizons.

Caruthersville soils have fewer, less distinct mottles than the Commerce and Hayti soils. They are not so sandy as the Crevasse soils and not so acid as the Dubbs soil.

Caruthersville very fine sandy loam (Ca).—This gently undulating soil occupies the highest parts of young natural levees bordering the Mississippi River. Its areas vary in shape and range from about 10 to 300 acres in size. This soil has the profile described as typical for the series.

Mapped with this soil are areas 2 to 10 acres in size that have a dark surface caused by waste and refuse from Indian camps and villages. These included areas occupy 2 to 5 percent of the acreage. An estimated 5 percent of the acreage consists of soils that are similar to this Caruthersville soil but lack mottling. Other similar included areas lack the calcareous reaction. Together, the included areas make up 15 to 20 percent of the acreage of this soil.

This soil is fertile, easily tilled, and well suited to nearly all crops grown in the county. (Capability unit I–1)

Caruthersville very fine sandy loam, sandy substratum variant (Ch).—This very gently undulating soil occupies areas on young natural levees bordering the Mississippi River. These areas are irregular in shape, are 100 to 200 acres in size, and ordinarily are adjacent to areas of Caruthersville very fine sandy loam and Crevasse soils.

The surface layer of dark grayish-brown very fine sandy loam is about 9 inches thick. This layer is underlain by dark grayish-brown stratified silt loam, loam, or very fine sandy loam that is 9 to 27 inches thick and has a few gray mottles. Next layer in the profile, at a depth between 18 and 36 inches, is loamy sand or sand.

The reaction of this soil is neutral to alkaline, and it is calcareous in most places.

This soil is a variant that differs from typical Caruthersville soils mainly in having sand or loamy sand at a depth of less than 40 inches.

Mapped with this soil are areas that have a silt loam and loam surface layer and spots of Crevasse silt loam that total less than 10 percent of its acreage.

This soil is slightly droughty. Permeability ranges from moderately rapid in the upper part to very rapid in the lower part. Available moisture capacity is fair to good. (Capability unit IIs–1)

Commerce Series

The Commerce series consists of deep, dark grayish-brown, somewhat poorly drained, nearly level, nearly neutral soils. These soils are mostly on young natural levees in the eastern part of the county.

In a typical profile, the surface layer is dark grayish-brown silt loam 9 inches thick. The normally stratified subsoil is grayish-brown and dark-gray silty clay loam and silt loam about 20 inches thick. The lower part is mottled. Below this, to a depth of more than 50 inches, is grayish-brown silt loam mottled with dark brown.

Permeability is moderately slow, and the available moisture capacity is very high. Areas near the Mississippi River not protected by levees are subject to overflow. Some of the areas subject to overflow have been planted to cottonwood trees.

Most areas of Commerce soils are cleared and are suitable for growing cotton, soybeans, corn, wheat, alfalfa, grasses, sugar beets, and fruits (fig. 2). Drainage ditches

Figure 2.—**Corn growing on Commerce silt loam. Rows are generally long and straight to accommodate modern multirow equipment.**

effectively alleviate the slight wetness of the soils. The native vegetation was mixed hardwoods and an undergrowth of vines and canes.

Profile of Commerce silt loam 80 feet south of the St. Francis Levee, about 3 miles northwest of Caruthersville, and about 50 feet west of the east boundary of SW¼NE¼ sec. 1, T. 18 N., R. 12 E.:

Ap—0 to 5 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, granular structure; friable; pH 7.3; abrupt, smooth boundary.

A1—5 to 9 inches, dark grayish-brown (10YR 4/2) to very dark grayish-brown (10YR 3/2) silt loam; thin platy structure breaking to moderate, fine, granular structure; compact (plowpan); friable; few fine roots; pH 7.0; clear, smooth boundary.

B21—9 to 16 inches, dark grayish-brown (10YR 4/2) light silty clay loam; common, fine, faint mottles of dark gray (10YR 4/1) and common, fine, distinct mottles of dark brown (7.5YR 3/2); moderate, fine, subangular blocky structure; firm to friable; few fine roots and pores; pH 7.0; clear, smooth boundary.

B22g—16 to 22 inches, dark-gray (10YR 4/1) to dark grayish-brown (10YR 4/2) silty clay loam; common, fine, dark reddish-brown (5YR 3/3) mottles; moderate, medium, subangular blocky structure; firm; common fine pores; few fine roots; pH 7.3; clear, smooth boundary.

B3g—22 to 29 inches, mottled grayish-brown (10YR 5/2), gray (10YR 5/1), and dark yellowish-brown (10YR 4/4) heavy silt loam; weak, fine, granular structure; friable; common fine pores; pH 7.5; clear, smooth boundary.

C1g—29 to 54 inches, grayish-brown (2.5Y 5/2) silt loam with many dark-brown (7.5YR 4/4 or 3/2) mottles; massive; friable; common fine pores; pH 7.5; clear, smooth boundary.

C2g—54 to 62 inches, gray (10YR 5/1), 5Y 5/1) silty clay loam; many, medium, brown (10YR 4/3) mottles; few, very fine, dark reddish-brown (5YR 2/2) stains; weak, fine, subangular blocky structure to massive; firm to friable; common pores; pH 8.0.

The texture of the A horizon is commonly silt loam, silty clay loam, or sandy loam. This horizon ranges from 3 to 5 in value and has a chroma of 2. Where the A horizon has a value of 3 when moist, it is less than 6 inches thick or has a dry value of 5.5 or higher.

The solum ranges from 20 to 40 inches in thickness and is generally stratified. At a depth between 10 and 40 inches, the texture of a stratum or lens ranges from a fine sandy loam to silty clay. The weighted average of the clay content at this depth is 18 to 35 percent, and the sand fraction is dominated by very fine sand. The B horizon has a 10YR hue, a value of 4 to 6, and a chroma of mainly 2. Layers with a chroma of 1 are common but are not dominant. The C horizon ranges from 10YR to 2.5Y in hue and has a value of 4 to 6 and a chroma of 1 to 2. In some places dark-colored, buried A horizons are present in the C horizon.

Reaction ranges from medium acid to mildly alkaline in the top 10 inches, and from slightly acid to moderately alkaline below. Some pedons are calcareous below a depth of 20 inches.

Commerce soils are not so gray nor so fine textured as Hayti soils. They have more mottling and grayer colors than Caruthersville soils.

Commerce sandy loam (Cm).—This very gently undulating soil occupies areas on the young natural levees that border the main courses followed by overflow from the Mississippi River. These areas are irregular in shape, are small in size, and are closely associated with Crevasse and Steele soils.

The surface layer is dark grayish-brown to brown sandy loam 6 to 18 inches thick. The subsoil is mainly silt loam to silty clay loam but in places includes a layer of sandy loam. The layers of this soil are more contrasting in color and texture than those in other Commerce soils.

Included with this soil in mapping are small areas of Commerce silty clay loam and Steele sandy loam.

Commerce sandy loam tends to be wet for most cultivated crops and has a low organic-matter content. It is easily tilled. (Capability unit IIw–1)

Commerce silt loam (Cr).—This soil is nearly level to gently undulating and occupies areas on young natural levees in the eastern part of the county. The areas are generally large, even hundreds or thousands of acres in size, but there are also many smaller areas where these soils occur in an intricate pattern with Crevasse soils.

This soil has the profile described as typical for the series. Commonly the profile is neutral throughout (fig. 3).

Mapped with this soil are areas having a loam or very fine sandy loam surface layer, and areas having a dark-colored surface caused by waste and refuse from Indian camps or by decay of grass vegetation. Caruthersville very fine sandy loam occurs in small areas near the Mississippi River and in bayous. It makes up about 5 percent of the acreage of this soil. Other included areas probably make up less than 10 percent.

Commerce silt loam is slightly wet and fieldwork may be delayed a day or two, but this soil requires little artificial drainage. Maintaining organic-matter content and tilth are the main concerns of management where row crops are grown continuously. (Capability unit IIw–1)

Commerce silty clay loam (Cs).—This nearly level soil occupies areas on young natural levees bordering the Mississippi River. These areas are large and generally are elongated in the direction of natural drainage and overflow. The largest area is in the Black Island area and is subject to seasonal overflow.

The surface layer is silty clay loam about 7 inches thick. Below this are stratified layers of silty clay loam to sandy loam. These layers generally are slightly finer textured in this soil than in the other Commerce soils.

Mapped with this soil are similar soils that show only faint evidence of texture and color stratification. These included soils commonly are silty clay loam to a depth of 40 inches. They are extensive in some mapped areas, are absent in others, and together occupy an estimated 25 percent of this Commerce soil.

Commerce silty clay loam tends to be wet and generally requires some artificial drainage. This soil is naturally fertile. Maintaining organic-matter content and tilth when growing continuous row crops is the major problem in management. (Capability unit IIIw–1a)

Cooter Series

The Cooter series consists of deep, moderately well drained soils that occupy depressional areas of former lakes, channels, and bayous. The soils are clayey sediments underlain at shallow depths by sandy alluvium. These nearly neutral soils occur in sediment and slackwater areas formed by recent overflow of the Mississippi River.

In a typical profile the plow layer or upper part of the surface layer is very dark grayish-brown silty clay loam 6 inches thick, and the lower part is very dark gray and very dark grayish-brown silty clay 8 inches thick. The material underlying the surface layer is brown to dark grayish-brown loamy sand to sand.

Permeability is moderately slow, and the available moisture capacity is fair.

Almost all areas of the Cooter soils have been cleared and are used for growing mainly cotton and soybeans. When adequately drained they are suitable for most row crops grown in the county. These soils tend to be wet and also droughty. Suitability can usually be improved by land leveling and by irrigation. Land leveling, in addition to eliminating surface water, fills swales and increases the available moisture capacity. The native vegetation was cypress and hardwoods.

Profile of Cooter silty clay loam from an area of Cooter and Crevasse silty clay loams one-half mile north of the State line, about 1 mile west of St. Francis Levee, and

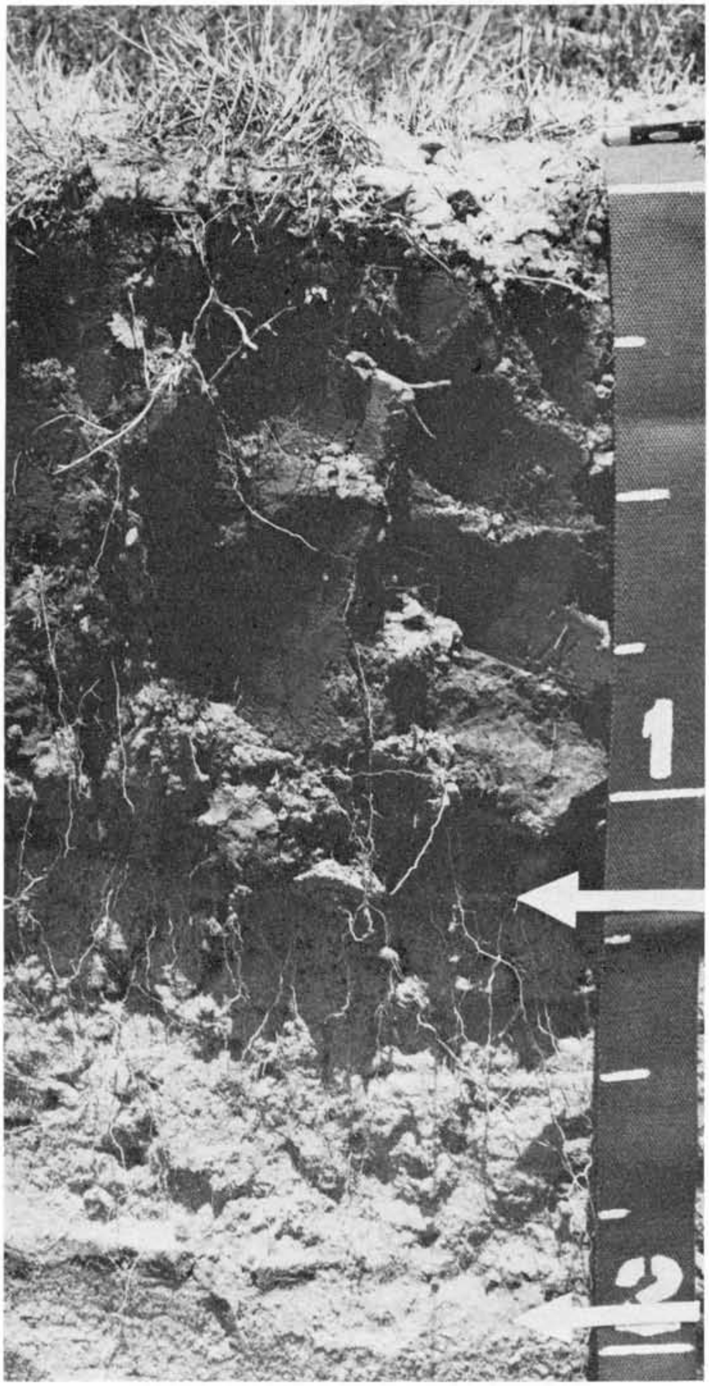

Figure 3.—Profile of Commerce silt loam.

about 100 feet south and 50 feet west of the northeast corner of SE¼NE¼ sec. 21, T. 16 N., R. 12 E.:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam; grayish brown (10YR 5/2) when dry; weak, very fine, granular structure; firm; plentiful fine roots; pH 7.0; abrupt, smooth boundary.

A1—6 to 14 inches, very dark gray (10YR 3/1) and very dark grayish-brown (10YR 3/2) silty clay with common fine brown (10YR 4/3) mottles; moderate, fine, subangular blocky structure; firm; plentiful fine roots; pH 7.3; clear, wavy boundary

IIC1—14 to 22 inches, dark grayish-brown (10YR 4/2) to brown (10YR 4/3) loamy sand, light gray (10YR 7/2) when dry; structureless, breaks easily to single grain; very friable; pH 6.8; gradual boundary.

IIC2—22 to 54 inches +, brown (10YR 5/3) medium sand with occasional pockets and thin lenses of grayish-brown (10YR 5/2) fine sandy loam; single grain; loose; pH 7.2.

The A horizon ranges from 10 to 20 inches in thickness and from silty clay loam to clay in texture. The average A horizon is more than 35 percent clay. It has a hue of 10YR, a value of 2 to 3.5, and a chroma of 1 to 3. The IIC horizon extends to depths of 40 inches or more. Its texture ranges from loamy fine sand to sand, and lenses of silt loam or very fine sandy loam occur. Color ranges from 10YR to 2.5Y in hue, from 4 to 6 in value, and from 2 to 6 in chroma. Reaction ranges from medium acid to mildly alkaline throughout the profile.

The surface layer of the Cooter soils is thicker and more clayey than that of the Crevasse soils. The clayey part of these soils is thinner than that of the Portageville and Sharkey soils. The Cooter soils have a coarse textured IIC horizon that Commerce or Hayti soils do not have.

Cooter and Crevasse silty clay loams (Ct).—These soils occupy depressional areas in natural lake beds, bayous, and old channels on the recent Mississippi River flood plain and in the Little River basin. These areas are irregular in shape and vary in size. Cooter silty clay loam makes up 50 percent of the area; Crevasse silty clay loam, 30 percent; and minor soils, the rest.

Mapped with the Cooter and Crevasse soils are areas similar to the Cooter soils without gray color, areas underlain by clayey material at a depth of 40 inches, and areas of Hayti silty clay loam.

Cooter and Crevasse silty clay loams tend to be wet because of location and their slowly permeable surface layer. They also tend to be droughty in dry periods. Most areas require artificial drainage. The soils have limited capacity for holding and supplying water to plants because the material below the surface layer is coarse. Land grading and irrigation can be used to alleviate crop retardation caused by lack of moisture. Deep cuts resulting from grading will lower productivity of the soils by exposing sandy material or leaving it near the surface. These soils are well suited to small grains, but cotton, soybeans, and corn usually need irrigation. (Capability unit IIw-1)

Crevasse Series

The Crevasse series consists of deep, dark grayish-brown, medium acid, excessively drained sandy soils. These soils are gently undulating and occur as small areas and narrow bands in all parts of the county.

In a typical profile the surface layer is loamy sand about 8 inches thick. The underlying material is light brownish-gray loamy sand or sand, most of which is quartz.

Permeability is very rapid, the available moisture capacity is very low to low, and the capacity for holding plant nutrients is very limited. These soils are subject to wind erosion if they are not protected.

Crevasse soils are farmed like adjacent soils because they rarely occur in areas large enough to be farmed separately. The native vegetation was cottonwoods, willows, and other hardwoods.

Profile of Crevasse loamy sand 45 feet north of the gravel road, about one-half mile southwest of the Indian mound, and about 825 feet west of the southeast corner of section 36, T. 18 N., R. 12 E.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; pH 5.8; clear, smooth boundary.

C1—8 to 48 inches, light brownish-gray (2.5Y 6/2) medium sand with occasional large dark-brown (7.5YR 3/2) mottles; massive in place but breaks to single grain; compact in upper 3 to 4 inches (plowpan); rest of layer very friable to loose; few fine roots; pH 6.0; gradual boundary.

C2—48 to 60 inches, light brownish-gray (2.5Y 6/2) medium sand; few, fine, distinct dark yellowish-brown (10YR 4/4) mottles; single grain; loose; occasional thin lens of grayish-brown (2.5Y 5/2) or gray (10YR 5/2) fine sandy loam; pH 6.0.

The texture of the A horizon is commonly loamy sand or silt loam but ranges to silty clay loam, sandy loam, and loam in some small areas. This horizon ranges from 10YR to 2.5Y in hue, from 3 to 5 in value, and from 2 to 3 in chroma.

At a depth between 10 and 40 inches, the texture is loamy fine sand or coarser. A thin strata of silt loam or very fine sandy loam occurs in some places. Below the A horizon, hue ranges from 10YR to 2.5Y, value from 4 to 6, and chroma from 2 to 3. A few brown, dark-brown, and dark yellowish-brown mottles occur in most profiles.

Reaction ranges from medium acid to mildly alkaline throughout the profile. Some pedons are calcareous below a depth of 24 inches.

Crevasse soils are coarser textured than the Caruthersville, Commerce, and Hayti soils.

Crevasse loamy sand (Cu).—This nearly level soil occurs throughout the county as irregular narrow bands that roughly parallel the natural ridges. It is locally referred to as "dead sand."

Texture of the surface layer varies because the areas are so narrow that normal tillage mixes this layer with the surface layer of the soils adjacent. The profile of this soil is the one described as typical of the Crevasse series (fig. 4). Its surface layer ranges from 6 to 18 inches in thickness.

Mapped with this soil are small areas of Steele sandy loam.

This Crevasse soil is rarely dominant. It is farmed with the major soils with which it is associated. Most of it is used for the row crops common to the area, but these crops are not well suited and are conspicuously dwarfed during most growing seasons. (Capability unit IIIs-4)

Crevasse loamy sand, acid variant (Cv).—This very gently undulating soil occupies small areas at the highest elevations on the old natural levees. Most of these areas, referred to locally as "sand ridges," are 10 to 50 acres in size.

The surface layer is very dark grayish-brown or dark-brown loamy sand about 15 inches thick. The dark color is credited to waste and refuse from Indian camps and villages. The underlying material is dark-brown or strong-brown loamy sand with a few yellowish-brown mottles. It is very strongly acid, is very friable, and has a weak structure that becomes loose and single grained when dry. The substratum is dark brown mottled with grayish brown; it is very strongly acid.

This soil is more acid and has a darker surface layer than Crevasse loamy sand; it is sandier than the Tiptonville and Dubbs soils.

Cotton, soybeans, corn, and wheat are grown on most areas. The soil is droughty and subject to moderate wind erosion; but erosion can be controlled by growing cover crops between regular crop seasons. If row irrigation is used, runs need to be short because the water intake rate is very high. (Capability unit IIIs-4)

Crevasse silt loam (Cw).—This nearly level soil occurs as narrow bands and irregular areas less than 100 acres in size. It is in the eastern part of the county, and generally adjacent to other Crevasse soils.

Figure 4.—**Profile of Crevasse loamy sand. Darker colored strata occasionally occur below a depth of 28 inches.**

The surface layer is dark grayish-brown to brown silt loam 6 to 12 inches thick. It is underlain by brown to light-gray sand or loamy sand that extends to depths of 40 inches or more (fig. 5).

Included with this soil in mapping were small areas that have a surface layer of loam or very fine sandy loam.

Cotton and soybeans are the major crops grown on this soil. Crop growth on this soil is better than on other

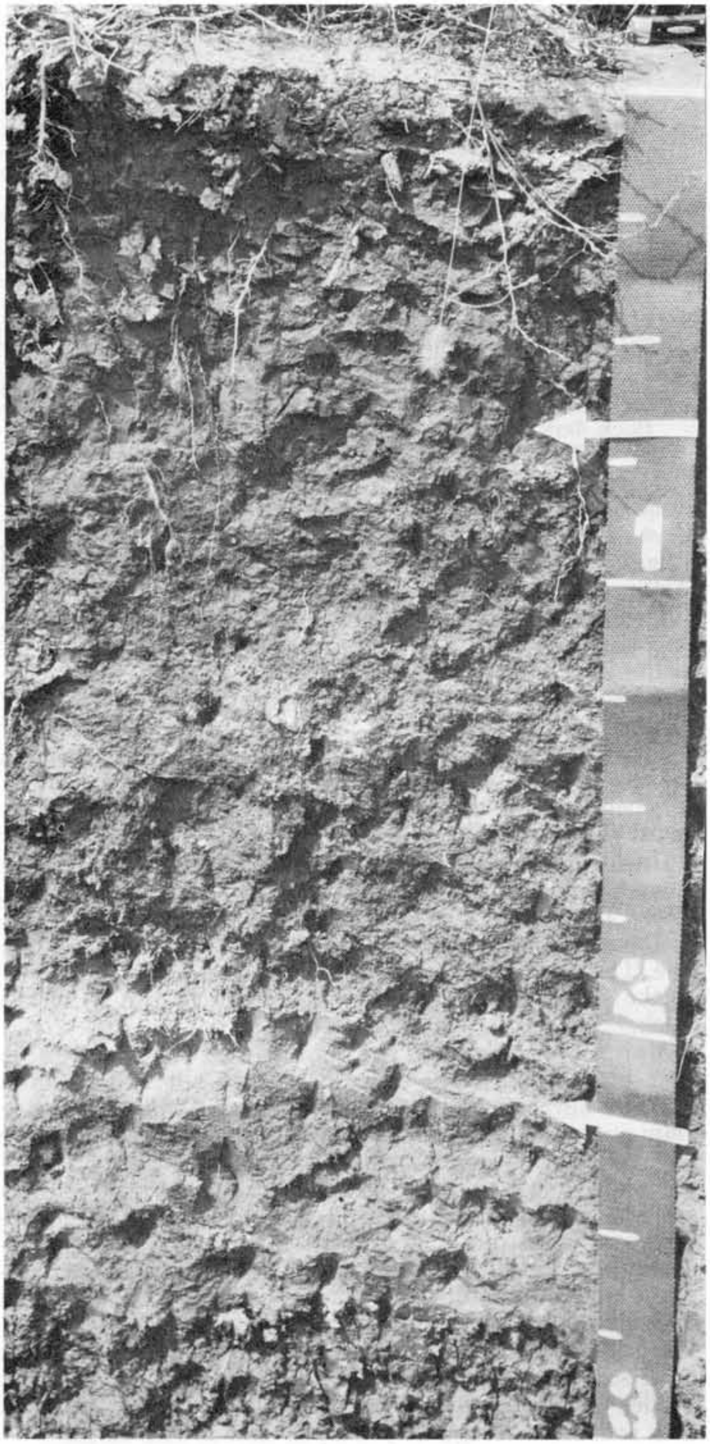

Figure 5.—Profile of Crevasse silt loam.

Crevasse soils in the county but this soil is droughty and low in nitrogen. Crop yields vary with the amount of rainfall received during the growing season. Many of the areas near the Mississippi River channel are subject to seasonal overflow. Small areas near the river are covered with timber and have never been cultivated. (Capability unit IIIs-4)

Dubbs Series

The Dubbs series consists of deep, well-drained, level to gently sloping soils. These friable, acid soils occur on old natural levees bordering Portage Open Bay and on other old natural levees.

In a typical profile the surface layer is dark grayish-brown and dark-brown silt loam 12 inches thick. The subsoil is brown silty clay loam to silt loam 22 inches thick. The substratum is dark yellowish-brown very fine sandy loam or silt loam.

Permeability is moderate, and the available moisture capacity is high.

The Dubbs soils are suitable for all row crops commonly grown in the county. Corn, cotton, and soybeans are the major crops grown. Gently sloping areas are susceptible to slight water erosion. The native vegetation was scattered hardwoods, mainly oaks.

Profile of Dubbs silt loam observed about 5 miles southeast of Portageville in the northeastern part of the county, about 60 feet north and 510 feet west of the southeast corner of sec. 2, T. 20 N., R. 13 E.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) to dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; common fine roots; pH 5.0; abrupt, smooth boundary.

A1—8 to 12 inches, dark-brown (10YR 3/3) heavy silt loam, brown (10YR 4/3) crushed; moderate, medium, granular structure; friable; many fine roots; common fine pores; pH 5.8; abrupt, smooth boundary.

B2t—12 to 22 inches, brown (10YR 4/3) silty clay loam; weak, medium, subangular blocky structure; firm to friable; thin dark brown (10YR 3/3) stained clay films along some vertical ped faces; few fine roots; common fine pores; pH 5.0; gradual, smooth boundary.

B3—22 to 34 inches, brown (10YR 4/3) heavy silt loam; weak, fine, subangular blocky structure; friable; common fine pores; pH 4.6; gradual boundary.

C—34 to 42 inches, dark yellowish-brown (10YR 4/4) very fine sandy loam or silt loam with few, fine, faint, dark grayish-brown (10YR 4/2) mottles; massive; friable; pH 4.6.

The solum ranges from 24 to 40 inches in thickness. The A horizon has a hue of 10YR, a value of 3 to 5, and a chroma of 2 to 3. The principal texture is silt loam, but very fine sandy loam and loam also occur. Colors that have a value of 3 and a chroma of 2 are in areas where the A horizon is less than 6 inches thick. The thickness of the A horizon ranges from 6 to 15 inches.

The B horizon ranges from 18 to 35 percent clay and has less than 18 percent sand coarser than very fine. This horizon usually ranges from 25 to 30 percent clay and from 10 to 15 percent sand. The B horizon has a hue of 10YR, a value of 4 to 5, and a chroma of 3 to 4. Mottles having a chroma of 2 or less do not appear in the upper 10 inches of the B horizon. Reaction ranges from medium acid to very strongly acid in the B horizon, and the base saturation is above 50 percent.

The C horizon is generally brown or dark yellowish brown and has grayish-brown or dark grayish-brown mottles. This horizon ranges from silt loam to loamy sand but commonly is very fine sandy loam. It is stratified in some places. Reaction is similar to the B horizon.

The Dubbs soil has a browner subsoil and lacks the mottles of the Wardell and Dundee soils. It is less sandy than the Crevasse soils and more acid than the Caruthersville and Commerce soils.

Dubbs silt loam (Db).—This soil occurs on the old natural levees. It is located mainly along the border of Portage Open Bay. Most of the acreage is nearly level, but about 20 percent of it is gently sloping.

Mapped with this soil are areas having a sandy loam surface layer. These areas make up about 7 percent of the acreage.

Dubbs silt loam is suitable to all row crops grown in the county including corn, cotton, and soybeans. Some wheat is also grown. The gently sloping areas are subject to slight erosion if improperly cultivated. (Capability unit I-1)

Dundee Series

The Dundee series consists of deep, somewhat poorly drained, nearly level soils. These friable, acid soils occur on old natural levees.

In a typical profile the surface layer is very dark grayish-brown silt loam 8 inches thick. The subsoil is dark grayish-brown to grayish-brown, mottled silty clay loam about 32 inches thick. The substratum is a grayish-brown, mottled, stratified loam.

Permeability is moderately slow, and the available moisture capacity is high.

Dundee soils are suited to most commonly grown row crops, small grains, and grasses. They are used mainly for cotton, soybeans, and wheat. Some areas near Pascola are in pasture; and some corn is grown on these soils in the northeastern part of the county. The native vegetation was hardwoods, mainly oaks.

Profile of Dundee silt loam observed in a pasture about one-half mile northeast of Pascola, and 450 feet north and 80 feet west of the southeast corner of NE¼NW¼ sec. 24, T. 19 N., R. 11 E.:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) to light gray (10YR 7/2) when dry; moderate, medium, granular structure; friable; abundant very fine roots; few dark-brown concretions; few coarse sand particles; pH 7.0; clear, smooth boundary.

B1t—8 to 12 inches, dark grayish-brown (10YR 4/2) and dark-gray (10YR 4/1) light silty clay loam with common, medium and fine, dark yellowish-brown (10YR 4/4) mottles; moderate, fine, subangular blocky structure; friable to firm; abundant very fine roots; thin, patchy clay films on vertical ped faces; pH 5.0; clear, smooth boundary.

B21t—12 to 23 inches, grayish-brown (10YR 5/2) to dark grayish-brown (10YR 4/2) silty clay loam with common, medium, yellowish-red (5YR 4/6) mottles, strong brown (7.5YR 5/6) when crushed; moderate, medium, subangular blocky structure breaks to very fine subangular blocky structure; plentiful fine roots; continuous clay films on larger ped faces; pH 4.8; gradual, smooth boundary.

B22tg—23 to 32 inches, grayish-brown (10YR 5/2) heavy silty clay loam with many, medium, dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; firm; few fine roots; continuous clay films on large ped faces; pH 4.6; clear, smooth boundary.

B23tg—32 to 40 inches, grayish-brown (10YR 5/2) silty clay loam with noticeable increase in sand content from that in the horizon above; common, medium, dark-brown (7.5YR 4/4) mottles; moderate, medium, prismatic structure breaking to weak, coarse, subangular blocky; firm; few very fine roots; patchy clay films; pH 4.6; clear, irregular boundary.

IICg—40 to 48 inches, grayish-brown (10YR 5/2) loam with common, medium, dark-brown (7.5YR 4/4 to 3/2) and reddish-brown (5YR 4/4) mottles; massive, stratified; friable; pH 5.0.

Thickness of the solum ranges from about 30 to 44 inches. The A horizon is silt loam, silty clay loam, or sandy loam, and some areas of loam. This horizon has a 10YR hue, a value of 3 to 5, and a chroma of 2. Where the A horizon has a value of 3 when moist, it is less than 6 inches in thickness or has a dry value greater than 5.5.

The B horizon ranges from 25 to 35 percent clay but more commonly is 30 to 35 percent clay. It has less than 15 percent sand coarser than very fine sand. The B horizon has a value of 4 to 5, and a chroma of 2; and it has common to many mottles of brown, dark yellowish brown, strong brown, or yellowish red. Clay films are distinct on the subangular blocky peds. Reaction ranges from very strongly acid to slightly acid, and base saturation is above 50 percent.

The C horizon is commonly light silty clay loam, silt loam, or loam, but ranges from sandy loam to sandy clay. This horizon has a 10YR or 2.5Y hue, a value of 4 to 6, and a chroma of 1 to 2, and in most places has dark-brown, strong-brown, or dark yellowish-brown mottles. Reaction ranges from very strongly acid to mildly alkaline.

The Dundee soils are more silty in texture throughout and browner in the subsoil than the Wardell soils. They lack the thick, dark surface layer of the Reelfoot soils, and are browner and coarser than the Sharkey soils.

Dundee sandy loam (Dd).—This soil occupies small areas on the old natural levees less than 100 acres in size. Most of these areas occur just south of Portage Open Bay, others are near Pascola, and some scattered areas are farther south.

The surface layer is dark grayish-brown sandy loam, It commonly is 6 to 10 inches thick, but ranges up to 18 inches in thickness. The subsoil is about 30 inches of silty clay loam. The substratum ranges from sandy loam to silty clay.

This soil is easily tilled and is suitable for growing most row crops common to the area. The organic-matter content is generally low. Wetness is the main concern of management. (Capability unit IIw-1)

Dundee silt loam (De).—This nearly level soil occupies areas on old natural levees several hundred acres in size. These areas occur south of Portage Open Bay, and south of Pascola, and in some scattered areas south to the State line. The profile of this soil is the one described as typical of the series (fig. 6). The surface layer is 6 to 10 inches thick.

Mapped with this soil are depressional areas of Dundee silty clay loam, small areas of Dubbs silt loam on the highest elevations, and some streaks and spots of sandy loam overwash. Together these included areas occupy about 5 percent of this Dundee soil.

Dundee silt loam tends to be wet and generally requires artificial drainage. This soil is easily worked, but requires lime and fertilizer. It is suitable for growing cotton, soybeans, corn, small grains, grasses, and some legumes. Alfalfa is not well suited, but it can be grown if it is limed and fertilized. (Capability unit IIw-1)

Dundee silt loam, thick surface variant (Dn).—This level soil occurs on the fringe of old natural levees that border the slackwater areas south of Portage Open Bay. The areas are irregularly shaped and rather large.

The surface layer is 22 inches thick. The uppermost part is a dark grayish-brown plow layer, and the lower part is light-colored silt loam that is not present in Dundee silt loam. The subsoil is about 30 inches of grayish-brown, mottled silty clay loam.

The surface layer of Dundee silt loam, thick surface variant, tends to run together and seal when wet and to form a crust when it dries. Runoff and water movement through the soil are slow, and surface drainage is needed. The soil is low in organic-matter content and nitrogen and

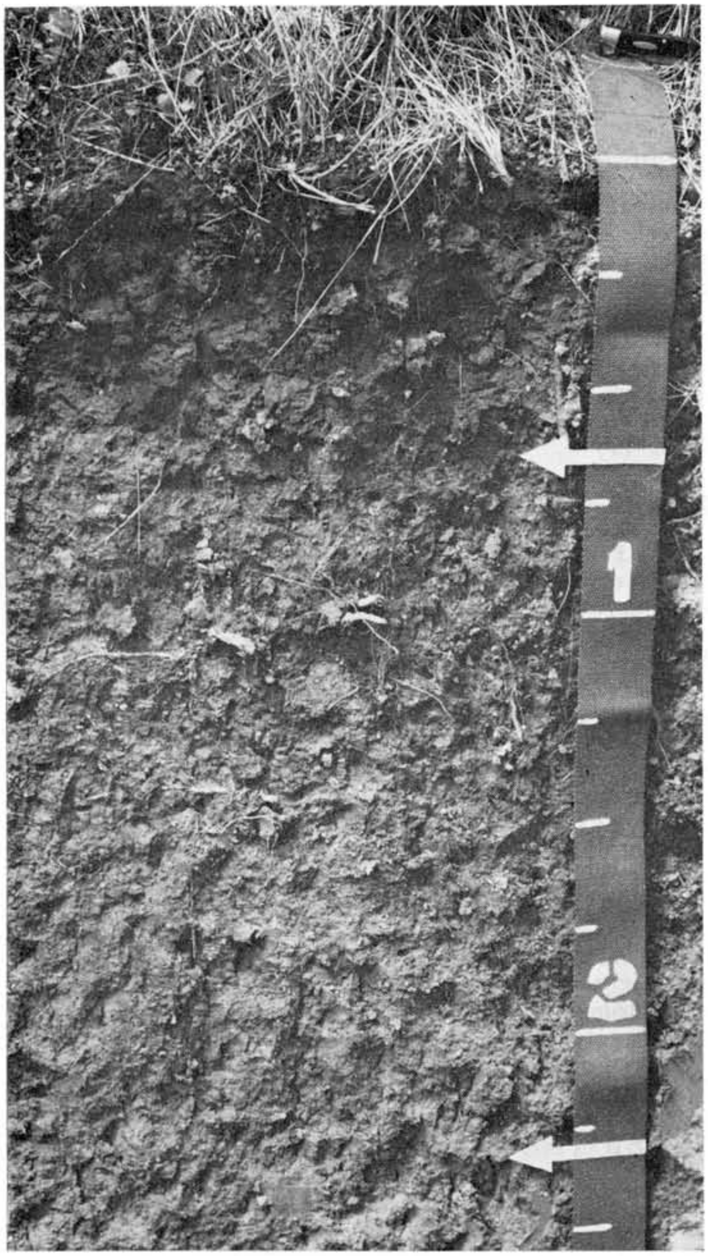

Figure 6.—Profile of Dundee silt loam shows little contrast between layers.

low in natural fertility. This soil is suitable for most row crops, small grains, and grasses when properly managed. Deep-rooted crops such as alfalfa and fruit trees are not well suited. (Capability unit IIw–1)

Dundee silty clay loam (Du).—This nearly level soil occupies areas several hundred acres in size on old natural levees. These soils occur in low positions bordering Sharkey silty clay loam and Dundee silt loam.

The surface layer is dark grayish-brown silty clay loam 6 to 10 inches thick. The subsoil is about 30 inches of strongly acid, grayish-brown silty clay loam. The substratum is strongly acid silty clay loam.

Mapped with this soil are depressions containing Sharkey silty clay loam, and spots and streaks, 2 to 3 acres in size, of Dundee sandy loam. In the south central part of the county are about 400 acres of soil similar to this Dundee silty clay loam that has a dark surface layer more than 10 inches thick. Together these included areas occupy about 8 percent or less of the acreage.

Dundee silty clay loam is suitable for growing cotton and soybeans, and some corn, rice, wheat, and pasture. It responds to lime and fertilizer. Wetness and difficulty of tillage are the main concerns in managing this soil. (Capability unit IIIw–1a)

Hayti Series

The Hayti series consists of deep, poorly drained, nearly level soils. These soils are nearly neutral and occur in the eastern part of the county on the recent Mississippi River flood plain. They developed in clayey and loamy alluvium.

In a typical profile the surface layer is very dark grayish-brown silty clay loam about 6 inches thick. The subsoil, which normally reaches to a depth of about 37 inches, is mainly dark-gray silty clay loam that contains thin strata of coarser or finer texture. Below this, to a depth of about 58 inches, is mottled dark grayish-brown and gray heavy silt loam.

Permeability of Hayti soils is slow, and the available moisture capacity is high. They are naturally fertile.

Almost all areas of the Hayti soils have been cleared and, if adequate drainage is provided, are suitable for growing cotton, soybeans, corn, alfalfa, and small grains. The native vegetation was water-tolerant hardwoods and some cypress.

Profile of Hayti silty clay loam 1 mile southeast of Hayti, and 10 feet north and 93 feet of the southwest corner of NE¼NW¼ sec. 11, T. 18 N., R. 12 E.:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam with few, fine, distinct, dark reddish-brown (5YR 3/4) mottles; weak, fine, granular structure; firm; common fine roots; pH 6.8; clear, smooth boundary.

B21g—6 to 13 inches, dark-gray (10YR 4/1) medium silty clay loam with common, fine, prominent, dark reddish-brown (5YR 3/4) mottles; moderate, medium, subangular blocky structure; firm; common fine pores; pH 6.4; clear, smooth boundary.

B22g—13 to 17 inches, dark-gray (5Y 4/1) light silty clay loam with common, fine, prominent, dark reddish-brown (5YR 3/4) mottles; weak to moderate, fine, subangular blocky structure; firm; few fine roots and pores; pH 6.4; abrupt, smooth boundary.

B23g—17 to 22 inches, gray (5Y 5/1) and dark grayish-brown (2.5Y 4/2) silt loam or very fine sandy loam with common, medium, prominent, reddish-brown (5YR 4/4) mottles; weak, fine, subangular blocky structure; friable; common fine pores; few worm casts; pH 7.5; abrupt, smooth boundary.

B24g—22 to 30 inches, dark-gray (5Y 4/1) heavy silty clay loam, with some ped interiors of dark grayish brown (2.5Y 4/2); common, fine, prominent, dark reddish-brown (5YR 3/3) mottles; moderate, medium, subangular blocky structure; firm; common very fine pores; few worm casts; pH 7.0; abrupt, smooth boundary.

B3g—30 to 37 inches, dark-gray (10YR 4/1) light silty clay loam with some ped interiors of dark grayish brown (2.5Y 4/2), common, medium, distinct, dark reddish-brown (5YR 3/4 to 4/4) mottles; weak, fine, subangular blocky structure; firm; pH 7.0; abrupt, smooth boundary.

C1g—37 to 58 inches, dark grayish-brown (2.5Y 4/2 to 5/2) and gray (5Y 5/1) heavy silt loam with common, medium, prominent, dark-brown (7.5YR 4/4) mottles containing many fine specks of dark reddish brown (2.5YR 3/4); weak, fine, subangular blocky structure to massive; friable; pH 7.3; gradual, smooth boundary.

C2g—58 to 72 inches, dark grayish-brown (2.5Y 4/2) silt loam or very fine sandy loam with few, fine, mottles ranging from dark red (10Y 3/6) to dark reddish brown (5YR 3/4); structureless; friable; pH 7.5.

The combined thickness of the A and B horizons ranges from 24 to 42 inches. At a depth between 10 and 40 inches, these soils have a clay content of 25 to 35 percent, and less than 15 percent of the sand fraction is coarser than very fine sand.

In the A horizon the most common textures are silty clay loam or silty clay, but sandy loam, silt loam, very fine sandy loam, and clay are present in places. This horizon is very dark grayish brown or very dark gray in hue of 10YR or 2.5Y. Reaction ranges from neutral to slightly acid.

The B horizon typically is silty clay loam in which there are strata of very fine sandy loam, but some layers range from sandy loam to clay. This horizon has a hue of 10YR, 2.5Y, or 5Y, a value of 4 to 6, and a chroma of 1. Occasionally a chroma of 2 occurs in a 5Y or bluer hue, and few or common mottles occur in hues redder than 10YR. Reaction ranges from slightly acid to mildly alkaline. The structure is weak to moderate.

The C horizon has the same range in texture as the B horizon. This horizon has a 10YR or yellower hue, a value of 4 to 6, and a chroma of 1 to 2. Reaction ranges from slightly acid to alkaline, and occasionally this layer is calcareous.

The Hayti soils are finer textured and grayer than the Commerce and Caruthersville soils. They lack the sandy substratum of the Cooter soils and are more stratified than the Sharkey and Portageville soils. The sandy overburden of the Steele soil is thicker than the allowable overwash of the Hayti soils.

Hayti sandy loam, overwash (Ha).—This level soil occupies narrow bands and irregular areas less than 100 acres in size. It is in the eastern part of the county and borders the main courses followed by overflow from the Mississippi River. The areas are generally intermingled with areas of Crevasse soils.

The surface layer is a grayish-brown sandy loam overwash 5 to 18 inches thick and acid in reaction. The underlying material is silty clay loam or silty clay that is neutral in reaction.

Mapped with this area are small areas, 1 to 3 acres in size, of loamy sand, and spots of Hayti silty clay loam and of Hayti silty clay. The included areas occupy less than 8 percent of this Hayti soil.

Most areas of Hayti sandy loam, overwash, are farmed like other Hayti soils, because they occur in small irregular areas not large enough to be farmed separately. This soil is easily tilled, but has a low organic-matter content and tends to be wet. (Capability unit IIIw–1b)

Hayti silty clay (Hc).—This soil occupies large depressional areas in the wide bends along overflow channels of the Mississippi River. It is in the eastern part of the county where overflow formed old Eastwood Lake and Tanner Lake near Hayti.

The surface layer is a dark silty clay about 7 inches thick. The subsoil is clayey but includes textures as coarse as sandy loam.

Mapped with this soil are areas of Sharkey clay and some small areas of Hayti silty clay loam. The included areas occupy about 10 percent of the acreage.

Hayti silty clay, generally referred to as "gumbo," tends to be wet and requires artificial drainage. This soil is naturally fertile and is used mainly for growing soybeans and cotton. Corn and alfalfa are not well suited but can be grown if good surface drainage is provided. Capability unit IIIw–14)

Hayti silty clay loam (Hy).—This soil occupies large, level and depressional areas at the lowest elevations on young natural levees in the eastern part of the county. These areas are adjacent to areas of Cooter and Crevasse soils and were originally natural shallow lakes. This soil has the profile described as typical for the series. (fig. 7).

Mapped with this soil are Cooter and Crevasse silty clay loams and Hayti silty clay, and in slight depressions a few spots of Portageville clay. A few areas are included that are clayey to depths of 24 to 30 inches. Together the included areas occupy about 10 percent of the acreage.

Hayti silty clay loam is naturally fertile but is wet in depressional areas. The main concern of management where common row crops are grown is providing good drainage to alleviate wetness. Leveling to grade is the surest means of providing good drainage. (Capability unit IIIw–1a)

Portageville Series

The Portageville series consists of deep, poorly to very poorly drained, level to depressional soils. These neutral to moderately alkaline soils occur in the oxbows, lakebeds, and meanders left by former channels of the Mississippi River.

In a typical profile the upper part of the surface layer is very dark grayish-brown clay about 6 inches thick, and the lower part is very dark gray clay 9 inches thick. The subsoil is mainly dark-gray and gray calcareous clay that extends to a depth of 47 inches. The substratum is mainly dark-gray to dark grayish-brown clay.

Permeability is very slow, and the available moisture capacity is high.

Almost all areas of the Portageville soils have been cleared. These soils are suitable for growing cotton, soybeans, corn, rice, and small grains. Alfalfa and sugar beets are fairly well suited. The native vegetation was cypress, water-tolerant hardwoods, and in places, water-loving sedges and grasses.

Profile of Portageville clay about 2 miles northeast of Concord in an area formerly known as Cooper Lake, 400 feet west and 110 feet north of the southeast corner of NE¼SW¼ sec. 32, T. 20 N., R. 13 E.:

AP—0 to 6 inches, very dark grayish-brown (10YR 3/2) clay with few, fine, dark reddish-brown (5YR 3/3) mottles; weak, fine to medium, granular structure; very firm; pH 7.0; abrupt, smooth boundary.

A1—6 to 15 inches, very dark gray (10YR 3/1) clay with common, medium, dark reddish-brown (5YR 3/4) mottles; moderate, fine to medium, subangular blocky structure; very firm; few fine roots and pores; pH 7.5, weakly calcareous; gradual, smooth boundary.

B1—15 to 25 inches, dark-gray (5Y 4/1) clay with common, medium, dark reddish-brown (5YR 4/3) mottles and few, coarse, yellowish-red (5YR 4/6) mottles; moderate, medium, angular blocky structure; very firm; few polished surfaces 1 to 4 inches across in angular position (slickensides); pH 8.0, weakly calcareous; gradual, smooth boundary.

B2—25 to 47 inches, gray (5Y 5/1) clay with few, fine, dark reddish-brown (2.5YR 2/4) mottles and common, fine, dark reddish-brown (5YR 3/4) and yellowish-red (5YR 4/8) mottles; weak, medium, angular blocky structure; very firm; many ped interiors of dark grayish brown (2.5Y 4/2); few polished surfaces 1 to 4 inches across in angular position (slickensides); pH 8.0, strongly calcareous; gradual boundary.

C—47 to 60 inches, dark gray (5Y 5/1) and dark grayish-brown (10YR 4/2) clay with common, fine, dark reddish-

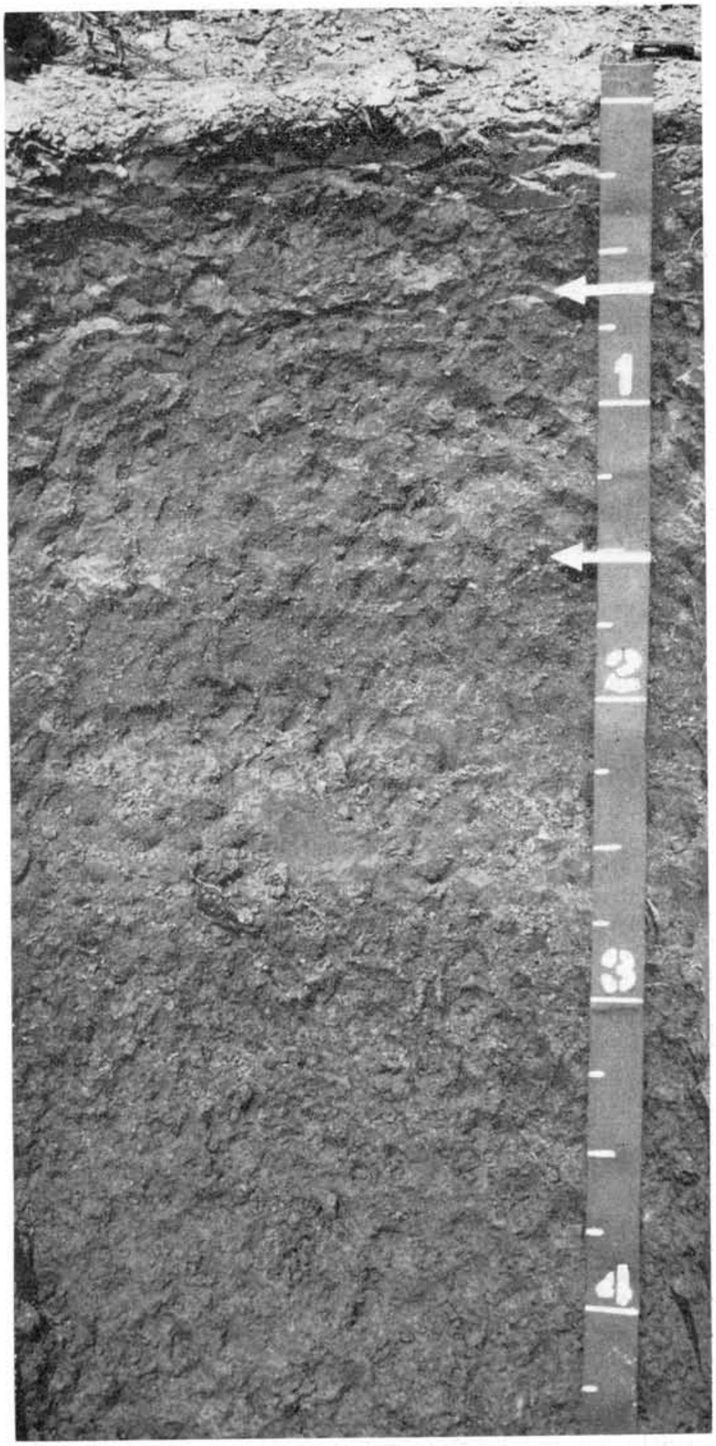

Figure 7.—**Profile of Hayti silty clay loam.**

brown (5YR 3/4) and dark-brown (7.5YR 4/4) mottles; massive, stratified; strata are ½ inch to 2 inches thick; dark reddish-brown (5YR 3/4) and yellowish-red (5YR 4/8) colors appear as thin lines between the strata, and there are occasional thin lenses (about ½ inch thick) of very fine sandy loam; very firm; pH 8.0, strongly calcareous.

At a depth between 10 and 40 inches, these soils have a clay content of 40 to 65 percent or more.

The A horizon ranges mainly from 10 to 20 inches in thickness, but is as much as 24 inches in places. Color ranges from 10YR to 2.5Y in hue, 2 to 3 in value, and 0 to 2 in chroma. The texture is commonly clay and silty clay loam, but there are areas of sandy loam or loamy sand overwash.

The B1 horizon ranges from 10YR to yellower in hue, has a value of 3.5 to 4.5, and has a chroma of 1. The B2 and C horizons range from 10YR to yellower in hue and have a value of 4 to 6 and a chroma of 1. Ped interiors have a chroma of 1 or 2.

Reaction ranges from slightly acid to moderately alkaline in the top 10 inches, and from neutral to moderately alkaline below. The soil material in the top 10 inches is calcareous in some places, and it ranges to violently calcareous below a depth of 10 inches.

Portageville soils are more calcareous and have a thicker dark-colored surface layer than the Sharkey soils. They are deep clays that do not have the bands of loamy texture that are characteristic of the Hayti soils.

Portageville clay (Po).—This soil occupies level and depressional areas on lakebeds and meanders of former channels in the recent Mississippi River flood plain. These areas are like oxbows in shape, are several hundred acres in size, and are in the eastern part of the county. The profile of this soil is the one described as typical for the Portageville series.

Mapped with this soil are areas of Sharkey clay that occupy 10 to 15 percent of the acreage. An estimated 10 percent of the acreage has the dark, thick, surface layer but lacks the calcareous reaction typical of Portageville clay. Other included areas have dark surface layers thicker than 20 inches, and streaks or spots of Hayti silty clay. Together, the included areas make up less than 35 percent of the acreage of this soil.

The main concerns of managing the Portageville clay are tendency to wetness; high water table; need for draining depressional areas subject to seasonal overflow by the Mississippi River; and difficulty in tilling and preparing a seedbed in the very firm clay. This soil is very fertile. It is best suited to cotton, soybeans, and rice, but corn, wheat, sugar beets, and alfalfa are also grown successfully. (Capability unit IIIw–14)

Portageville silty clay loam (Pr).—This soil occupies level and depressional areas and borders of oxbow-shaped lakes on the Mississippi River flood plain. These areas range from a few acres to about 200 acres in size and are in the eastern part of the county.

The surface layer is very dark grayish-brown silty clay loam 10 to 20 inches thick. The subsoil is 20 to 40 inches of dark gray clay. The substratum is clayey and occasionally contains strata of sandy material.

Mapped with this soil are some areas of Sharkey silty clay loam, some areas of Hayti silty clay loam, and other areas with dark surface layers more than 20 inches thick. Together, the included areas make up less than 35 percent of the acreage of this soil.

Portageville silty clay loam is very fertile and suitable for growing all the crops commonly grown in the county if properly drained and managed. Surface drainage is usually good if adjacent soils are adequately drained. (Capability unit IIIw–14)

Reelfoot Series

The Reelfoot series consists of deep, somewhat poorly drained, nearly level, dark, acid soils. These soils are on old natural levees.

In a typical profile the surface layer is very dark grayish-brown and very dark gray loam to silt loam about 22 inches thick. The dark color is credited partly to waste and refuse from Indian camps and villages. The subsoil is grayish-brown, mottled silty clay loam to silt loam about 20 inches thick. The substratum is grayish-brown, mottled, usually stratified, silty clay loam.

Permeability is moderate, available moisture capacity is high, and organic-matter content is usually high.

Reelfoot soils are suitable for growing most crops common to the county and are used mainly for row crops. The natural vegetation is thought to have been tall grasses and scattered trees.

Profile of Reelfoot loam 250 feet south of gravel road, about one-half mile northeast of Hayti, and 75 feet west of field ditch, SE¼NW¼ sec. 35, T. 19 N., R. 12 E.:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) loam, grayish-brown (10YR 5/2) when dry; weak, medium, granular structure; friable; pH 6.5; abrupt, smooth boundary.

A1—8 to 17 inches, very dark gray (10YR 3/1) silt loam, very dark brown (10YR 2/2) when crushed; moderate, medium, subangular blocky structure breaking to weak, medium, granular structure; friable; numerous very fine pores; pH 6.5; clear, smooth boundary.

A3—17 to 22 inches, dark grayish-brown (10YR 4/2) heavy silt loam with few, fine, dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; friable; numerous very fine pores; pH 5.8; gradual, smooth boundary.

B21tg—22 to 27 inches, grayish-brown (10YR 5/2) light silty clay loam with many, medium, dark yellowish-brown (10YR 4/4) mottles; moderate, weak, subangular blocky structure; friable to firm; patchy clay films; common fine pores; pH 5.6; gradual, smooth boundary.

B22tg—27 to 34 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, large, brown (10YR 5/3) and dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; firm; few patchy clay films; pH 5.0; clear, smooth boundary.

B3g—34 to 42 inches, grayish-brown (10YR 5/2) silt loam with many, large, dark-brown (7.5YR 4/4) mottles; weak, medium, subangular blocky structure; friable; pH 5.4; gradual, smooth boundary.

Cg—42 to 48 inches, grayish-brown (10YR 5/2) light silty clay loam with many, medium, dark yellowish-brown (10YR 4/4) mottles; massive; friable; some lenses of sandy loam in lower part; pH 5.6.

The solum has an extreme range of 30 to 60 inches in thickness, but a range of 36 to 46 inches is more common. In the A horizon the range in texture is from loam and silt loam to silty clay loam. Also, sandy loam overwash is common. This horizon has a value of 3.5 or darker and a chroma of 2 to 3 in the uppermost part and a chroma of 1 to 3 in the lower part. The sandy loam overwash has a value from 3 to 6 and a chroma of 2 to 3, and is up to 18 inches thick.

The B horizon is typically light silty clay loam, loam, or sandy clay loam with the sand size dominantly very fine. The full range of clay content at this depth is 18 to 35 percent, but a range of 25 to 30 percent is more common. The sand fraction is dominated by very fine sand. Color of the B horizon is dark grayish brown or grayish brown in 10YR to 2.5Y hues, and there are mottles of brown, yellowish brown, or strong brown. Clay films are distinct and occasionally are patchy on the subangular blocky peds. Reaction ranges from strongly acid to slightly acid, and the base saturation is above 50 percent.

The C horizon is grayish-brown to light brownish-gray silt loam or light silty clay loam; its reaction range is similar to that of the B horizon.

Reelfoot soils have thicker dark surface layers than the Dundee soils. They have grayer subsoils and more mottling than the Dubbs and Tiptonville soils.

Reelfoot loam (Re).—This nearly level soil occupies small areas along Portage Open Bay and south to Hayti. Most of these areas are less than 50 acres in size. They occur on old natural levees bordering old lakes or bayous. The profile of this soil is the one described as typical of the series. The surface layer ranges from loam to silt loam in texture and from 10 to 18 inches in thickness. The substratum commonly is stratified and ranges from sandy loam to silty clay in texture and from slightly acid to strongly acid in reaction.

Mapped with this soil are small spots having a dark surface layer more than 18 inches thick, and areas of sandy loam or loamy sand, overwash. These included areas make up about 15 percent of the acreage of this soil.

Reelfoot loam has a high organic-matter content and tends to be only slightly wet, even though the subsoil is gray and mottled. Surface drainage is usually, but not always, adequate. This soil is generally farmed with adjacent soils. Soybeans, corn, and cotton are the major crops. (Capability unit IIw–1)

Reelfoot sandy loam, overwash (Rf).—This soil occupies small areas adjacent to Portage Open Bay and, in general, the same former water courses associated with Reelfoot loam.

The surface layer is dark grayish-brown sandy loam 8 to 18 inches thick. It is very friable and is medium acid. This layer is underlain by the buried surface layer of very dark grayish-brown silt loam or loam 10 to 20 inches thick. The subsoil is 20 inches of grayish-brown silty clay loam (fig. 8).

Mapped with this area are a few small areas where the overwash of sandy loam is more than 18 inches thick.

The Reelfoot sandy loam, overwash, tends to be slightly wet, but this does not adversely affect crops in most seasons. The deeper areas are slightly droughty, and are subject to wind erosion if they are not protected. This soil is farmed to row crops and small grains. (Capability unit IIw–1)

Sandy Alluvial Land

Sandy alluvial land (Sa) is a miscellaneous land type consisting of gently undulating sandbars and riverwash in the Mississippi River channel and on the adjoining banks. It occupies areas 50 to several hundred acres in size when the river is at a normal flow.

All layers of this land type vary in texture. The soil textures are sands, loamy sands, and sandy loams, and include lenses of loams, silt loams, very fine sandy loams and occasional clays. There is little organic matter accumulation evident in the surface layer, and all layers are calcareous. Most of this land consists of new deposits formed too recently for profile development to have taken place.

This land type is not suited to cultivation. It is frequently covered by floodwaters in the spring and early summer, and it constantly changes and shifts positions. Most areas were essentially void of vegetation when mapped. The natural vegetation, where it exists, is weeds and willows. Some areas will gain vegetation as they catch sediments, and some areas eventually will become recognizable kinds of soils.

Some areas of this land can be used for growing cottonwoods. (Sandy alluvial land is not classified in a capability unit)

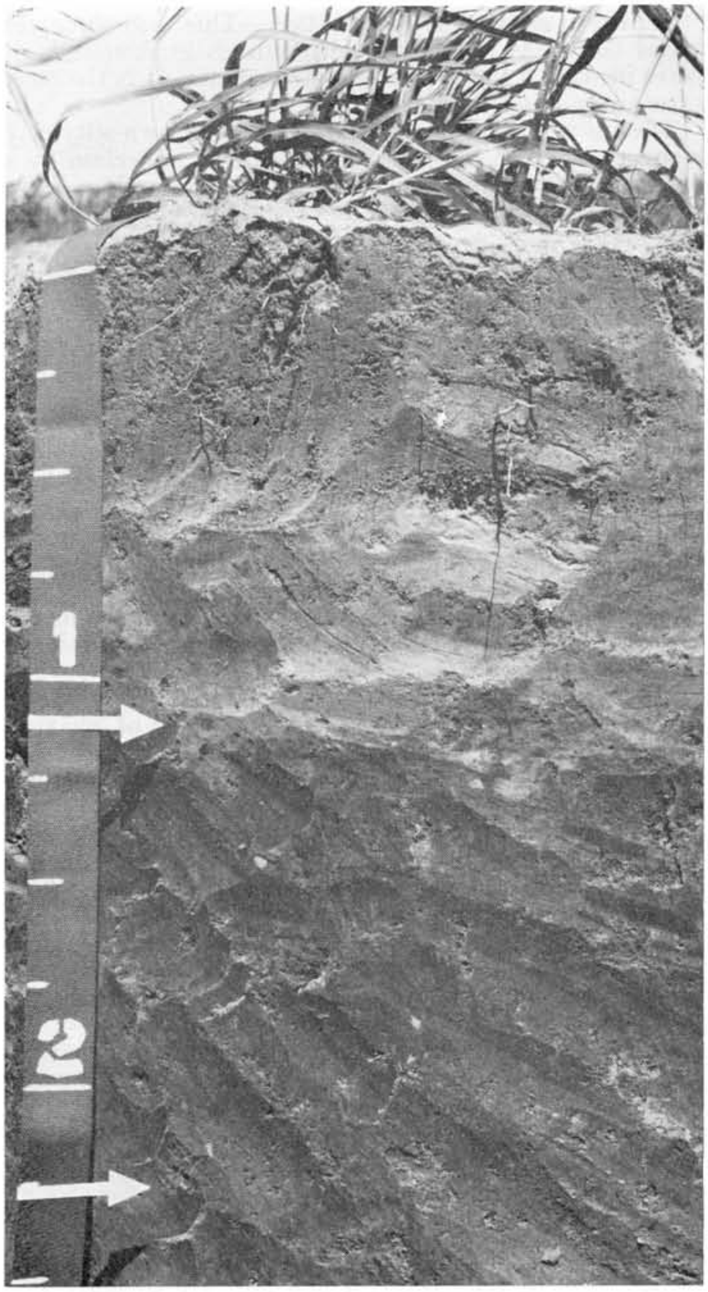

Figure 8.—Profile of Reelfoot sandy loam, overwash.

Sharkey Series

The Sharkey series consists of deep, poorly drained, nearly neutral, very dark gray, heavy textured soils. They occur on the broad, level and depressional slack water areas in the western and central parts of the county.

The surface layer is very dark grayish-brown clay about 6 inches thick. The next layer is dark-gray clay that extends to a depth of about 26 inches. This layer is underlain by gray and dark-gray clay to a depth of 60 inches.

Permeability is very slow, and the available moisture capacity is high.

Almost all areas of the Sharkey soils are cleared and are suitable for growing soybeans, cotton, and some rice. These soils are not very suitable for growing corn or alfalfa. The native vegetation was tupelo-gum, other water-tolerant hardwoods, and cypress.

Profile of Sharkey clay about 3½ miles north of Pascola, and 680 feet east and 100 feet south of the northwest corner of sec. 1, T. 19 N., R. 11 E.:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) clay; weak, fine, granular structure; firm; pH 6.5; abrupt, smooth boundary.

AC1—6 to 18 inches, dark-gray (10YR 4/1) clay with many, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, fine, subangular blocky structure; firm; few vertical streaks of very dark grayish brown (10YR 3/2); pH 6.0; gradual, smooth boundary.

AC2—18 to 26 inches, dark-gray (10YR 4/1) clay with many, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, fine and medium, subangular blocky structure; firm; many shiny ped surfaces; common grooved slickensides 1 to 3 inches wide; pH 6.8; clear, wavy boundary.

C1—26 to 44 inches, gray (10YR 5/1) to dark-gray (10YR 4/1) clay with many, medium, distinct, dark-brown (7.5YR 4/4) mottles; weak to moderate, fine, subangular blocky structure; firm; occasional fine roots; many shiny ped faces; few vertical seams of dark gray (10YR 4/1); common coarse sand grains; common slickensides; pH 7.0; gradual boundary.

C2—44 to 60 inches +, dark-gray (5Y 4/1 to 10YR 4/1) clay with common, medium, distinct, dark-brown (7.5YR 4/4) mottles; weak to moderate, fine, subangular blocky structure; firm; few, fine, white powdery accumulations (noncalcareous), pH 7.8.

The combined thickness of the A and AC horizons ranges from 15 to 40 inches. At depths between 10 and 40 inches the texture is clay.

The A horizon has a hue of 10YR, a value of 3 to 4, and a chroma of 1 to 2. Only in places where the surface layer is less than 10 inches thick is the color very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1). The A horizon is mainly clay or silty clay loam, but where the surface layer is about 15 inches thick, some sandy loam overwash occurs. The AC horizon has a hue of 10YR, a value of 4 to 6, and a chroma of 1. The C horizon has a hue of 10YR or 5Y, a value of 4 to 6, and a chroma of 1 to 2. In places this horizon has neutral colors. Mottles are commonly yellowish brown (10YR 4/4) or dark brown (7.5YR 4/4) and in places include reddish-brown or yellowish-red colors. Coarser textured material sometimes occurs below a depth of 40 inches.

Reaction ranges from medium acid to neutral in the A and AC horizons, and from medium acid to alkaline below these horizons. In places the soils are calcareous below a depth of 20 inches.

Sharkey soils lack the thick dark surface layer and the calcareous reaction of the Portageville soils.

Sharkey clay (Sh).—This soil occupies level to slightly depressional areas several hundred acres in size. Its profile is the one described as typical of the series (fig. 9).

This soil is used for row crops, mainly soybeans and cotton. Some rice is grown. This soil is wet and difficult to till. Excess water can be removed by field ditches, but land leveling is a more effective way. (Capability unit IIIw-14)

Sharkey sandy loam, overwash (Sk).—This slightly undulating soil is in irregularly shaped areas on the east side of the slackwater area that borders Pemiscot Bayou and the Channel of Little River. This is a clay soil with a sandy loam overwash that came from floodwater deposits. The areas range from a few acres to about 150 acres in size.

The surface layer is usually grayish-brown sandy loam overwash 5 to 15 inches thick.

Mapped with this soil are some spots of loamy sand and sandy clay loam, and some spots of Sharkey silty clay

Figure 9.—**Profile of Sharkey clay.**

loam and silty clay. The included areas do not represent a significant part of this Sharkey soil.

Sharkey sandy loam, overwash, is easily tilled; however, it tends to be wet, and the surface layer has a low organic-matter content. Most of the acreage has been cleared and is used for the same crops as the adjacent soils. Cotton and soybeans are the major crops grown. (Capability unit IIIw–3)

Sharkey silty clay loam (Sm).—This soil occupies broad flat areas ranging from hundreds to thousands of acres in size on the west side of the county. It is the most extensive soil in the county.

The surface layer is very dark grayish-brown silty clay loam up to 10 inches thick. This layer is underlain by a layer of dark-gray silty clay or clay. Occurring below this layer at a depth of 40 inches or more is a layer of gray silty clay or clay.

Mapped with this soil are areas of Sharkey clay in depressions, areas that have a sandy clay loam surface layer, and areas of Dundee silty clay loam on old natural levees. Together, the included areas make up less than 10 percent of the acreage of this soil.

Nearly all of this soil is used for growing soybeans and cotton. Rice is also grown to a lesser extent. This soil is wet, is difficult to till, and in general needs lime and some fertilizer. Excess water can be removed by use of land leveling and field ditching. (Capability unit IIIw–14)

Sharkey-Crevasse complex (Sr).—These gently undulating soils mostly occur on broad flat areas in the south-central part of the county. Sharkey soils make up about 60 percent of the acreage, and Crevasse sandy loam makes up about 30 percent. The areas range from 50 to 300 acres in size.

Most of the Sharkey soils have a surface layer of sandy clay to sandy loam, but there are some spots of Sharkey clay. The Crevasse soils are deep spots of sandy loam that have a variable texture at the surface. Also, there are some included areas of Steele sandy loam.

The Sharkey soils of this complex are poorly drained and very slowly permeable, and the Crevasse soils are excessively drained and rapidly permeable. Management is complicated because the Sharkey soils tend to be wet, and the Crevasse tend to be droughty. Surface runoff is slow, and there are numerous potholes. Landforming would provide more even drainage and distribute the droughty spots of sandy Crevasse soil material.

Cotton and soybeans are the major crops grown. They are commonly spotted and uneven because of excess water in some places and limited moisture in others. (Capability unit IIIw–3)

Steele Series

The Steele series consists of moderately well drained soils that occur in irregularly shaped narrow bands in the eastern part of the county. These soils are strongly acid to neutral.

In a typical profile the surface layer is dark grayish-brown sandy loam 9 inches thick. The next layer is brown, very friable, loamy sand 15 inches thick. Below a depth of about 28 inches is mottled black to gray silty clay loam to silty clay.

Permeability in the upper part of this soil is rapid, but below the upper part it is slow. The available moisture capacity is moderately low. These soils have a very limited capacity for holding and supplying water and plant nutrients to growing plants.

Steele soils are easy to work and are usually farmed with adjacent soils. The native vegetation was cottonwoods, willows, boxelders, and similar hardwoods.

Profile of Steele sandy loam 3½ miles southwest of Caruthersville, and 90 feet east of a gravel road and 190 feet north of a house in SW¼NW¼ sec. 35, T. 18 N., R. 12 E.:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, red (2.5YR 5/2) when dry; weak, medium, granular structure; very friable; pH 5.2; abrupt, smooth boundary.

C1—9 to 24 inches, brown (10YR 5/3 to 4/3) loamy sand; pale brown (10YR 6/3) when dry; structureless; breaks into chunks held together by moisture then into single grains; very friable to loose; pH 5.8; clear, smooth boundary.

C2g—24 to 28 inches, dark grayish-brown (2.5Y 4/2) loam with prominent, common, medium, dark-brown (7.5YR 4/4) mottles, light brownish gray (2.5Y 6/2) when dry; weak, medium, subangular blocky structure; very friable; abrupt, smooth boundary.

IIA1bg—28 to 35 inches, black (10YR 2/1) to very dark gray (10YR 3/1) silty clay, very dark grayish brown (10YR 3/2) when crushed, dark gray (10YR 4/1) when dry; few, fine, dark-brown (7.5YR 3/2) mottles; moderate, medium, subangular blocky structure; firm; pH 7.0; gradual, smooth boundary.

IIC3g—35 to 48 inches, dark-gray (10YR 4/1) silty clay loam with many, fine and medium, dark-brown (7.5YR 3/2 to 4/4) mottles; weak, fine, subangular blocky structure; pH 7.0; friable to firm.

Thickness over the clayey IIAb horizon ordinarily ranges from 20 to 36 inches, but the extreme range is from 18 to 40 inches. The A horizon has a 10YR hue, a value of 3 to 4 when moist and 5.5 when dry, and a chroma of 2 to 3. It is 6 to 12 inches thick. Reaction ranges from strongly acid to neutral.

The C1 horizon has a hue of 10YR, a value of 4 to 6, and a chroma of 2 to 3. It commonly ranges from pale brown (10YR 6/3) to brown (10YR 4/3). It ranges from coarse sand to loamy fine sand in texture, and is medium acid or slightly acid in reaction.

The C2 horizon ranges from loam to sandy loam in texture. It has values and chromas similar to those of the C1 horizon, but it ranges in hue to 2.5Y and 5Y and is mottled.

The IIAb horizon ranges from medium silty clay loam to clay in texture, and from 2 to 4 in value, and has a chroma of 1 or 2.

The IIC horizon has a wide range of texture, but is commonly silty clay loam. It is dark grayish brown or dark gray and has mottles of higher chroma. The reaction is slightly acid to neutral.

The Steele soils have a finer texture at a depth of 18 to 36 inches than the Crevasse soils. They are coarser textured than the Caruthersville, Commerce, and Hayti soils.

Steele sandy loam (St).—This soil occupies narrow bands of various lengths in the eastern part of the county. It occurs in positions similar to those occupied by Crevasse sandy loam. No large areas occur where it is the dominant soil.

Mapped with this soil are a few areas of Crevasse sandy loam, which makes up 5 to 10 percent of its acreage.

Steele sandy loam is farmed like adjacent soils because it rarely occurs in large enough areas to be farmed separately. This soil tends to be droughty, and has a limited capacity to hold available plant nutrients. This soil is suited to small grain crops, because their growing season coincides more closely with the rainy season. Land leveling is usually beneficial to crop growth. (Capability unit IIIs-4)

Tiptonville Series

The Tiptonville series consists of deep, friable, acid, dark-colored, level to very gently sloping, well-drained soils on the high rim of the old natural levees. The dark color is partly credited to waste and refuse from Indian camps and villages. These soils border Portage Open Bay.

In a typical profile the upper part of the surface layer is very dark grayish-brown loam 6 inches thick, and the lower part is very dark brown silt loam 6 inches thick. The subsoil is progressively very dark grayish-brown, brown, and dark yellowish-brown silty clay loam that extends to a depth of 33 inches. Below this is brown, stratified fine sandy loam and loam.

The subsoil is moderately permeable, and the available moisture capacity is high.

Tiptonville soils are easy to work and are suitable for all commonly grown crops in the county. Corn, cotton, and soybeans are the major crops grown. The native vegetation was scattered hardwoods and grasses.

Profile of Tiptonville silt loam about 1,000 feet south of Portage Open Bay, 335 feet west of State Highway TT, and 335 feet west and 90 feet north of the southeast corner of NE¼NW¼ sec. 2, T. 20 N., R. 13 E.:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) loam; dark grayish brown (10YR 4/2) when dry; weak, fine granular structure; friable; porous and some worm casts; few fine roots; pH 5.8; abrupt, smooth boundary.

A1—6 to 12 inches, very dark brown (10YR 2/2) silt loam, very dark grayish brown (10YR 3/2) when crushed; brown (10YR 5/3) when dry; moderate, fine, granular structure; few fine roots; porous; pH 5.6; clear, wavy boundary.

B21t—12 to 18 inches, very dark grayish-brown (10YR 3/2) light silty clay loam with ped interiors of brown (10YR 4/3); very dark grayish brown (10YR 3/2) when kneaded; moderate, fine, subangular blocky structure; few fine roots; very dark brown (10YR 2/2) coattings covering many ped surfaces; pH 5.6; clear, wavy boundary.

B22t—18 to 25 inches, brown (10YR 4/3) to dark yellowish-brown (10YR 4/4) silty clay loam with thick very dark brown (10YR 2/2) stains on vertical ped faces and clay films of dark grayish brown (10YR 4/2) on vertical and horizontal ped faces; dark grayish brown (10YR 4/2) when kneaded; moderate, fine, subangular blocky structure; firm; some pores; pH 5.2; gradual, smooth boundary.

B3—25 to 33 inches, brown (10YR 4/3) to dark yellowish-brown (10YR 4/4) light silty clay loam; few, fine, faint brown (10YR 5/3) mottles; brown (10YR 4/3) when kneaded; weak, fine, subangular blocky structure; firm; many fine pores; root channels and vertical cracks coated with very dark brown (10YR 2/2); pH 5.0; abrupt, wavy boundary.

C—33 to 45 inches, brown (10YR 4/3) stratified fine sandy loam and loam with common, fine, brown (10YR 5/3) mottles; massive; friable; fine pores and root channels filled or coated with very dark brown (10YR 2/2); pH 5.0.

The solum ranges from 33 to 56 inches in thickness. The A horizon has a hue of 10YR, a value of 2 to 3, and a chroma of 2 to 3. Reaction ranges from strongly acid to neutral. Silt loam is the dominant texture, but there are minor areas of loam, sandy loam, very fine sandy loam, and silty clay loam. The A horizon is 10 to 18 inches thick.

The B horizon ranges from 18 to 35 percent clay but more commonly is 25 to 30 percent clay. It has less than 15 percent sand coarser than very fine sand. The B horizon has a hue of 10YR, a value of 3 to 5, and a chroma of 2 to 4. It is 20 to 36 inches thick. Reaction ranges from very strongly acid to slightly acid, and the base saturation is above 50 percent.

The C horizon ranges to loam or silty clay loam, but commonly is very fine sandy loam or fine sandy loam. It usually becomes coarser textured with depth, and it is stratified in some places. In color the C horizon ranges from grayish brown or dark grayish brown to brown or dark yellowish brown. In some places the brighter colors are mottled with shades of gray. The reaction of the C horizon is similar to that of the B horizon. The C horizon tends to be less acid in the more clayey textures.

This soil has a browner subsoil and lacks the mottles of the Reelfoot soils. It has a darker surface layer than the Dubbs soil and is darker and more acid than the Caruthersville and Commerce soils.

Tiptonville silt loam (Tp).—This very gently sloping soil occupies areas on old natural levees that border Portage Open Bay. They are less than 100 acres in size. An exception is one large area in the northeastern corner of the county.

Mapped with this soil is some sandy loam overwash that makes up about 20 percent of the acreage, and slight depressional areas that are stained to the extent that subsoil colors are masked to a depth of more than 18 inches. These included areas occupy about 25 percent of this soil.

Tiptonville silt loam is fertile and easy to work. It readily takes water, and surface runoff is medium. This soil is suitable to all row crops, small grains, grasses, and legumes. Alfalfa can be grown, but lime is generally needed. (Capability unit I–1)

Wardell Series

The Wardell series consists of deep, poorly drained, nearly level, very dark grayish-brown soils. These soils occur in the northwestern part of the county on old natural levees. They are acid.

In a typical profile the surface layer is very dark grayish-brown loam 8 inches thick. The subsoil is olive-gray to gray loam to clay loam about 29 inches thick. It has strong-brown, dark yellowish-brown, reddish-brown, and dark-red mottles. The substratum is grayish clay and sandy clay over stratified sand.

Permeability of the Wardell soils is slow, and the available moisture capacity is medium.

Almost all areas of the Wardell soils, except for some small woodlots, have been cleared and are used mainly for growing row crops and wheat. The native vegetation was mixed hardwoods.

Profile of Wardell loam about 1 mile east of Peach Orchard, and 40 feet east and 10 feet south of northwest corner SW¼NW¼ of sec. 19, T. 20 N., R. 11 E.:

Ap—0 to 8 inches, very dark grayish-brown (10YR3/2) loam, grayish brown (10YR 5/2) when dry; occasional fine pebbles; weak, fine, granular structure; very friable; common fine roots; pH 6.5; abrupt, smooth boundary.

B1g—8 to 16 inches, olive-gray (5Y 6/2 to 6/1) loam; common, medium, distinct, dark-brown (7.5YR 4/4) and reddish-brown (5YR 4/4) mottles; weak, medium, subangular blocky structure; friable; few fine roots; common fine pores, pH 6.2; clear, wavy boundary.

B21tg—16 to 25 inches, gray (5Y 6/1) heavy loam or light clay loam; many, coarse, prominent, strong-brown (7.5YR 5/6) and yellowish-red (5YR 4/8) and dark-red (2.5YR 3/6) mottles; dark yellowish brown (10YR 4/4) when kneaded; weak, medium, subangular blocky structure; friable to firm; clay films in pores, and some ped faces have thin patchy clay films; occasional crack filled with dark grayish-brown (10YR 4/2) loam; pH 5.8; clear, wavy boundary.

B22tg—25 to 37 inches, gray (5Y 6/1) clay loam; many, fine, prominent, strong-brown (7.5YR 5/6) mottles; stratified; weak, fine, subangular blocky structure to massive; friable; occasional patchy clay films; pH 4.8; abrupt, smooth boundary.

IIC1g—37 to 55 inches, light-gray (5Y 6/1) to greenish-gray (5GY 6/1) clay; many, fine, prominent, strong-brown (7.5YR 5/6) and reddish-brown (5YR 4/4) mottles; massive; firm; pH 5.0; clear, smooth boundary.

IIC2g—55 to 60 inches, gray (5Y 5/1) sandy clay; few, fine, prominent, dark-brown (7.5YR 4/4) mottles; massive; very friable; pH 5.0.

IIIC3g—60 to 72 inches +, brown (10YR 5/3) medium and coarse sand; many small clay balls; stratified, structureless; loose; pH 5.2.

The thickness of the solum ranges from 26 to 42 inches. The A horizon is very dark grayish brown (10YR 3/2) or very dark gray (10YR 3/1). It ranges from 5 to 15 inches in thickness. The upper 20 inches of the B horizon ranges from 18 to 35 percent clay and has more than 15 percent sand larger than very fine. Most of the sand content is medium and coarse. The B horizon ranges in texture from sandy clay loam to silty clay loam. It is 20 to 36 inches thick. This horizon has a hue of 10YR to 5Y, or bluer, a value of 4 to 7, and a chroma of 1 to 2. Thin, patchy, clay films occur principally on vertical ped faces; clay flows along channels and pores are distinct and relatively thick. Reaction ranges from medium acid to very strongly acid in the B horizon. The C horizon is stratified, and its texture usually becomes coarser with depth. Reaction ranges from very strongly acid to mildly alkaline in the C horizon.

Wardell soils are sandier and grayer than the Dundee soils. They are not so fine textured as the Sharkey soils and are more acid than the Hayti soils.

Wardell loam (Wa).—This nearly level soil occupies areas on old natural levees. These areas are large and are in the northwestern corner of the county.

The profile of this soil is the one described as typical of the series.

Mapped with this soil are many small areas of sandy loam less than 10 acres in size and a few spots of Wardell sandy clay loam that occur in slight depressions. These included areas make up less than 15 percent of the acreage.

The Wardell loam surface layer takes water readily, but the subsoil is slowly permeable; therefore, it tends to be wet and requires surface drainage. It is low in organic-matter content and nitrogen. This soil is well suited to row crops. Corn, soybeans, and cotton are the major crops grown. (Capability unit IIIw–1b)

Wardell sandy clay loam (Wd).—This nearly level soil occupies areas on old natural levees. These areas are large and are in the northwestern corner of the county between areas of Wardell loam and the slackwater soils.

The surface layer is sandy clay loam about 7 inches thick. The subsoil is about 24 inches of silty clay loam or clay loam.

Mapped with this soil are small areas of Wardell loam and a few spots of Sharkey silty clay loam that occur in slight depressions. These included areas make up less than 10 percent of the acreage.

The main concerns in managing the Wardell sandy clay loam are its tendency to wetness; a seasonal high water table; need for drainage; and need for fertilizer. The soil is suitable for the crops commonly grown in the county. (Capability unit IIIw–1a)

Use and Management of Soils

This section describes some basic practices of management for soils used for cultivated crops. The system of capability grouping is defined, and the use and management of the soils in each capability unit are discussed. Also discussed in this section are predicted average yields of principal crops, and the engineering properties of the soils.

Management of Soils for Crops

Most of Pemiscot County is used to grow soybeans, cotton, corn, and wheat; part is in rice, rye, vetch, sunflowers, and pasture; and some is in cottonwood and pecan trees.

Wetness, droughtiness, low fertility, low organic-matter content, and unfavorable soil structure can limit productivity in this county. The basic practices to consider in managing the soils (*4*) are surface drainage, irrigation, selection of a suitable cropping system, application of lime and fertilizer, return of crop residues to the soil, and practice of minimum tillage.

Natural drainage is very slow in this county. The direction of flow is toward the southwest (fig. 10). Landforming offers many advantages. It provides more uniform surface drainage, eliminates potholes, allows irrigation, and permits a more even stand of crops (fig. 11).

Row crops can be grown almost continuously on most of these soils, but an occasional sod crop should be grown if soil structure deteriorates. Some of the soils are acid and need lime, and most areas need nitrogen. The amount of lime and kinds and amounts of fertilizer to apply should be determined by soil tests. Soil tests have generally shown adequate amounts of phosphorus and potassium in the soils of this county, but starter applications ordinarily improve productivity. Calcium and magnesium generally are not needed in the recent alluvial soils near the Mississippi River. Turning under crop residues and growing winter cover crops and crops for green manure help to maintain organic matter and improve soil tilth. Keeping tillage to a minimum helps to protect soil structure from breakdown.

Capability grouping

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

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

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

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

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

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

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

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes.

Pemiscot County has no soils in classes IV through VIII.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained (none in Pemiscot County); *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States but not in Pemiscot County, shows 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 limitations. Class V (none in Pemiscot County) can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIIs-4. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Pemiscot County are described and suggestions for the use and management of the soils are given. The numbering of capability units is not consecutive because a statewide system is used in Missouri, and some of the capability units are not represented in this county. The names of the soil series represented are mentioned in the description of each

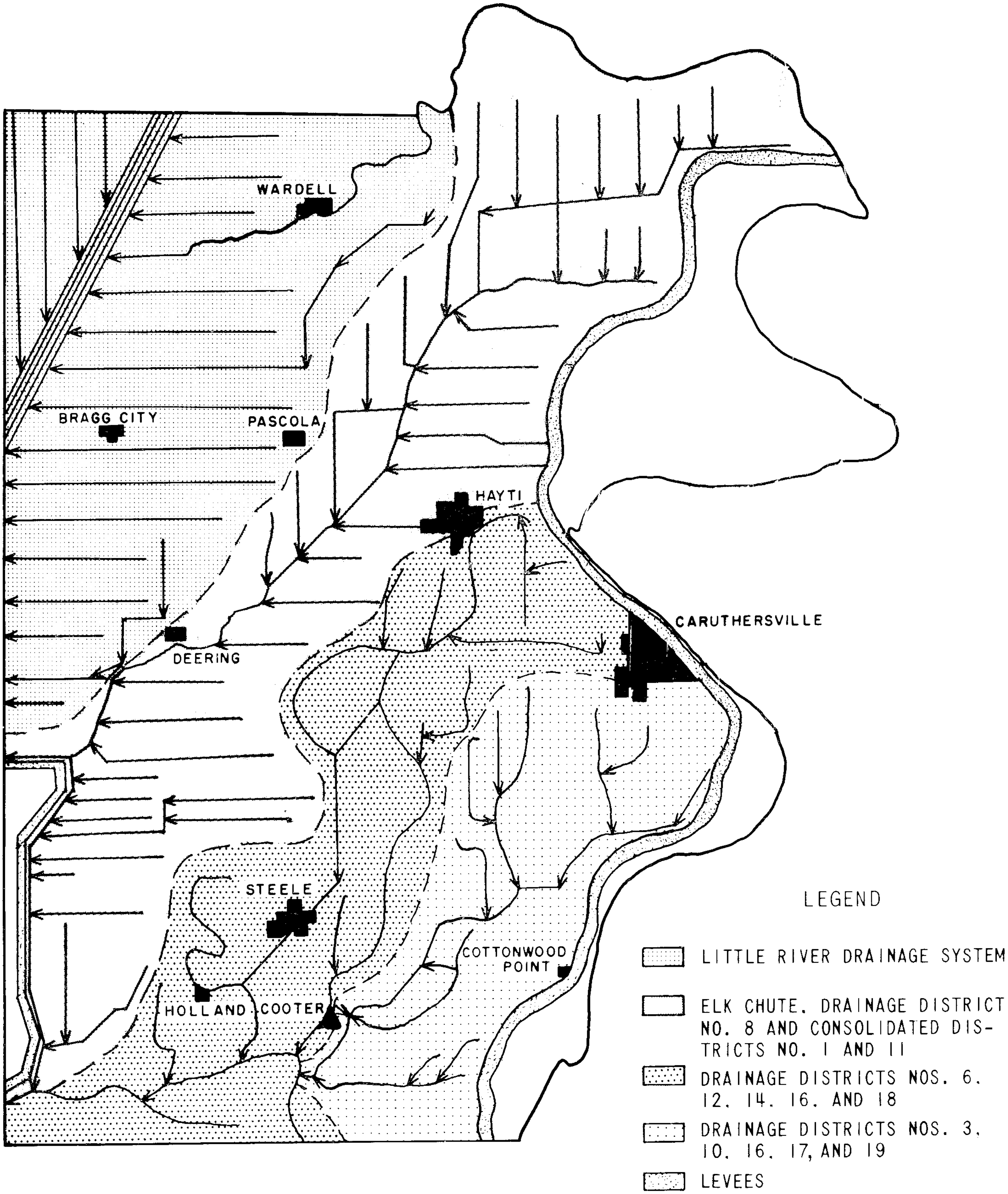

Figure 10.—Drainage pattern in Pemiscot County, Missouri.

Figure 11.—Furrow irrigation of soybeans on a leveled field of Commerce silt loam.

capability unit, but this does not mean that all the soils of a given series appear in the unit. To find the names of all of the soils in any given capability unit, refer to the "Guide to Mapping Units" at the back of this survey.

CAPABILITY UNIT I-1

This capability unit consists of deep, well drained and moderately well drained soils of the Caruthersville, Dubbs, and Tiptonville series. These nearly level soils are on natural levees. They have a medium-textured and moderately fine textured subsoil.

These soils have few limitations that restrict their use. They have a high to very high available moisture capacity, moderate permeability, and medium to slow surface runoff. The organic-matter content ranges from low to high. Some areas between the levees and the Mississippi River are subject to overflow.

The soils of this unit are suitable to all crops commonly grown in the county, including row crops, small grains, grasses, legumes, and trees. They are not suited to rice.

Use of crop rotation helps control pests, diseases, and weeds. These soils are suitable for land leveling and surface irrigation. Surface irrigation will increase productivity in most years.

CAPABILITY UNIT IIw-1

This capability unit consists of deep, somewhat poorly drained and moderately well drained soils of the Commerce, Cooter, Crevasse, Dundee and Reelfoot series. These nearly level soils are on natural levees. Their surface layer commonly is loam or silt loam, but in places is a sandy loam.

The soils of this group are fertile. Their available moisture capacity generally is medium to very high, permeability is generally moderate to moderately slow, and surface runoff is slow. The organic-matter content of the sandy loams is ordinarily low. Commerce soils that occur between the levee and the Mississippi River are subject to yearly overflow. The Cooter and Crevasse soils are moderately wet, but they are droughty when drained. Their available moisture capacity is fair.

The soils of this unit are suited to all crops commonly grown in the county, except rice. The major crops are soybeans, corn, and wheat (fig. 12).

Tillage is easy, but wetness of these soils may delay fieldwork a few days. The occasional potholes require artificial drainage. Land leveling will aid surface drainage and help to alleviate the wetness. Crops on these soils respond well to additions of phosphate and potash. The nonlegumes also respond to nitrogen, and on the acid Dundee and Reelfoot soils, crops respond to lime. The soils of this group are well suited to irrigation when a proper drainage outlet is provided.

Figure 12.—Wheat on Commerce silt loam, a soil in capability unit IIw-1.

CAPABILITY UNIT IIs-1

Only one soil, Caruthersville very fine sandy loam, sandy substratum variant, is in this capability unit. This soil has a silty surface layer ranging from 18 to 36 inches in thickness that is underlain by coarse-textured materials.

Natural fertility is high, available moisture capacity is fair to good, and organic-matter content is low. Permeability in the upper part of this soil is moderately rapid, but the soil is slightly droughty, because the underlying material has limited capacity to hold water for plants. Runoff, in most areas, does not present a problem.

This soil is suited to grasses and legumes, and to some degree is suitable for cotton, soybeans, sorghum, corn, and small grains, but it is not suited to rice. Generally, nitrogen is the only fertilizer needed.

Supplemental irrigation is generally worthwhile, because crops commonly lack moisture during the growing season. Landforming that results in deep cuts is detrimental, because it removes the surface soil and exposes the sandy underlying material. Removal of the surface soil lowers the available moisture capacity.

CAPABILITY UNIT IIIs-4

This capability unit consists of deep, excessively drained and moderately well drained, nearly level to very gently undulating soils of the Crevasse and Steele series. The texture of the surface layer ranges from coarse to medium, but the underlying layers all have coarse textures.

These soils are droughty and have a low capacity for supplying water and nutrients to plants. The available moisture capacity is moderately low and low, permeability is rapid, and surface runoff is adequate. The organic-matter content is low to medium. These soils are subject to wind erosion if they are not protected.

These soils are suited to pasture, hay, watermelons, cantaloups, and small grains. They are not well suited to row crops, but early corn and soybeans are grown.

These soils generally occur in small, irregularly shaped patterns in an intricate mixture with other soils. They are farmed like adjacent soils because it is not practical to farm them separately.

Under highly specialized management, the soils in this capability unit can be used to grow continuous row crops by applying nitrogen during the growing season, and by arranging the rows to conserve moisture and reduce soil blowing. Minimum tillage will reduce breakdown of soil structure and prevent formation of a plowpan.

If surface irrigation is used, runs need to be short, because the water intake rate is very high. Landforming that results in deep cuts is detrimental, because it removes surface soil that is favorable to plant root growth, and it exposes sandy subsurface material.

CAPABILITY UNIT IIIw-1a

This capability unit consists of deep, somewhat poorly and poorly drained soils of the Commerce, Dundee, Hayti, and Wardell series. These soils have a texture of silty clay loam or sandy clay loam.

The soils in this unit are wet. The available moisture capacity is medium to very high, runoff is slow, permeability is moderately slow to slow, and generally the organic-matter content is medium. Large areas of these soils that occur between the levee and Mississippi River are subject to yearly overflow.

These soils are suited to soybeans, small grains, cotton, sorghum, corn, alfalfa, and vetch.

Tillage is somewhat difficult and should not be attempted when the soils are wet. Water runoff is aided by row arrangement, and excess water can be removed by field ditches. Nitrogen is the principal fertilizer these soils need, but the acid Dundee and Wardell soils respond to lime. These soils are suited to landforming and surface irrigation. Landforming eliminates potholes and assures a more even stand of crops, but the resulting deep cuts will expose acid soil material that will need lime, fertilizer, and additions of organic matter.

CAPABILITY UNIT IIIw-1b

This capability unit consists of poorly drained soils of the Hayti and Wardell series. These soils have a surface layer of sandy loam or loam that averages 10 inches in thickness, but ranges from 5 to 10 inches. The surface layer is underlain by a stratified, moderately fine textured, clayey subsoil.

The clayey subsoil, the high water table, and the slow runoff result in soil wetness. The available moisture capacity is medium and high, permeability is slow, and the organic-matter content is medium.

These soils are suited to soybeans, cotton, corn, small grains, and vetch; they are fairly suited to alfalfa.

Tillage is easy. Minimum tillage will reduce the chance that soil structure will break down and help prevent formation of a plowpan. Large amounts of lime and fertilizer are generally not needed. A starter fertilizer is needed, however, and a maintenance fertilizer should be applied. Landforming levels undulating areas, eliminates potholes, and provides a field suitable for irrigation. Irrigation helps alleviate the slight droughtiness. Deep fills of sandy material on the sandy surface may result in droughtiness. Erosion from blowing occurs if the soils are not protected.

CAPABILITY UNIT IIIw-3

This capability unit consists of poorly drained soils of the Sharkey series and excessively drained soils of the Crevasse series. The acreage consists mostly of a Sharkey soil, overwash, but includes some Crevasse soil that is excessively drained and droughty. The Sharkey soil has a sandy loam surface layer 5 to 18 inches thick, and it is underlain by clay to a depth of 40 inches or more.

The organic-matter content of these soils is low, the available moisture capacity is low to high, and the surface runoff is slow. The permeability is very slow in the Sharkey soils and is very rapid in the Crevasse soils.

These soils are suited to soybeans, small grains, vetch, cotton, and corn. They are not suited to rice and alfalfa.

Tillage is easy but should not be attempted if the soils are wet. These soils generally need nitrogen and lime. Erosion from blowing will occur if these soils are not protected. Surface irrigation is suited to the Sharkey soils but not the Crevasse soils.

CAPABILITY UNIT IIIw-14

This capability unit consists of poorly drained soils of the Hayti, Portageville, and Sharkey series. These soils are in swales and lake beds on the recent Mississippi River flood plain and in the Little River basin. The surface layer is silty clay loam, silty clay, or clay.

These soils hold a large amount of water, but only part of it is available to plants. Available moisture capacity and natural fertility are high, and organic-matter content is low to medium. Difficulty in cultivating and working these soils to a good seedbed is experienced, because surface runoff and water movement through the soil material is very slow.

These soils are suited to rice, soybeans, and grasses. When adequate drainage is provided, they are suited to cotton and small grains; however, they are not suited to corn and alfalfa.

These soils are plastic when wet and become hard and crack when they dry. They, therefore can be cultivated only within a narrow range of moisture content. Deep plowing in fall is desirable because weathering breaks down the clods before spring, and preparing the seedbed is then much easier.

These soils require artificial drainage. Landforming is an efficient way of providing uniform drainage, and adequate ditches need to be provided for drainage outlets. Surface irrigation is suited to these soils. When crops are irrigated before cracks occur in these soils, better efficiency is attained.

Predicted yields

Table 2 gives the predicted average acre yields for the crops commonly grown in Pemiscot County. In columns A are yields to be expected under ordinary management. In columns B are yields to be expected under the high level of management practiced by some farmers in the county. The figures given are based on interviews with farmers, on field crop research by the Missouri Agricultural Experiment Station, and on experience and judgment of representatives of the Soil Conservation Service. The average yields are estimates based on material obtained over a period of years.

Under the level of management used to obtain the yields in columns A, row crops are grown continuously without a planned cropping sequence. Green-manure crops are not grown, and crop residues are not utilized properly. Although lime and fertilizer are used, they are used without regard for or knowledge of requirements based on soil tests. Wet areas are drained by field ditches, but potholes are common.

To obtain the yields of field crops shown in columns B, the following management practices are used:

1. A suitable cropping sequence is selected. For those soils that need extra organic matter and improved tilth, green-manure crops are a part of the cropping sequence.
2. Crop residues are left in the field and mixed with the soil.
3. Adequate drainage is provided, including landforming necessary to eliminate potholes.

TABLE 2.—*Predicted average yields of the principal crops under two levels of management*

[Yields in columns A are those to be expected under ordinary management, and yields in columns B are those expected under improved management. Absence of a yield figure indicates that the crop is not commonly grown at the management level indicated. Borrow pits and Sandy alluvial land are not listed in this table because they are nonarable]

Soil	Cotton		Soybeans		Corn		Rice	
	A	B	A	B	A	B	A	B
	Lb. of lint	*Lb. of lint*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Caruthersville very fine sandy loam	700	825	30	45	70	110	----	----
Caruthersville very fine sandy loam, sandy substratum variant	350	550	15	30	40	75	----	----
Commerce sandy loam	600	800	25	40	70	100	----	----
Commerce silt loam	650	825	30	45	70	100	----	----
Commerce silty clay loam	550	700	20	40	50	90	----	70
Cooter and Crevasse silty clay loams	400	700	20	40	50	90	----	----
Crevasse loamy sand	125	225	10	15	25	50	----	----
Crevasse loamy sand, acid variant	150	250	10	20	30	55	----	----
Crevasse silt loam	150	250	10	20	30	55	----	----
Dubbs silt loam	625	800	25	45	65	100	----	----
Dundee sandy loam	575	775	25	40	55	100	----	----
Dundee silt loam	600	800	25	45	65	100	----	----
Dundee silt loam, thick surface variant	550	775	25	40	55	100	----	----
Dundee silty clay loam	500	700	20	40	45	90	----	70
Hayti sandy loam, overwash	425	675	20	35	40	80	----	----
Hayti silty clay	350	575	20	40	35	65	55	90
Hayti silty clay loam	475	700	20	40	45	90	----	85
Portageville clay	325	550	20	40	30	50	55	90
Portageville silty clay loam	350	550	15	35	35	65	55	90
Reelfoot loam	625	825	25	40	60	100	----	----
Reelfoot sandy loam, overwash	600	800	25	40	55	100	----	----
Sharkey clay	300	500	20	40	20	50	50	90
Sharkey sandy loam, overwash	375	500	18	30	35	55	----	80
Sharkey silty clay loam	325	525	20	40	25	55	50	90
Sharkey-Crevasse complex	350	475	18	30	35	55	----	----
Steele sandy loam	125	250	10	20	25	55	----	----
Tiptonville silt loam	650	800	30	45	70	110	----	----
Wardell loam	475	675	20	35	45	80	----	----
Wardell sandy clay loam	475	650	20	35	45	80	----	70

4. Fertilizer and lime are applied in amounts indicated by soil tests. Starter and maintenance applications are used to insure a good stand and to replace nutrients removed in harvested crops.
5. Tillage is kept to a minimum to preserve soil structure.
6. Adapted, high-yielding varieties are planted at proper rates.
7. Weeds and insects are controlled and planting and harvesting are done at the right time.

Engineering Uses of the Soils [2]

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, facilities for storing water, drainage systems, and systems for disposing of sewage. This section discusses those properties of the soils in Pemiscot County that most affect engineering. This information was developed by the cooperative efforts of soil scientists and engineers.

The information in this survey can be used to—

1. Make soil and land use studies that will aid in selecting and developing sites for industries, businesses, residences, and recreational areas.
2. Make preliminary estimates of the engineering properties of soils for use in planning irrigation and drainage systems, landforming, dikes and levees, reservoirs, and other measures for soil and water conservation.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, pipelines, and airports and in planning detailed investigations of the soils at the selected locations.
4. Estimate drainage areas and runoff characteristics for use in designing culverts and bridges.
5. Classify soils along a proposed highway route for use in making preliminary estimates of required thickness of flexible pavement.
6. Estimate the need for material to stabilize the surfacing on unpaved roads.
7. Make preliminary evaluations of topography, surface drainage, subsurface drainage, depth to water table, and other features that need to be considered in designing highway embankments, subgrades, and pavements.
8. Correlate performance of engineering structures with types of soil and thus develop information that will be useful in designing and maintaining certain engineering structures.
9. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.
10. Supplement the information obtained from other published maps, reports, and aerial photographs for the purpose of making soil maps and reports that can be used readily by engineers.
11. Develop preliminary estimates for construction.

[2] Carl L. Anderson, Assistant State Conservation Engineer, Soil Conservation Service assisted in the preparation of this section.

In this section, most of the information about soil engineering is given in tables 3, 4, and 5. Table 3 contains engineering test data on a few soils; table 4, estimated properties of all the soils; and table 5, estimated behavior of the soils when used for topsoil, highway subgrade material, septic tank filter fields, foundations for buildings, and various water-control structures ordinarily used on farms.

The interpretations in this section, and the soil maps, are useful to engineers but do not eliminate need for sampling and testing at a site chosen for a specific engineering work where excavations are to be made to depths greater than are reported in this soil survey. Even in such situations, however, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that can be expected.

Information of value in planning engineering work is given throughout the text, especially in the section "Descriptions of the Soils." Some terms used by soil scientists may not be familiar to the engineer. Most of these terms, as well as other special terms used in this survey, are defined in the Glossary.

Engineering classification systems

Agricultural scientists of the U.S. Department of Agriculture classify soils according to texture. In some ways this system of naming textural classes is comparable to the two systems used by engineers for classifying soils; that is, the system of the American Association of State Highway Officials (AASHO) (*1*) and the Unified soil classification system (*11*).

Most highway engineers classify soil materials in accordance with the systems approved by AASHO. In the AASHO system, soil materials are classified in seven principal groups. The groups range from A-1, consisting of gravelly soils of high bearing capacity, to A-7, which is made up of clay soils having low strength when wet. Within each group, the relative engineering value of the material is indicated by a group index number. The group index numbers range from 0 for the best material to 20 for the poorest. In this soil survey, group index numbers are assigned only on the soils on which tests have been performed. The group index number is shown in parentheses, after the soil group symbol, in the next to last column of table 3.

Many engineers prefer to use the Unified soil classification system. In the Unified system, soil materials are identified according to their texture and plasticity, and according to their performance as engineering construction materials. Soils are identified as coarse grained, 8 classes; fine grained, 6 classes; and highly organic. Within these classes two letters, for example, ML, are used to indicate the kind of soil material and to designate each soil group. The letters used to indicate kinds of soil material are S, M, and C, which stand for sand, silt, and clay, respectively. The letters L and H stand for low and high liquid limit. Where the symbols of two soil separates are given, for example SM for sand and silt, the first letter indicates the dominant soil separate. Soils on the borderline between two classifications are given a joint classification, for example ML-CL. Table 3 gives the Unified engineering classification of the soils tested.

The Unified system provides for a simple field method and a laboratory method for determining the grain size and plastic properties of the soils. Both methods are based on gradation and plasticity and vary only in degree of accuracy. Mechanical analysis, liquid limit data, and plasticity indexes are used in the laboratory method to obtain an exact classification. A plasticity chart on which the liquid limit and the plasticity index are plotted is used for a more accurate classification of the fine-grained soils.

Soil test data

To make the best use of the soil map and the soil survey, the engineer needs to know the physical properties of the soil materials and the condition of the soil in place. After testing the soil materials and observing the behavior of soil in engineering structures and foundations, the engineer can develop designs that are suited to the soils shown on the map.

The data given in table 3 show the results of tests made by the Missouri State Highway Commission, Division of Materials and Research, under a cooperative agreement with the Bureau of Public Roads and the Soil Conservation Service. Results of these tests help in evaluating the soils for engineering purposes. Samples of ten different soil types were taken and tested in accordance with standard procedures. The samples tested were generally taken at some depth between 5 and 52 inches.

The soils listed in table 3 were sampled at one location. The test data for a soil indicates the engineering characteristics of the soil at that specific location. It must be recognized that there may be variations in the physical test characteristics of this soil at other locations in the county.

Table 3 gives compaction (moisture-density data) for the tested soils. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached, but after that the density decreases with an increase in moisture. The highest dry density obtained in the compaction test is called the maximum dry density. Moisture-density data are important in earthwork, for as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

The engineering soil classifications given in the last two columns of table 3 are based on data contained from mechanical analysis and tests made to determine the liquid limit and plasticity index of the soils. The mechanical analyses were made by the combined sieve and hydrometer methods.

Tests for liquid limit and plastic limit measure the effect of water on the consistency of the soil material. As moisture is added, the material changes from a semisolid to a plastic, and as further water is added it changes from a plastic to a liquid state. The plastic limit is the moisture content, expressed as a percentage of the oven-dry weight of the soil, at which the material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. This index indicates the range of moisture content within which a soil material is in a plastic condition. Some silty and sandy soils are nonplastic; that is, they are not plastic at any moisture content.

Engineering properties of the soils

In table 4 are estimated properties of the soils that are significant in engineering. The estimates are based on engineering test data shown in table 3 and on experience with the same or similar soils from other counties. The significance of some of the engineering properties shown in table 4 are apparent; other properties need some explanation.

Depth to bedrock is not given in table 4 and is not significant to engineering in Pemiscot County, because the bedrock is several hundred feet below the alluvium and other unconsolidated material.

The depth to seasonal water table is not listed because the fluctuation in Pemiscot County is influenced by elevation, by the amount of rainfall, and by the adequacy of drainage outlets. In the low-lying, poorly drained Hayti, Portageville, Sharkey, and Wardell soils, the water table is at or near the surface. In the excessively drained and well-drained Crevasse, Dubbs, and Tiptonville soils, the water table is rarely nearer to the surface than 3 feet. Other soils in the county generally experience a water table fluctuation of 1 to 3 feet at some period during the year. The water table is within 3 to 4 feet of the surface in all soils of the county during the wet season.

Permeability refers to the rate at which water moves downward through undisturbed soil; it depends largely on texture and structure of the soil. The permeability ratings used in this survey and their equivalents in words are as follows:

Inches per hour	*Rating*
Less than 0.06	Very slow.
0.06 to 0.2	Slow.
0.2 to 0.6	Moderately slow.
0.6 to 2.0	Moderate.
2.0 to 6.3	Moderately rapid.
6.3 to 20.0	Rapid.

Reaction refers to the pH value of the soil. A soil with a pH of 7.0 is neutral. Lower values indicate increasing acidity, and higher values indicate increasing alkalinity. In this county, the reaction of the soils varies from very strongly acid (pH 4.5) to strongly alkaline (pH 8.5). The surface layer of the soils generally has a pH of 6.0 to 7.0. The lower horizons are typically either more acid or alkaline.

The available moisture capacity, measured in inches of water per inch of soil depth, is the water available to plants. This is the water held in the range between field capacity of the soil and the permanent wilting point (*3*) of common crops.

The shrink-swell potential is an indication of the volume change to be expected of the soil material with a change in moisture content. Soils that have high shrink-swell potential present hazards to the maintenance of structures constructed in, on, or with such material. Estimates of shrink-swell are based on liquid limit of the soil. The soils that have a liquid limit of 25 or less are given a rating of low; those that have a liquid limit of 25 to 40 are given a rating of moderate; those that have a liquid limit of 40 to 60 are given a rating of high; and those that have a liquid limit of more than 60 are given a rating of very high.

TABLE 3.—*Engineering*

Soil name and location	Parent material	Mo. State Highway Commission laboratory number	Depth	Moisture density: Maximum dry density	Moisture density: Optimum moisture
			In.	*Lb. per cu. ft.*	*Pct.*
Caruthersville very fine sandy loam: 25 ft. E. and 210 ft. N. of the SW. corner of SE¼SE¼ sec. 6, T. 19 N., R. 13 E.	Coarse silty alluvium.	760776	8–17	101	17
		760742	34–44	99	18
Commerce silt loam: 190 ft. S. of the levee road on the Section line and 135 ft. W. in SE¼NE¼ sec. 1, T. 16 N., R. 12 E.	Fine silty alluvium.	760777	16–22	102	21
		760750	22–40	106	18
Crevasse silty clay loam: 30 ft. W. of field road and 900 ft. N. of where field road crosses railroad tracks in NW¼SE¼ sec. 3, T. 18 N., R. 12 E.	Shallow clayey alluvium over coarse loamy sediments.	760755	8–36	103	16
Dundee silt loam: 450 ft. N. and 80 ft. W. of SE. corner of NE¼NW¼ sec. 24, T. 19 N., R. 11 E.	Fine silty alluvium.	760751	23–32	99	22
		760752	40–48	112	16
Dundee silt loam, thick surface variant: 75 ft. W. of Swift (REA) Substation on U.S. Highway 61 and 50 ft. N. of gravel road in SW¼SE¼ sec. 13, T. 20 N., R. 12 E.	Fine silty alluvium.	760748	8–13	111	16
		760746	22–32	106	20
		760778	48–52	102	20
Hayti silty clay loam: 265 ft. N. and 75 ft. E. of the intersection of county road and Mo. Highway 84 in NW¼NW¼ sec. 7, T. 18 N., R. 13 E.	Stratified alluvium.	760749	7–23	99	22
		760743	29–39	92	26
Portageville clay: 750 ft. E. of culvert over big lake ditch and 60 ft. N. of field road, NW¼ sec. 19, T. 19 N., R. 13 E.	Clayey alluvium.	760745	10–30	88	29
Reelfoot loam: 250 ft. S. of gravel road and 75 ft. W. of ditch in SE¼NW¼ sec. 35, T. 19 N., R. 12 E.	Mixed alluvium.	760756	8–17	106	17
		760754	27–34	100	22
		760779	40–48	105	18
Sharkey clay: 450 ft. S. and 30 ft. E. of NW. corner sec. 1, T. 19 N., R. 11 E.	Clayey alluvium.	760747	5–36	90	26
Sharkey silty clay loam: 60 ft. N. of Highway A in SW. corner of Ross school property in SE¼SE¼ sec. 24, T. 20 N., R. 12 E.	Clayey alluvium.	760744	8–22	100	21
		760775	30–40	100	22

[1] Test performed by the Missouri State Highway Commission. [2] Nonplastic.

test data [1]

Mechanical analysis							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—							
No. 10 (2.0 mm.)	No. 40 (0.042 mm.)	No. 200 (0.074 mm.)	0.05 mm	0.02 mm	0.005 mm.	0.002 mm.			AASHO	Unified
							Pct.			
	100	93	62	17	10	9	[2] NP	[2] NP	A-4(8)	ML
	100	89	53	18	7	4	NP	NP	A-4(8)	ML
	100	99	88	57	36	29	40	17	A-6(11)	CL
	100	99	84	45	22	18	33	7	A-4(8)	ML
100	99	34	17	7	4	3	NP	NP	A-2-4(0)	SM
	100	92	88	69	48	40	48	24	A-7-6(15)	CL
100	99	58	53	40	26	22	30	14	A-6(7)	CL
100	98	81	70	48	27	20	27	8	A-4(8)	CL
100	99	93	86	65	40	31	48	27	A-7-6(16)	CL
100	98	94	85	64	40	40	46	25	A-7-6(15)	CL
	100	99	98	85	51	37	50	23	A-7-6(15)	ML-CL
	100	99	99	96	77	60	78	50	A-7-6(20)	CH
		100	99	96	80	61	77	44	A-7-5(20)	CH
100	99	94	78	46	26	18	30	7	A-4(8)	ML-CL
100	99	96	89	67	40	31	44	21	A-7-6(13)	CL
	100	95	79	43	24	19	32	9	A-4(8)	ML-CL
100	98	93	93	90	80	68	76	47	A-7-6(20)	CH
100	99	95	91	78	60	46	60	37	A-7-6(20)	CH
100	99	97	94	82	62	50	62	39	A-7-6(20)	CH

TABLE 4.—*Estimated*

[Borrow pits (Bp), Sandy alluvial land (Sa), and Sharkey-Crevasse

Map symbol	Soil	Depth from surface	Classification
			USDA texture
		Inches	
Ca	Caruthersville very fine sandy loam.	0–49	Very fine sandy loam
Ch	Caruthersville very fine sandy loam, sandy substratum variant.	0–27 27–48	Very fine sandy loam Sand or loamy sand
Cm	Commerce sandy loam.	0–9 9–29 29–62	Sandy loam Heavy silt loam or silty clay loam. Silt loam to silty clay loam
Cr	Commerce silt loam.	0–9 9–29 29–62	Silt loam Heavy silt loam or silty clay loam Silt loam to silty clay loam
Cs	Commerce silty clay loam.	0–9 9–29 29–62	Silty clay loam Heavy silt loam or silty clay loam Silt loam to silty clay loam
Ct	Cooter and Crevasse silty clay loams (Cooter soil only). For the Crevasse soil, see Crevasse silt loam in this table.	0–14 14–54	Silty clay loam to silty clay Loamy sand to sand
Cu	Crevasse loamy sand.	0–60	Loamy sand
Cv	Crevasse loamy sand, acid variant.	0–40	Loamy sand
Cw	Crevasse silt loam.	0–10 10–60	Silt loam Loamy sand
Db	Dubbs silt loam.	0–12 12–34 34–42	Silt loam Silty clay loam Very fine sandy loam
Dd	Dundee sandy loam.	0–8 8–40 40–48	Sandy loam Silty clay loam Loam
De	Dundee silt loam.	0–8 8–40 40–48	Silt loam Silty clay loam Loam
Du	Dundee silty clay loam.	0–8 8–40 40–48	Silty clay loam Silty clay loam Loam
Dn	Dundee silt loam, thick surface variant.	0–22 22–52	Silt loam Silty clay loam
Ha	Hayti sandy loam, overwash.[1]	0–7 7–37 37–72	Sandy loam Silty clay loam Silt loam
Hc	Hayti silty clay.	0–7 7–37 37–72	Silty clay Silty clay loam Silty loam
Hy	Hayti silty clay loam.	0–7 7–37 37–72	Silty clay loam Silty clay loam Silty loam
Po	Portageville clay.	0–47	Clay

See footnote at end of table.

e ngineering properties of the soils

complex (Sr) are too variable for their properties to be estimated]

Classification—Continued		Percentage passing sieve—		Permeability	Available moisture capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
				Inches per hour	*Inches per inch of soil depth*	*pH value*	
ML	A-4	100	85-95	0. 6-2. 0	0. 18-0. 23	6. 1-8. 5	Low.
ML	A-4	100	85-95	0. 6-2. 0	0. 18-0. 23	6. 1-8. 0	Low.
SM	A-2	100	15-35	6. 3-10. 0	0. 02-0. 08	6. 1-8. 0	Low.
SM	A-2-4, A-4	100	30-45	2. 0-6. 3	0. 10-0. 14	6. 1-7. 0	Low.
CL or ML-CL	A-6 or A-7-6	100	85-95	0. 2-0. 6	0. 18-0. 21	6. 1-7. 5	Moderate.
ML	A-4	100	85-95	0. 6-2. 0	0. 17-0. 21	6. 1-7. 5	Moderate.
ML	A-4	100	85-95	0. 6-2. 0	0. 18-0. 23	6. 1-7. 5	Low.
CL or ML-CL	A-6 or A-7-6	100	85-95	0. 2-0. 6	0. 18-0. 21	6. 1-7. 5	Moderate.
ML	A-4	100	85-95	0. 6-2. 0	0. 17-0. 21	6. 1-7. 5	Moderate.
CL	A-6 or A-7-6	100	80-90	0. 2-0. 6	0. 17-0. 21	6. 1-7. 5	Moderate.
CL or ML-CL	A-6 or A-7-6	100	85-95	0. 2-0. 6	0. 18-0. 21	6. 1-7. 5	Moderate.
ML	A-4	100	85-95	0. 6-2. 0	0. 17-0. 21	6. 1-7. 5	Moderate.
CL	A-4 or A-7-6	100	80-90	0. 2-0. 6	0. 15-0. 20	6. 0-7. 0	High.
SM	A-2-4	100	15-35	6. 3-10. 0	0. 02-0. 08	5. 6-7. 0	Low.
SM	A-1-b	100	15-25	6. 3-10. 0	0. 02-0. 08	5. 6-7. 5	Low.
SM	A-2-4	100	25-35	6. 3-10. 0	0. 04-0. 08	4. 5-6. 0	Low.
ML	A-4	100	70-90	0. 6-2. 0	0. 18-0. 23	5. 6-7. 5	Low.
SM	A-1-b	100	15-25	6. 3-10. 0	0. 02-0. 08	5. 6-7. 5	Low.
ML	A-4	100	85-95	0. 6-2. 0	0. 15-0. 23	5. 6-7. 0	Low.
CL	A-6 or A-7-6	100	85-95	0. 6-2. 0	0. 15-0. 21	4. 8-6. 0	Moderate.
ML or ML-CL	A-4	100	55-60	0. 6-2. 0	0. 18-0. 23	5. 1-6. 5	Low.
SM	A-4 or A-2-4	100	30-40	2. 0-6. 3	0. 10-0. 15	5. 6-7. 0	Low.
CL	A-7-6	100	85-95	0. 2-0. 6	0. 15-0. 21	4. 8-6. 0	High.
CL	A-6	100	55-65	0. 6-2. 0	0. 14-0. 18	5. 1-6. 5	Moderate.
ML	A-4	100	75-85	0. 6-2. 0	0. 15-0. 23	5. 6-7. 0	Low.
CL	A-7-6	100	85-95	0. 2-0. 6	0. 15-0. 21	4. 8-6. 0	High.
CL	A-6	100	55-65	0. 6-2. 0	0. 14-0. 18	5. 1-6. 5	Moderate.
CL	A-6 or A-7-6	100	80-90	0. 2-0. 6	0. 14-0. 18	5. 6-7. 0	Moderate.
CL	A-7-6	100	85-95	0. 2-0. 6	0. 15-0. 21	4. 8-6. 0	High.
CL	A-6	100	55-56	0. 6-2. 0	0. 14-0. 18	5. 1-6. 5	Moderate.
ML	A-4	100	80-90	0. 6-2. 0	0. 18-0. 23	4. 0-5. 0	Low.
CL	A-7-6	100	90-100	0. 2-0. 6	0. 15-0. 21	5. 0-6. 0	High.
SM	A-4 or A-2-4	100	30-40	2. 0-6. 3	0. 10-0. 15	6. 0-7. 0	Low.
ML-CL	A-7-6	100	80-95	0. 06-0. 2	0. 18-0. 21	6. 0-7. 5	High.
ML	A-4	100	75-95	0. 6-2. 0	0. 18-0. 23	6. 5-8. 0	Low.
CL or CH	A-7-6	100	90-100	0. 06-0. 6	0. 15-0. 21	6. 0-7. 3	High.
ML-CL	A-7-6	100	80-95	0. 06-0. 2	0. 18-0. 21	6. 0-7. 5	High.
ML	A-4	100	75-95	0. 6-2. 0	0. 18-0. 23	6. 5-8. 0	Low.
CL or CH	A-7-6	100	90-100	0. 06-0. 6	0. 15-0. 21	6. 0-7. 3	High.
ML-CL	A-7-6	100	80-95	0. 06-0. 2	0. 18-0. 21	6. 0-7. 5	High.
ML	A-4	100	75-95	0. 6-2. 0	0. 18-0. 23	6. 5-8. 0	Low.
CH	A-7-5	100	90-100	<0.06	0. 15-0. 18	7. 0-8. 5	Very high.

TABLE 4.—*Estimated engineering*

Map symbol	Soil	Depth from surface	Classification: USDA texture
		Inches	
Pr	Portageville silty clay loam.	0–6	Silty clay loam
		6–47	Clay
Re	Reelfoot loam.	0–17	Silt loam and loam
		17–34	Silty clay loam
		34–42	Silt loam
Rf	Reelfoot sandy loam, overwash.	0–12	Sandy loam
		12–29	Silt loam
		29–46	Silty clay loam
		46–52	Silt loam
Sh	Sharkey clay.	0–60	Clay or silty clay
Sk	Sharkey sandy loam, overwash.	0–10	Sandy loam
		10–60	Clay or silty clay
Sm	Sharkey silty clay loam.	0–8	Silty clay loam
		8–40	Clay or silty clay
St	Steele sandy loam.	0–9	Sandy loam
		9–26	Loamy sand
		26–48	Silty clay or silty clay loam
Tp	Tiptonville silt loam.	0–12	Silt loam
		12–33	Silty clay loam
		33–45	Loam
Wa	Wardell loam.	0–16	Loam
		16–55	Clay loam
Wd	Wardell sandy clay loam.	0–48	Sandy clay loam and clay loam

[1] Hayti soils are stratified; the individual layers range from sandy loam to clay.

TABLE 5.—*Interpretation*

[Borrow pits (Bp) and Sandy alluvial land (Sa) are too

Soil series and map symbol	Suitability as source of—		Soil features affecting engineering practices—	
	Topsoil	Highway subgrade material	Dikes and levees	Reservoir areas
Caruthersville: Ca, Ch	Good	Fair	Poor stability and compaction; susceptible to piping; moderate permeability.	Moderate permeability; excessive seepage.
Commerce: Cm, Cr, Cs	Fair to good	Poor to fair	Fair stability; slow permeability.	Moderately slow permeability; stratified material.

See footnote at end of table.

properties of the soils—Continued

Classification—Continued		Percentage passing sieve—		Permeability	Available moisture capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
				Inches per hour	*Inches per inch of soil depth*	*pH value*	
CH	A-7-6	100	85-95	0. 2-0. 6	0. 18-0. 21	6. 0-7. 5	High.
CH	A-7-5	100	90-100	<0. 06	0. 15-0. 18	6. 1-7. 0	Very high.
ML-CL	A-4	100	85-95	0. 6-2. 0	0. 15-0. 23	6. 1-7. 0	Moderate to low.
CL	A-7-6	100	90-100	0. 6-2. 0	0. 18-0. 21	5. 1-6. 0	High.
ML-CL	A-4	100	90-100	0. 6-2. 0	0. 18-0. 23	5. 1-6. 5	Moderate.
SM	A-4 or A-2-4	100	30-40	2. 0-6. 3	0. 10-0. 15	5. 6-6. 5	Low.
ML	A-4	100	85-95	0. 6-2. 0	0. 18-0. 23	6. 1-7. 0	Moderate.
CL	A-7-6	100	85-100	0. 6-2. 0	0. 18-0. 21	5. 1-6. 0	High.
ML-CL	A-4	100	85-100	0. 6-2. 0	0. 18-0. 23	5. 1-6. 5	Moderate.
CH	A-7-6	100	90-100	<0. 2	0. 15-0. 18	5. 6-7. 5	Very high.
SM	A-4 or A-2-4	100	30-40	20. -6. 3	0. 10-0. 15	5. 6-7. 0	Low.
CH	A-7-6	100	90-100	<0. 2	0. 15-0. 18	5. 6-7. 5	Very high.
CH	A-7-6	100	85-95	0. 2-0. 6	0. 18-0. 21	5. 6-6. 5	High.
CH	A-7-6	100	90-100	<0. 2	0. 10-0. 15	5. 6-7. 0	Very high.
SM	A-2-4 or A-4	100	30-40	2. 0-6. 3	0. 10-0. 15	5. 6-7. 0	Low.
SM	A-1-b	100	15-25	6. 3-10. 0	0. 02-0. 08	5. 6-6. 5	Low.
CL-CH	A-7-6 or A-6	100	90-95	0. 06-0. 6	0. 15-0. 21	6. 1-7. 0	High.
ML	A-4	100	85-95	0. 6-2. 0	0. 15-0. 23	5. 6-7. 0	Low.
CL	A-6 or A-7-6	100	85-95	1. 0-3. 0	0. 18-0. 21	5. 1-6. 0	Moderate.
CL	A-6	100	70-80	0. 6-2. 0	0. 18-0. 23	5. 1-6. 5	Moderate.
ML	A-4	100	60-80	0. 06-0. 2	0. 14-0. 18	5. 6-7. 0	Low.
CL	A-6	100	70-80	0. 06-0. 2	0. 16-0. 18	5. 0-6. 0	Moderate.
SC, CL	A-6	100	45-80	0. 06-0. 2	0. 14-0. 18	5. 0-6. 5	Moderate.

of engineering properties

variable in characteristics for their properties to be estimated]

Soil features affecting engineering practices—Cont.	Suitability for—		Limitations for septic tank filter fields	Suitability and bearing capacity for low building foundations [1]
Irrigation	Landforming	Agricultural drainage		
Medium intake rate; high moisture capacity.	Suitable	Moderately good: surface drainage generally adequate.	Moderate: moderate permeability; seasonal high water table.	Poor: seasonal high water table to 2 feet below surface.
Medium intake rate; high moisture capacity.	Suitable	Somewhat poor: fluctuating water table at depth of 2 to 17 feet; some surface drainage needed.	Severe: seasonal high water table within 18 inches of surface.	Fair: seasonal high water table within 18 inches of surface.

366-084—71——3

TABLE 5.—*Interpretation of*

Soil series and map symbol	Suitability as source of—		Soil features affecting engineering practices—	
	Topsoil	Highway subgrade material	Dikes and levees	Reservoir areas
Cooter: Ct. For properties of Crevasse soil, refer to Crevasse series.	Fair	Poor in upper 10 to 14 inches; good in subsurface layer.	Fair stability; upper 10 to 24 inches has slow permeability; material below is susceptible to piping.	Moderately slow permeability in upper 10 to 24 inches; shallow to sandy material.
Crevasse: Cu, Cv, Cw	Poor to very poor; good silt loam surface.	Fair to good	Susceptible to piping; moderate permeability; difficult to vegetate.	Rapid permeability; too porous to hold water.
Dubbs: Db	Good	Poor	Fair stability; slow permeability; good resistance to piping.	Moderate permeability
Dundee: Dd, De, Dn, Du	Fair to good	Poor	Fair to good compaction; good resistance to piping; high shrink-swell, slow permeability.	Moderately slow permeability.
Hayti: Ha, Hc, Hy	Fair; poor in silty clay surface layer.	Poor	Poor to fair stability; good resistance to piping; high shrink-swell.	Slow permeability; stratified.
Portageville: Po, Pr	Poor to fair	Poor	Excellent resistance to piping; very high shrink-swell potential; very slow permeability.	Very slow permeability; clayey material.
Reelfoot: Re, Rf	Very good; fair sandy loam overwash.	Fair to poor	Fair to good compaction; good resistance to piping; slow permeability; high shrink-swell.	Moderate permeability
Sharkey: Sh, Sk, Sm, Sr. For properties of the Crevasse soil in Sr, refer to Crevasse series.	Poor to fair	Poor	Poor stability and compaction; very high shrink-swell potential; very slow permeability.	Very slow permeability; poor stability; clayey material.
Steele: St	Fair	Good in upper 2 feet; poor below a depth of 2 feet.	Fair stability below depth of 40 inches; upper 18 to 40 inches susceptible to piping; slow permeability.	Slowly permeable substratum.
Tiptonville: Tp	Very good	Fair to poor	Fair to good stability and compaction; slow permeability.	Moderate permeability
Wardell: Wa, Wd	Fair to good	Fair to poor	Fair to good stability and compaction; good resistance to piping; slow permeability.	Slow permeability

[1] Specific values should not be applied to the estimates given for bearing capacity of soils.

engineering properties—Continued

Soil features affecting engineering practices—Cont.	Suitability for—		Limitations for septic tank filter fields	Suitability and bearing capacity for low building foundations [1]
Irrigation	Landforming	Agricultural drainage		
Medium intake rate; low moisture capacity.	Suitable for filling; not suitable for cutting: shallow to sand.	Moderately good: depressional; subject to surface flooding.	Moderate to severe: seasonal high water table.	Good: seasonal high water table.
Very rapid intake rate; low moisture capacity.	Not suited: sandy; low in organic matter.	Excessive: drainage not generally needed.	Moderate: rapid permeability; seasonal high water table.	Good: seasonal high water table to 2 feet below surface.
Medium intake rate; high moisture capacity.	Suitable; finer textures and lower acidity exposed by cuts.	Good: drainage generally not needed.	Moderate: moderate permeability; seasonal high water table.	Fair: seasonal high water table below 30 inches.
Medium intake rate; medium moisture capacity.	Suitable; finer textures and lower acidity exposed by cuts.	Somewhat poor: surface drainage needed; subsurface drainage difficult.	Severe: seasonal high water table within 1 foot of surface.	Fair: seasonal high water table within 1 foot of surface, high shrink-swell.
Slow to medium intake rate; medium moisture capacity.	Suitable	Poor: depressional; outlets difficult to find.	Severe: seasonal high water table to surface.	Fair to poor: seasonal high water table to surface, high shrink-swell.
Slow intake rate; medium moisture capacity.	Suitable	Poor to very poor: depressional; outlets difficult to find.	Severe: very slow permeability; seasonal high water table to surface.	Poor suitability; fair bearing capacity: very high shrink-swell; seasonal high water table to surface.
Medium intake rate; medium moisture capacity.	Suitable	Somewhat poor: slow surface runoff.	Severe: seasonal high water table to within 1 foot of surface.	Fair: seasonal high water table to within 1 foot of surface, high shrink-swell.
Slow intake rate; medium moisture capacity.	Suitable	Poor: level topography; surface drainage necessary; outlets difficult to find.	Severe: very slow permeability; seasonal high water table to surface.	Poor suitability; fair bearing capacity: very high shrink-swell; seasonal high water table to surface.
Rapid intake rate; low moisture capacity.	Suitable	Moderately good: drainage not generally needed.	Severe: slowly permeable substratum; seasonal high water table.	Fair to poor suitability: fair bearing capacity; seasonal high water table.
Medium intake rate and moisture capacity.	Suitable; finer texture and lower acidity exposed by cuts.	Good: drainage generally not needed.	Moderate: moderate permeability; seasonal high water table.	Fair: seasonal high water table below depth of 30 inches.
Medium intake rate; medium moisture capacity.	Suitable	Poor: surface drainage needed.	Severe: seasonal high water table to or near surface.	Fair to poor suitability; fair bearing capacity: seasonal high water table to or near surface.

Engineering interpretations of the soils

Table 5 indicates the suitability of the soils of Pemiscot County as a source of topsoil and subgrade material, and contains information useful to engineers and others who plan to use soil material in construction of dikes, levees, and reservoirs. It indicates features affecting type and design of field drainage systems, irrigation systems, and low building construction. Table 5 also indicates limitations that affect the suitability of the soils for septic tanks. The rating and other interpretations were based on available test data, including those in table 3; on estimated properties of the soils in table 4; and on field experience.

Topsoil is ordinarily high in organic matter and is used as a topdressing for roadsides, gardens, and lawns. The ratings indicate suitability for such use.

The most desirable subgrade material in Pemiscot County is the sandy soils; the least desirable subgrade material is clay. The high water table and high natural moisture content of some soils make excavating and handling difficult.

The limiting factors given for dikes and levees are those that influence the suitability of the disturbed soil material for construction purposes. The soils can be safely used for dikes and levees if they are properly compacted and sealed so that seepage is controlled.

Reservoir areas are evaluated by features and qualities of undisturbed soils that affect their suitability for water impoundment. Of primary concern are factors affecting the seepage rate. Many sites in Pemiscot County were partially dug out and their subsoil and substratum evaluated.

Features and qualities of the soil that affect surface drainage practices are considered in the column headed "Agricultural drainage." Runoff for the entire county is slow, and drainage outlets are not always adequate.

The main factors affecting irrigation are intake rate and moisture capacity of the soils. Most of these soils are suitable for gravitational irrigation systems. Irrigation is used as a supplement to rainfall during moisture-deficient periods.

Limiting factors and suitability of the soils for landforming are given in the column headed "Landforming." Organic matter accumulations in the surface layers are removed or covered, which exposes subsoils that are generally lower in organic matter, finer textured, and more acid. Cuts in Crevasse and Cooter soils expose sandy subsoil and create droughty areas that are low in productivity.

The factors that most limit the suitability of the soils of Pemiscot County for septic tank filter fields are a high water table and slow permeability. Soils for sewage lagoon use are not rated, but would be rated similar to reservoir areas.

Features of the undisturbed soil that influence its capacity to support low buildings that have normal foundation loads are considered in the column headed "Low building foundations."

Formation and Classification of Soils

This section tells how the factors of soil formation have affected the development of soils in Pemiscot County. It also explains the current system of soil classification, and places the soil series in higher categories of this classification. A description of each soil series in the county and of a profile typical of each series can be found in the section "Descriptions of the Soils."

Factors of Soil Formation

Accumulation of parent material in the form of alluvium can be considered the first of two major steps in soil formation in Pemiscot County. The next step is the differentiation of horizons in the soil profile that result from the interaction of climate, plants and animals, and relief on the parent material through periods of time. The interaction of these factors can account for many differences among soils. Most soils in this county, however, have layers resulting from accidents of deposition, rather than soil horizons that result from processes of soil formation. Low maximum relief is dominant among the soil-forming factors in this county. Climate has caused only small differences among the soils because only a relatively short time has elapsed since the parent materials were deposited.

Following are discussions of each of the major factors of soil formation as they affect the soils of this county.

Parent material

All the land surface in Pemiscot County is of alluvial origin. The Mississippi and Ohio Rivers were the major sources of material. The alluvial deposits are of varying age (fig. 13). The material on the recent Mississippi River flood plain is composed of fresh sediment that is nearly neutral in reaction and that retains most of the basic elements. This young alluvium is of mixed composition, as its sources are glacial drift, loess, and materials weathered from rock formations in the wide reaches of the upper Mississippi River basin. Sorting of these materials occurs, but not consistently year after year. The general pattern of deposition, however, is as follows.

As the river overflows its channel and water spreads over the flood plain, the coarser sediments are dropped first. Thus, sands are commonly deposited near the river in bands parallel to the direction of overflow. The Crevasse and Steele soils are the result of this deposition.

Silt, next smaller than sand in particle size, and lighter in weight, is deposited as speed of the overflow water diminishes. The low ridges thus formed are known as natural levees. The Caruthersville and Commerce soils are on these levees.

As the floodwaters recede, large areas of still, or slack, water remain in the depressions, sloughs, lakes, and bayous. Clay, the smallest and lightest particle, stays in suspension longer than the sand and silt, so it settles out in the still waters during long periods between major floods. The Portageville soils formed in these deposits.

The simple pattern of deposition just described is complicated by the intensity of flooding, the migration of the river channel back and forth across much of the flood plain, and other little known or unknown factors. Unpredictable floodwaters deposit new materials while truncating adjacent areas. In years of major floods, sands and silts are deposited on top of slack-water clays. During the succeeding interflooded period, clays are again deposited over the coarser textured materials, and this gives rise to relatively thin beds of contrasting alluvium. The Hayti and Cooter soils formed in deposits of this kind.

Old natural levees extend intermittently from the northern part of the county southward through the central part

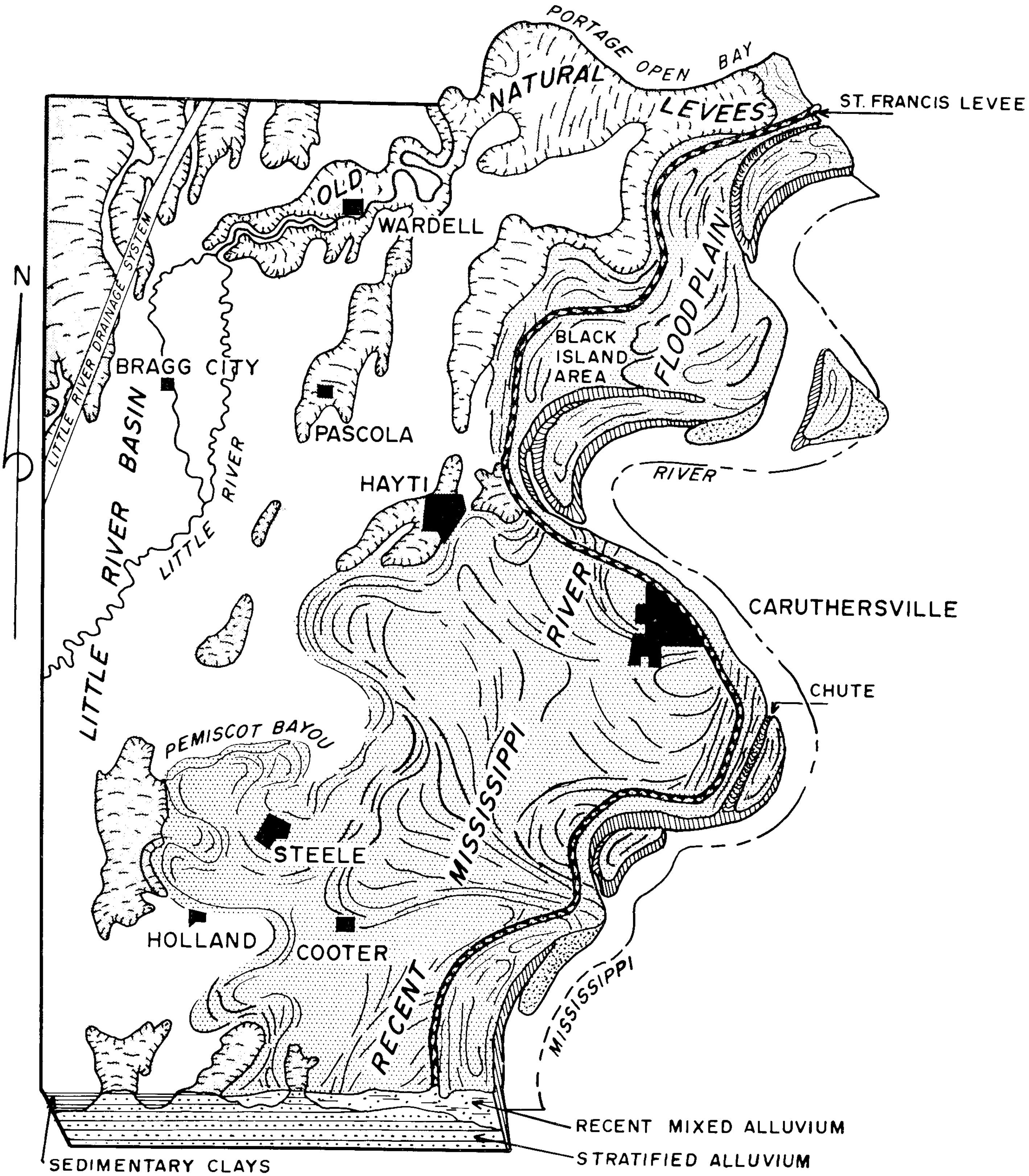

Figure 13.—Physiography of Pemiscot County, Missouri.

of the county. They are the remnants of old alluvial deposits and give rise to Dundee, Wardell, Dubbs, and related soils. It seems reasonable to assume that the old levee once was a continuous barrier that restricted overflow from the Mississippi River to the east side of the county. Truncation or subsidence has eliminated all of this barrier except the few remnants that now exist.

The large areas of slack-water clays on the west side of the county have been comparatively stable. This is partly because they are farther away from the present meander belt established by the Mississippi River.

The water table of the slack-water area was apparently near or above the surface most of the year. Because they were a part of the Little River lowland, these areas continually received some overflow and sedimentation, and the Mississippi River probably contributed some backwater during annual flooding. The shallow, stagnant waters from these sources deposited clays over a period of time, during which they were essentially free of disturbance from floodwater currents. Depth of the clay thus deposited ranges from 4 to 10 feet or more. Sharkey soils are dominant in the slack-water areas.

Climate

The climate is of the humid, temperate, continental type. This climate has prevailed throughout the period of soil development in the county but has made only a slight impression on the soils. Regions with a humid, temperate climate normally have strongly weathered, leached, acid soils of low fertility. But this is not true in Pemiscot County because the flood plain of the Mississippi River delta is geologically young. Not enough time has elapsed to permit the strong weathering of sediments that takes place in a humid climate. Furthermore, the sediments have come mainly from loessal and glacial sections of the country, where weathering is not intense.

The soil materials in Pemiscot County were very fertile when deposited and have changed little since. The oldest soils in the county, the Dubbs, Wardell, and Dundee, show some alteration resulting from the weathering action expected in a humid climate. They have been leached enough to have an acid reaction in some part of their solun, and their natural fertility has been lowered. Even these soils, however, show only slight resemblance to the soils that normally occur in a humid climate.

Plants and animals

The soils of this county are young, but the influence of plants and animals on their formation is evident.

The native vegetation has changed only slightly during the short geological time the present landforms have existed. The vegetation has been primarily forest. About 60 species of trees have been identified as native to Pemiscot County (*5*).

At least three types of forest cover appear to have existed under native conditions. Baldcypress was dominant in swampy areas now occupied by Sharkey, Portageville, and some Hayti soils. Cypress trees and other typical swamp growth were on these soils at the time they were cleared for cultivation. Earlier, they had different vegetation. When the Little River drainage system was excavated, logs of oak, elm, hickory, and other upland species were found at depths up to 25 feet. Probably the change from upland forest to swamp vegetation resulted from subsidence caused by the earthquake of 1811 or by previous disturbances.

On the old natural levees, the forest was dominantly shagbark hickory, white oak, Shumard oak, and southern red oak. Species vary slightly, depending on soil conditions. The soils on the old natural levees, the Dubbs, Wardell, and Dundee, have an acid reaction favoring growth of oaks and other hardwoods.

On the recent Mississippi River flood plain, the growth was willow, eastern cottonwood, American elm, boxelder, and related species. Canebrakes and vines were the common undergrowth. The soils on this flood plain are mainly the Caruthersville and Commerce.

Differences in native vegetation in this county are associated mainly with variations in drainage. On the old natural levees, however, climate has altered parent material to the extent that differences in tree species have resulted. Small areas of prairie have been reported to have occurred. In general, soils formed under grasses are darker in color than those formed under trees. The Tiptonville and Reelfoot soils probably were influenced by grasses. The reason for prairie vegetation occurring on these soils is not known, but its effect on them is evident.

The effect of animals on soils is difficult to estimate or measure. In this county observations were confined mainly to the activity of earthworms. Activity of earthworms seems to be limited in the sandy soils and in the heavy textured soils. Most of the other soils contain many worm casts.

Observations indicate that man has affected soil development in this county for two thousand years or more. Nearly 3,600 acres in the county have been mapped separately because the surface soil is unusually dark colored. A large part of this acreage has been identified as kitchen middens, or sites of aboriginal homes. Numerous sites too small to map were designated by symbol on the detailed soil map. These ancient campsites vary from a few square yards to 20 acres or more in size. They occur adjacent to old watercourses, usually in high, well-drained sites. These sites occur where there are areas of Tiptonville, Reelfoot, Caruthersville, Commerce, Dubbs, Crevasse, acid variant, Wardell, and Dundee soils.

Man continues to alter the soils in this county by clearing the trees, leveling the land, plowing the soils, providing drainage, controlling water, adding fertilizers, and introducing new plant species.

Relief and landform

Pemiscot County has the least relief of any county in the State. The highest elevation, 285 feet above sea level, is in the northeastern corner, and the lowest, 246 feet, is in the southwestern corner (fig. 14). The distance between these two points is more than 31 miles. The difference in elevation is 39 feet, and the change in elevation is at the rate of slightly more than 1 foot per mile.

In general, the highest elevations are on the old natural levees and those parts of the recent natural levees that immediately border the Mississippi River. The clay, or slack-water, areas are generally at the lower elevations.

As a whole, the county is level to undulating. Local relief ranges from extremes of less than 1 foot to more than 10 feet within a square mile, but a range from 1 foot to 5 feet is more common. In some large areas the land is essentially

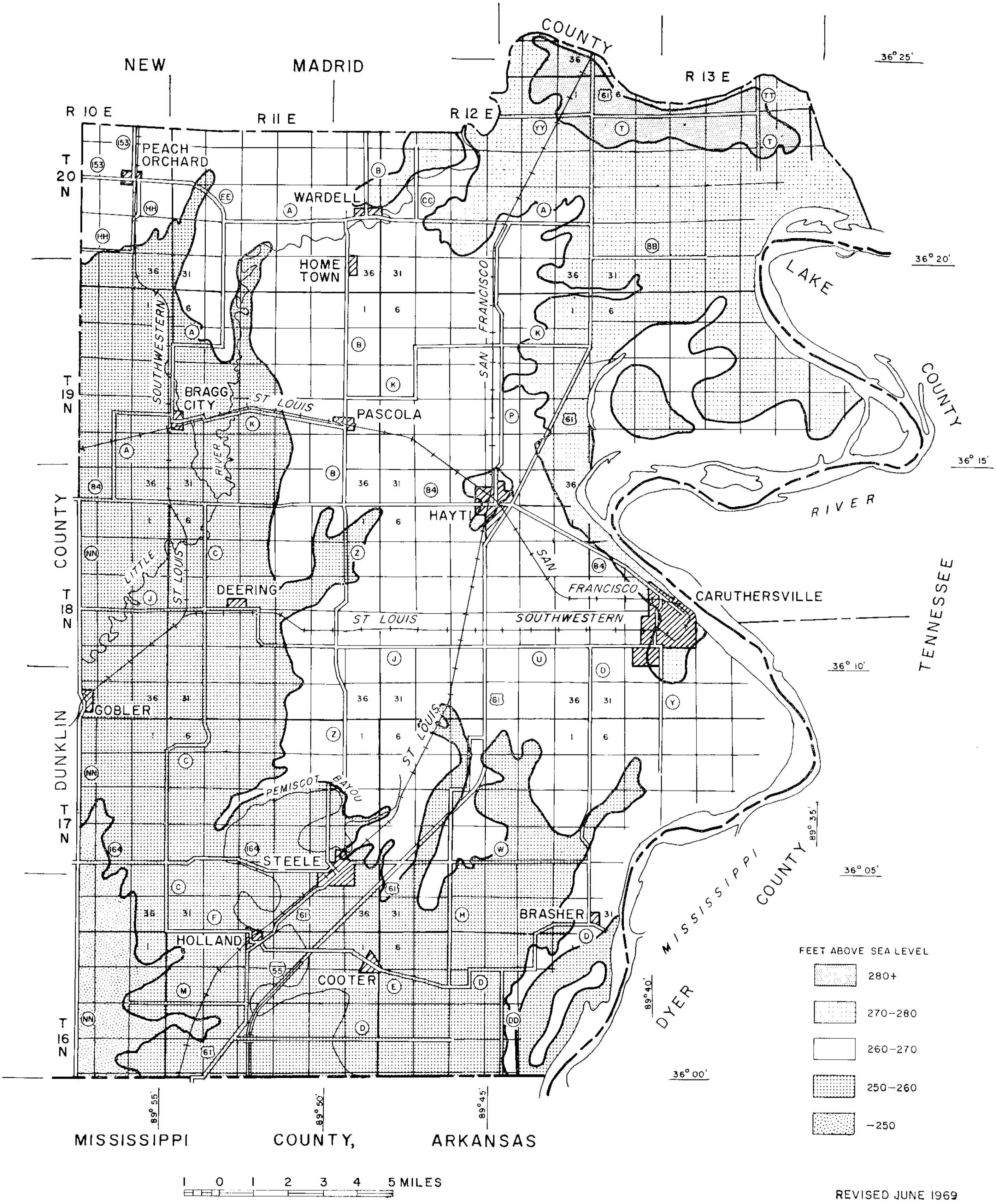

Figure 14.—Relief in Pemiscot County, Missouri.

level. Artificial drainage systems have increased the maximum relief by as much as 10 feet in some places.

The entire county is a product of stream deposition, and the landforms reflect this origin. Sandbars occur on the meanders and curves of the river. Low ridges, or natural levees, parallel the present river course, and remnants of such levees mark former positions of the river. The large flood plains are marked by numerous oxbow lakes, meander scars, and abandoned cutoffs. In many places on the flood plain, a chute cutoff has isolated a sandbar and thus formed an island.

Low relief hastened the effect of climate in some places and slowed or almost stopped it in others. Crevasse soils, in high positions on recent natural levees, and Dubbs soils in comparable positions on old levee remnants, are fully influenced by climatic forces. The influence of climate, however, can be obscured or offset by occasional overflow. During major floods, in areas near the St. Francis Levee, free carbonates removed through climatic weathering can be replaced by carbonates in the floodwaters. Areas between a levee and the river channel are flooded annually, so the effect of climate is minimized. A fluctuating water table has affected development of many soils. For example, poor drainage and a high water table have exerted more influence in altering parent material of the Sharkey soils than has the climate.

Time [3]

Compared with other soils of Missouri, those in Pemiscot County are very young. New sediments are still being deposited in parts of the county. Some deposition of alluvium took place throughout the recent Mississippi River flood plain until the St. Francis Levee was constructed. (See fig. 14, p. 37.) The Little River basin received sediments regularly until the first major drainage was completed in 1899.

The remnants of old natural levees are the oldest soil materials. The soils on these levees show the effects of leaching, including downward movement of clay and formation of a weakly defined textural B horizon. This degree of soil formation suggests a landform that has been essentially undisturbed for a period measured in at least hundreds of years.

Probably it is safe to assume that all of the county has been formed in or influenced by glacial outwash. The last glacial advance, the Mankato, occurred about 11,000 years ago. As that glacier melted, streams carried away glacial debris for several thousand years. Glacial ice remained in some northerly lake basins as late as 8,500 years ago.

Archaeology provides clues to the age of the landforms. Study of Indian artifacts found at village sites and camp sites suggests that several distinct Indian cultures are represented in the county, each spanning a different period in time. These different timespans have been more or less accurately determined by radioactive carbon (C–14) dating. The archaeological data are far from complete, but they do suggest the age of certain soils in the county.

Artifacts of the earliest Indians in Pemiscot County belong to the Archaic Period, which dates back as much as 5,000 years. These artifacts are found only along some higher land areas near the Little River and perhaps Portage Open Bay. The artifacts found in Late Archaic materials, which are 3,000 years old or more, are on the older natural levees.

Artifacts of the Woodland Period, 1,000 B.C. to 1,000 A.D., are commonly found in the county. Two main cultural styles can be identified in this period. The first (Tchula) dates from around 1,000 B.C. to approximately 1 A.D. It is distributed mainly on soils of the Little River basin but occurs sparingly on the meander-belt ridge that lies between the Little River basin and the Pemiscot Bayou area. The second development of the Woodland Period, the Baytown, dates from shortly before 1 A.D. to about 1,000 A.D. Artifacts of the Baytown culture are found along Portage Open Bay and on the high meander-belt ridge that runs obliquely across the county.

The Mississippian Period, dating from around 900 A.D. to 1,600 A.D., is the most recent of the three periods. Artifacts of this period are generally found in sites that overlie the more eastern Baytown sites, or they are the only evidence of an Indian culture. Where only Mississippian sites are evident, there is a unique correlation between these sites and the recent Mississippi River flood plain, in the southeastern part of the county.

From the foregoing it can be concluded that the oldest land surfaces in the county are the old natural levees, and that they are at least 2,000 or 3,000 years old, and possibly as old as 5,000 years. Apparently the recent Mississippi River flood plain did not become stable enough for habitation until about 1,100 years ago. In fact, some land surfaces that contain Mississippian artifacts may date as late as the coming of the Europeans.

Processes of Soil Formation

Some of the processes that affect formation of horizons in soils of Pemiscot County are (1) accumulation of organic matter; (2) leaching of carbonates and soluble salts; (3) oxidation and reduction that result in development of a B horizon differentiated by color or structure; (4) formation and translocation of silicate clays resulting in the development of a B horizon differentiated by clay films and texture; and (5) weathering of primary minerals. Each of these processes operates at all times, but one process may be dominant during early stages of soil formation, and another process may become dominant later.

Most soils in Pemiscot County are at so early a stage of development that their mineralogical composition is primarily that inherited from the parent material. Early stages of soil development are indicated, however, by accumulation of organic matter in the A1 horizon, by leaching of carbonates beneath the A1 horizon, and by appearance of a B horizon differentiated by structure or color.

In this county all soils show some accumulation of organic matter in the surface layer, and this results in slightly darker color in this layer. The organic-matter content of this layer normally ranges from about 1 to 3 percent, but in some very recent alluvium only faint accumulation is apparent. For most soils of the county, the relatively dark surface layer is at least 4 inches thick, but generally not more than 10 inches. Exceptions are the Tiptonville, Reelfoot, and Portageville soils, which have a surface layer 10 inches or more in thickness. The deep, dark surface layers of these soils presumably results from

[3] RICHARD A. MARSHALL, archaeologist, University of Missouri, contributed part of the information in this subsection.

significant additions of organic matter that took place during formation of the soils.

Leaching of carbonates and soluble salts goes on while organic matter is accumulating. Very soluble salts, sodium salts for example, ordinarily are removed to depths below the solum during the early stage of leaching. Calcium carbonates leach out more slowly than the sodium salts. Even so, some recently deposited soils of this county have been leached free of carbonates in all except the lower part of their solum. Percolating water, which is quickly saturated with calcium carbonates, removes the carbonates from the upper part of the calcareous zone. Where rainfall is sufficient, and the time lapse is long enough, carbonates are eventually removed and a soil no longer has a calcareous zone.

After carbonates have leached out, a B horizon differentiated either by color or structure begins to form. This step is most evident in soils that are well drained. Where drainage is good, oxidation of iron in the soil material takes place. This brings brighter colors, such as brown instead of the grayish brown that is common in fresh alluvium deposited in this county. Caruthersville soils of this county show the grayish-brown color typical of the fresh alluvium.

Where drainage is restricted, reduction of iron takes place instead of oxidation. Reducation of iron, or gleying, produces gray colors. Thus, in soils where the water table stays high, the reduction and transfer of iron results in uniform gray colors in those horizons that remain saturated. Where the water table fluctuates, reduced iron is either carried from the soil in percolating water, or it is deposited as concretions or mottles as the water table recedes. The deposited iron forms reddish-brown, strong-brown, and yellowish-brown mottles. Such mottling is prominent in Dundee silt loam, thick surface variant, and noticeable in all other soils except Crevasse, Dubbs, and Tiptonville.

Translocation of materials takes place in soils after leaching of carbonates has occurred. Clays and other minerals are transported from upper to lower parts of the soil profile, and as this process continues, a B horizon begins to form. This B horizon has structure different from that of the A horizon. Commerce and Hayti soils show differentiation of structure in the B horizon.

If translocation of clay continues long enough, a B horizon is formed that has different texture than the A horizon. Such a B horizon can be identified by the presence of oriented clay films on structural peds. Since the migrating clays follow lines of weakness in the original material, and coat the peds of that material, they first make the structure of the B horizon stronger, and later change its texture. In this county, B horizons differentiated by texture have begun to form but are in the early stages of formation. Vertical movement of clay from the A horizon to the B horizon is taking place in Dubbs, Wardell, and Dundee soils.

Classification of Soils

Soils are classified so that we may more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationships to one another and to the whole environment, and to develop principles that help us understand their behavior and their response to manipulation. First, through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

In classification, soils are placed in narrow categories that are used in detailed soil surveys so that knowledge about the soils can be organized and applied in managing farms, fields, and woodlands; in developing rural areas; in performing engineering work; and in many other ways. They are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and later revised (*7*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965. The current system is under continual study (*6, 9*). Therefore, readers interested in developments of this system should search the latest literature available.

In table 6 the family, subgroup, and order of the current system are given for each soil series. The classes in the current system are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates.

Table 6 shows the four soil orders in Pemiscot County—Alfisols, Entisols, Inceptisols, and Mollisols. Alfisols contain accumulated aluminum and iron, have argillic or natric horizons, and have a base saturation of more than 35 percent. Entisols are recent soils in which there has been little, if any, horizon development. Inceptisols occur mostly on young, but not recent, land surfaces. Mollisols have a thick dark-colored surface layer, moderate to strong structure, and base saturation of more than 35 percent.

SUBORDER.—Each order is divided into suborders, primarily on the basis of soil characteristics that indicate genetic similarity. The suborders have a narrower climatic range than the order. The criteria for suborders reflect either the presence or absence of waterlogging, or soil differences resulting from climate or vegetation.

GREAT GROUP.—Each suborder is divided into great groups on the basis of uniformity in kind and sequence of genetic horizons. The great group is not shown in table 6 because the name of the great group is the same as the last word in the name of the subgroup.

SUBGROUP.—Each great group is divided into subgroups, one representing the central (typic) segment of the group, and others, called intergrades, made up of soils that have mostly the properties of one great group but also one or more properties of another great group.

FAMILIES.—Families are established within subgroups primarily on the basis of properties important to plant growth. Some of these properties are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

SERIES.—The series is a group of soils that have major horizons that, except for texture of surface layer, are similar in important characteristics and in arrangement in the profile.

TABLE 6.—*Classification of soil series in Pemiscot County, Mo.*

Soil series	Current system			1938 system
	Family	Subgroup	Order	Great soil group
Caruthersville	Coarse-silty, mixed, calcareous, thermic.	Typic Udifluvents	Entisols	Alluvial soils.
Commerce	Fine-silty, mixed, nonacid, thermic	Aeric Fluventic Haplaquepts	Inceptisols	Alluvial soils.
Cooter	Clayey over sandy or sandy-skeletal montmorillonitic, thermic.	Aquic Fluventic Hapludolls	Mollisols	Alluvial soils.
Crevasse	Sandy, mixed, thermic	Typic Udipsamments	Entisols	Alluvial soils.
Dubbs	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Dundee	Fine-silty, mixed, thermic	Aeric Ochraqualfs	Alfisols	Gray-Brown Podzolic soils.
Hayti	Fine-silty, mixed, nonacid, thermic	Fluventic Haplaquepts	Inceptisols	Low-Humic Gley soils.
Portageville	Fine, montmorillonitic, calcareous, thermic.	Vertic Haplaquolls	Mollisols	Grumusol.
Reelfoot	Fine-silty, mixed, thermic	Aquic Argiudolls	Mollisols	Brunizem.
Sharkey	Very fine, montmorillonitic, nonacid, thermic.	Vertic Haplaquepts	Inceptisols	Grumusol.
Steele	Sandy over clayey, mixed, nonacid, thermic.	Aquic Udifluvents	Entisols	Regosol; intergrades to Alluvial.
Tiptonville	Fine-silty, mixed, thermic	Typic Argiudolls	Mollisols	Brunizem.
Wardell	Fine-loamy, mixed, thermic	Mollic Ochraqualfs	Alfisols	Low-Humic Gley soils.

General Nature of the County

This section gives general facts about Pemiscot County, including history and development, physiography and drainage, water supply, wildlife, climate, and agriculture.

History and Development

DeSoto and his party were the first Europeans to enter or come near the part of Missouri that is now Pemiscot County. They passed through the area in 1540. The first settlement in the county was at Little Prairie. Francois Le Sieur constructed a fort at this location in 1794, and by 1799 the population had grown to 78. Little Prairie continued to grow until 1811, when it was almost destroyed by an earthquake. This settlement later became known as Caruthersville. Four other settlements were established in the area by 1808.

Pemiscot County was created in 1851 from the southern part of New Madrid County. Pemiscot is said to be an Indian word meaning "liquid mud."

Early residents in the county used the Mississippi River to reach markets, and this continued to be the main source of transportation until the railroad was built in 1893–94. Today the county is served by U.S. Highway 61, by State highways, and by county roads. Interstate Highway 55 also serves the county. In nearly all parts of the county, blacktop roads extend to within 2 miles of most farms.

Many churches of several denominations are located throughout the county. Other facilities that serve the county residents are a rural water system, four weekly newspapers, a county hospital, and two libraries. Schoolbuses provide transportation to both elementary and high schools from all parts of the county.

Physiography and Drainage

Pemiscot County, part of the Mississippi River delta, has three main physiographic regions. These regions are the Mississippi River flood plain in the eastern part of the county, the Little River basin on the western side, and the old natural levees interspersed throughout the county. The levees are close to Portage Open Bay, Little River basin, Pascola, and Hayti. (See fig. 13, p. 35.)

The level to gently undulating Mississippi River flood plain includes remnants of old channels and lakes that resulted from frequent overflows. The flood plain consists of mixed alluvium.

The Little River basin consists of heavy textured alluvium deposited by slack water. Originally the Little River carried part of the drainage from Cape Girardeau, Bollinger, and Wayne Counties that flowed from the eastern Ozarks onto the northern extent of the lowland. As part of the early drainage program, Little River was diverted east to the Mississippi River just south of Cape Girardeau, but lack of a definite channel and the nearly level topography of the area resulted in the Little River dispersing its waters over the entire basin. In addition, floodwaters of the Mississippi backed into the area. The present Little River drainage system carries the runoff from the lowland part of the Little River watershed.

The old natural levees consist of weakly developed, acid, level to gently undulating soils formed in old alluvium. An escarpment along the eastern boundary of the old natural levees separates these levees from the recent Mississippi River flood plain.

Drainage is a major concern in managing soils of this county. Under natural conditions an estimated 10 percent of the county was permanently ponded (fig. 15).

A large part of the county was subject to overflow and was generally wet from 1 to 3 months of the year. Small, slow-moving, sluggish streams, such as Elk Chute and Little River, carried the runoff, but they meandered widely and overflowed their banks. Some areas had good surface drainage, but for the most part, surface water flowed away slowly until artificial drainage projects were started.

The first major artificial drainage efforts began in 1875 and were completed in 1899. These efforts consisted of

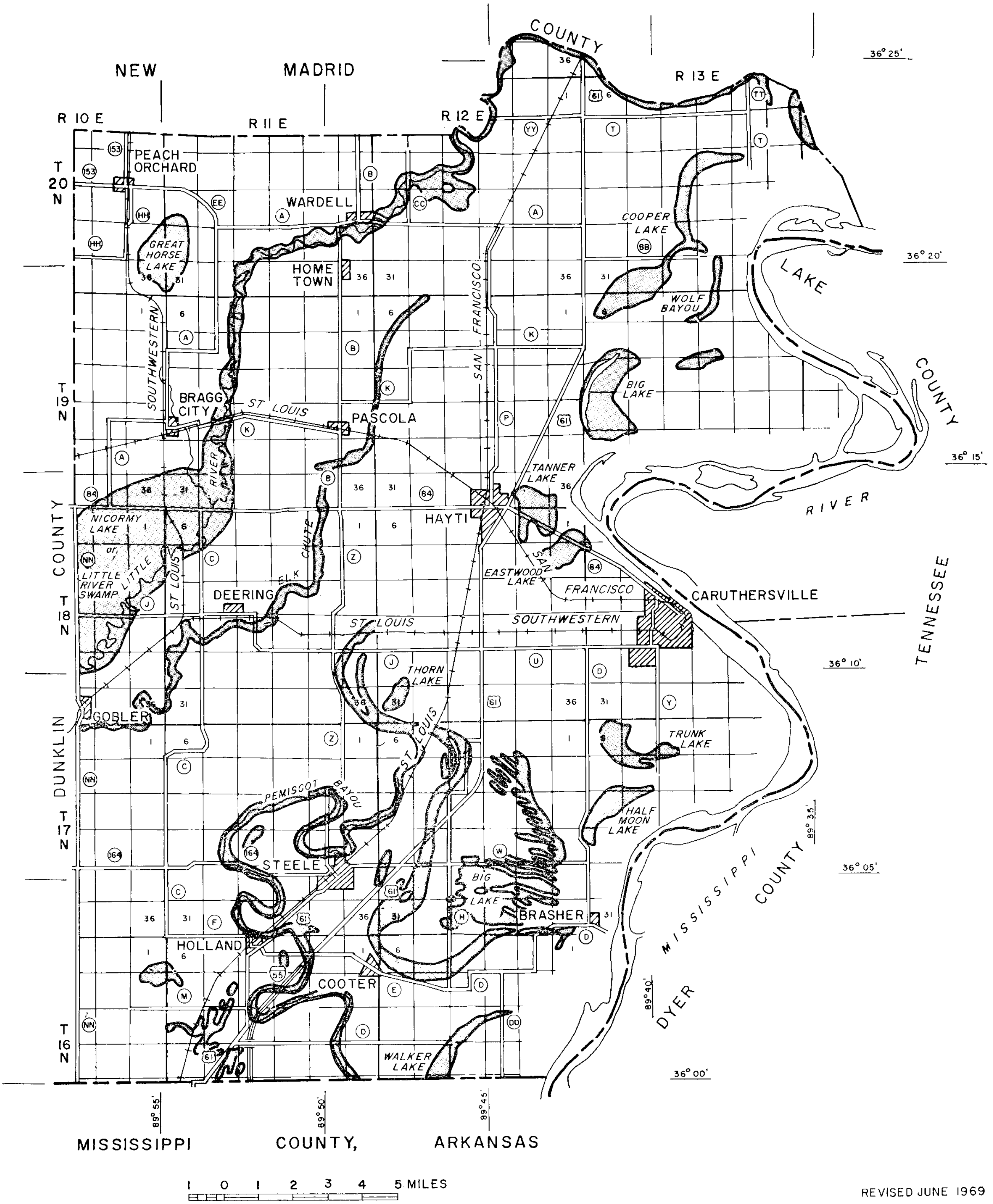

Figure 15.—Permanently ponded areas in Pemiscot County, Missouri, before artificial drainage was started.

dredging, straightening, and removing obstructions from the Little River and its tributaries.

The St. Francis Levee District, organized in 1893, constructed the St. Francis Levee along the Mississippi River from New Madrid to the State line. The results of the levee were good, but it became evident that it alone was not sufficient when early levee construction was washed away by floodwaters.

Water Supply

Pemiscot County has a bountiful supply of ground water, which is used almost to the exclusion of surface water. The three principal water-bearing strata are the surface deposit of alluvium, the Wilcox Group, and the McNairy (Ripley) Formation.

The alluvium is a surface formation 150 to more than 200 feet thick. Water from this alluvium is moderately hard but is satisfactory for irrigation. Unless treated, it contains too much iron for satisfactory domestic use. Yields from wells range from 600 to more than 4,000 gallons per minute.

The Wilcox Group underlies the alluvium and belongs to the Tertiary System. The quality of water is similar to that from the alluvium, but yields are generally less.

The McNairy (Ripley) Formation, a water-bearing strata of the Cretaceous System, is beneath the Wilcox Group. The water is generally low in iron, soft, and very desirable for use in municipal systems. Internal pressure causes water to flow, and under favorable conditions wells yield 200 to 500 gallons per minute.

Wildlife

Clearing of forests and improvement of drainage for intensive farming have reduced the wildlife population in Pemiscot County. The squirrel population was decimated by clearing of forests. Populations of quail and cottontail rabbits increased rapidly after the clearing of forest but declined as farming became more intensive. Drainage of bayous and lakes has reduced the number of migratory waterfowl and furbearing animals. The ditches built for drainage, however, have helped maintain a population of muskrat and mink.

Increased acreage in grain crops has brought about an increase in number of mourning doves, as grain lost during harvest provides a year-round source of food.

Fishing has declined since the original lakes and bayous were drained, but it is still a popular pastime. The large drainage ditches and the Mississippi River provide countless fishing holes. Some of the best fishing is in the borrow pits and bayous on the riverside of the levee, after the floods have subsided. Blocking or jugging is still practiced in the main stream.

Climate [4]

Data used in preparing this section are from records of the U.S. Weather Station in Caruthersville, for the period 1931–60. Observations from the Caruthersville station are considered representative of weather conditions in Pemiscot County. Averages and extremes of precipitation and temperature in the county are given in table 7. Additional facts about precipitation are given in tables 8 and 9. The probable dates of the last freezing temperature in spring and the first in fall are shown in table 10. Heating degree days are shown in table 11.

The average annual rainfall in this county is approximately 46 inches, but in the 30-year period of record, the

[4] By James D. McQuigg, State climatologist, U.S. Weather Bureau, Columbia, Mo.

Table 7.—*Precipitation*

Month	Precipitation										
	Average total	One year in 10 will have—		Extreme values in monthly precipitation		Greatest daily rainfall	Days with—			Snowfall	
		Less than—	More than—	Least	Most		0.10 inch or more	0.20 inch or more	1.00 inch or more	Monthly average	Most extreme value
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Number*	*Number*	*Number*	*Inches*	*Inches*
January	4.65	1.35	9.00	0.57	15.76	4.00	7.33	5.66	1.20	1.6	5.50
February	4.07	1.50	7.50	.61	9.54	3.50	6.96	5.33	1.06	1.7	5.00
March	5.04	2.00	9.35	.97	10.66	3.70	7.70	6.10	1.43	.7	7.00
April	4.01	2.00	6.60	.90	6.95	3.33	7.16	5.60	1.06	0	1.00
May	4.24	1.25	6.25	.35	13.93	3.75	6.46	4.96	1.23	0	0
June	3.36	.90	6.00	.09	9.21	2.75	6.03	4.56	.90	0	0
July	3.52	1.60	6.50	.56	7.53	3.76	5.26	4.06	1.16	0	0
August	3.04	.60	6.70	.44	9.35	4.45	5.13	3.66	.86	0	0
September	3.02	.80	5.50	.18	8.39	2.25	4.66	3.66	1.13	0	0
October	3.11	1.00	6.00	.78	8.21	3.25	4.63	3.63	1.00	0	0
November	3.87	1.30	7.25	.62	12.00	3.15	6.20	4.90	1.30	.2	3.0
December	4.03	2.00	6.50	1.80	9.32	4.00	6.73	5.16	1.13	.5	4.5
Year	45.96	32.00	58.00	----------	----------	4.45	----------	----------	----------	----------	----------

annual rainfall has ranged from 29 to 76 inches. The total snowfall in the county is generally no more than 1 inch for a whole winter season; however, a total of 10 inches or more can be expected about 1 year in 7.

There is generally less rain during the cropping season than during the fall. Probabilities of precipitation during the cropping season are given in detail in table 8.

Table 9 shows the probability of occurrence of intense, short-duration rainstorms in Pemiscot County.

The largest variation in temperature in Pemiscot County occurs during fall and winter, as shown in table 7 by the standard deviations from the daily mean.

Total amount of water that falls as rain or snow is only a partial indicator of amount of moisture available for plants. Water loss through runoff, evaporation, and transpiration through plants all need to be taken into account (fig. 16). Runoff in this county averages approximately 18.5 inches annually. Monthly runoff data shown in figure 9 are considered representative for Pemiscot County, though no measurements were made in the Little River Drainage District, which lies west and north of this county.

Combined loss through evaporation and transpiration, called *evapotranspiration*, is about 35.6 inches in this county, and most of it occurs between April and October.

As shown in figure 16, precipitation in Pemiscot County is generally heavy from January to April. During this period, runoff is comparatively high and evapotranspiration is at a minimum. During summer, however, temperatures rise and evapotranspiration increases. Then, when showers are light and widely spaced in time, there is a moisture deficit. At such times, supplemental irrigation would benefit crops on some soils.

The amount of moisture a soil holds available for crops is dependent on texture of the soil materials to the depth plant roots can reach, or a maximum of about 6 feet. The amount held ranges from as low as 3 inches in a loamy sand to as much as 15 inches in a loam, silt loam, or very fine sandy loam.

Agriculture and Industry

Timber originally covered almost all of Pemiscot County, but 40 percent of the area had been cleared by 1910, and 86 percent by 1963. In 1963, approximately 270,000 acres was in crops, mainly soybeans, cotton, corn, wheat, and alfalfa. The crops are grown almost entirely for the cash market.

Corn, the first staple crop grown in the county, reached a maximum of 46,000 acres in 1950. Soybean production started in 1940, but this crop has now grown to approximately 175,000 acres, and the acreage is still increasing. Cotton production began in 1870, reached a peak of 155,000 acres in 1949, and has since decreased to approximately 85,000 acres.

Number of livestock on farms has been decreasing for several years. The number of beef and dairy cattle has decreased from 14,000 in 1939 to about 5,000; hogs have decreased from 31,000 in 1939 to less than 5,000; and only a few horses and mules are left. The cattle graze principally on pasture produced on the levees (fig. 17).

The size of farms has been increasing, and the number, decreasing. In 1964, the average farm was 262 acres in size. Population trend corresponds with the trend in number of farms. Population reached a peak of 47,000 in 1940 and has been decreasing since.

Farming and commerce and industry related to farming continue to be the main enterprises in the county. Cotton gins, compresses, grain elevators, an alfalfa mill, a packing plant, and numerous related businesses operate in the county. Industrial enterprises not closely related to farm-

and temperature data

Temperature														
Average daily			Standard deviation of daily mean	Average daily maximum			Average daily minimum			Two years in 10 will have at least 4 days with—		Extreme values	
Maximum	Minimum	Mean		32° F. or more	50° F. or more	90° F. or more	0° F. or less	32° F. or less	50° F. or less	Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—	Maximum	Minimum
°F.	*°F.*	*°F.*	*°F.*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*°F.*	*°F.*	*°F.*	*°F.*
48.6	30.3	39.4	10.4	2.5	14.3	0	0.3	17.6	28.7	68	12	76	−8
52.0	32.5	42.2	9.8	1.2	16.9	0	.1	14.0	27.2	69	18	78	−8
60.3	39.0	49.6	9.5	.5	24.3	0	0	9.1	26.4	77	24	85	5
71.5	49.4	60.5	8.6	0	29.6	.1	0	.9	16.7	84	36	91	26
80.3	58.7	69.5	7.0	0	30.9	2.5	0	0	5.5	91	47	98	34
88.4	67.5	78.0	5.5	0	30.0	12.9	0	0	.1	98	58	108	50
91.1	70.7	80.9	4.5	0	31.0	19.4	0	0	0	99	64	106	54
90.2	69.8	80.0	4.8	0	31.0	18.1	0	0	0	99	61	108	53
84.0	62.3	73.2	7.0	0	30.0	8.1	0	0	1.9	95	49	103	37
74.2	50.9	62.5	8.3	0	30.7	.9	0	.5	15.0	86	38	94	28
60.1	39.1	49.6	9.8	.1	24.6	0	0	7.9	24.7	76	24	87	5
50.5	32.5	41.5	10.1	1.4	16.2	0	0	16.2	29.3	67	18	76	5
70.9	50.2	60.5	----	----	----	----	----	----	----	99	12	108	−8

Table 8.—*Probability of receiving at least the specified amounts of precipitation during the 2-week periods indicated*

Weeks	Amounts of precipitation (inches)			
	0.40	1.00	2.00	4.00
	Percent	*Percent*	*Percent*	*Percent*
March 1 to March 15	90	69	38	9
March 16 to March 29	92	75	45	12
March 30 to April 12	86	64	37	12
April 13 to April 26	94	76	48	15
April 27 to May 10	90	73	47	17
May 11 to May 24	78	57	33	11
May 25 to June 7	80	61	39	16
June 8 to June 21	85	64	36	10
June 22 to July 5	68	43	20	4
July 6 to July 19	79	52	24	5
July 20 to August 2	78	57	34	12
August 3 to August 16	75	55	31	10
August 17 to August 30	80	57	31	8
August 31 to September 13	74	55	33	12
September 14 to September 27	77	57	30	7
September 28 to October 11	74	53	29	8
October 12 to October 25	85	67	41	13
October 26 to November 8	86	62	31	7

Table 9.—*Recurrent precipitation intensity in Pemiscot County, Missouri (10)*

Period	One year in 2	One year in 10	One year in 100
	Inches	*Inches*	*Inches*
30 minutes	1.30	1.85	2.60
60 minutes	1.60	2.30	3.20
24 hours	3.75	5.30	7.30

ing include a shoe factory, a stainless steel products plant, garment factories, a box company, a sand and gravel company, a veneer company, and a recently established shipbuilding industry.

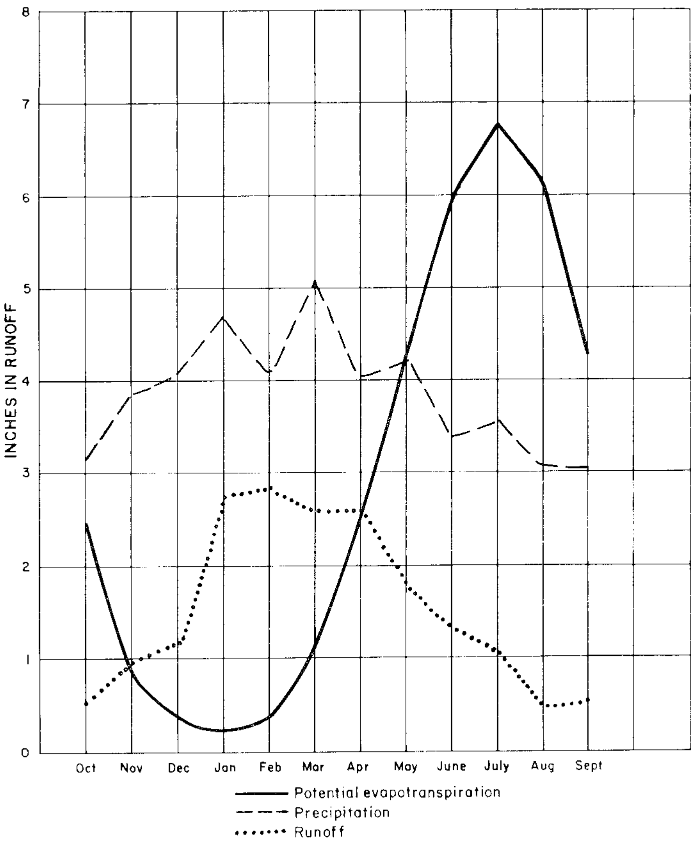

Figure 16.—**Average precipitation, runoff, and potential evapotranspiration in Pemiscot County, Missouri.**

Table 10.—*Probabilities of last freezing temperatures in spring and first in fall*

[Absence of an entry indicates that there will be no temperature this cold]

Probability	Dates for given probability and temperature				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
1 year in 10 later than		March 22	March 23	March 31	April 12
2 years in 10 later than	March 11	March 12	March 15	March 25	April 6
5 years in 10 later than	February 15	February 20	February 29	March 14	March 26
Fall:					
1 year in 10 earlier than			November 13	October 30	October 25
2 years in 10 earlier than			November 20	November 7	October 31
5 years in 10 earlier than		December 11	December 3	November 11	November 10

TABLE 11.—*Heating degree-days*[1] *at Caruthersville, Missouri*

Month	Average heating degree-days	One year in 10, heating degree-days are—	
		More than—	Less than—
July	0		
August	0		
September	15		
October	144	225	63
November	468	590	346
December	729	889	569
January	794	986	602
February	643	812	474
March	482	662	302
April	184	274	94
May	39	79	1
June	2		
Season	3,500		

[1] Degree days based on 65 degrees Fahrenheit. Heating degree-days for a day are determined by subtracting the average temperature for the day from 65. If the mean temperature for a given day is greater than 65 degrees, the heating degree-day value for that day is zero. These daily values are totaled to obtain the number of degree days in a month. For example, to determine the average degree days for January in an 8-hour period, determine the total of degree days for each January in that period and divide by 8.

Figure 17.—**Cattle grazing on the St. Francis Levee. Most of the 1,321 acres of levee in the county is used for pasture.**

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available moisture capacity. The capacity of a soil to hold water in a form available to 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.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Drainage, surface. Runoff, or surface flow, of water from an area.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

Loam. The textural class name for soil having a moderate amount of sand, silt, and clay. Loam soils contain 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common*, and *many;* size—*fine*, *medium*, and *coarse;* and 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*, ranging from 5 millimeters 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.

Nutrient, plant. Any element taken in by a plant, essential to its growth and used by it in the production of food and tissue. Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil and carbon, hydrogen, and oxygen obtained largely from the air and water, are plant nutrients.

Old natural levee. Loam sediments that formed a low ridge alongside the river long ago.

Parent material. The disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow*, *slow*, *moderately slow*, *moderate*, *moderately rapid*, *rapid*, and *very rapid*.

Phase, soil. A subdivision of a soil, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil type, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

pH value. A numerical means for designating relatively weak acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value alkalinity; and a lower value, acidity.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Productivity, soil. The present capability of a soil for producing a specified plant or sequence of plants under a specified system of management. It is measured in terms of output, or harvest, in relation to input of production for the specified kind of soil under a specified system of management.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of aidity or alkalinity are expressed thus:

	pH		pH
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Recent natural levee. Recently deposited loamy sediments that form a low ridge alongside the river.

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sandy loam. Soil texture that generally has more than 52 percent sand, 20 percent or less clay, and the percentage of silt plus the percentage of clay exceeds 30; or less than 7 percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Silt loam. Soil material that contains 50 percent or more silt and 12 to 27 percent clay; or soil material that contains 50 to 80 percent silt and less than 12 percent clay.

Silty clay. Soil of this textural class contains 40 percent or more clay and 40 percent or more silt.

Silty clay loam. Soil of this textural class contains 27 to 40 percent clay and less than 20 percent sand.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned, by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stratified. Composed of, or arranged in, strata, or layers, such as stratified alluvium. Layers in soils that result from the processes of soil formation are called horizons. Those inherited from the parent material are called strata.

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 together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically the part of the soil below the solum.

Surface runoff. External soil drainage or the relative rate water is removed by flow over the surface of the soil.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the 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.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Type, soil. A subdivision of the soil series that is made on the basis of differences in the texture of the surface layer.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. In referring to a capability unit, read the introduction to the section it is in for general information about its management. Other information is given in tables as follows:

Acreage and extent, table 1, p. 4.
Predicted yields, table 2, p. 23.
Engineering uses of soils, tables 3, 4, and 5, pp. 26 through 33.

Map symbol	Mapping unit	Described on page	Capability unit Symbol	Capability unit Page
Bp	Borrow pits	4	------	---
Ca	Caruthersville very fine sandy loam	5	I-1	21
Ch	Caruthersville very fine sandy loam, sandy substratum variant	5	IIs-1	22
Cm	Commerce sandy loam	6	IIw-1	21
Cr	Commerce silt loam	6	IIw-1	21
Cs	Commerce silty clay loam	6	IIIw-1a	22
Ct	Cooter and Crevasse silty clay loams	7	IIw-1	21
Cu	Crevasse loamy sand	8	IIIs-4	22
Cv	Crevasse loamy sand, acid variant	8	IIIs-4	22
Cw	Crevasse silt loam	8	IIIs-4	22
Db	Dubbs silt loam	9	I-1	21
Dd	Dundee sandy loam	10	IIw-1	21
De	Dundee silt loam	10	IIw-1	21
Dn	Dundee silt loam, thick surface variant	10	IIw-1	21
Du	Dundee silty clay loam	11	IIIw-1a	22
Ha	Hayti sandy loam, overwash	12	IIIw-1b	22
Hc	Hayti silty clay	12	IIIw-14	22
Hy	Hayti silty clay loam	12	IIIw-1a	22
Po	Portageville clay	13	IIIw-14	22
Pr	Portageville silty clay loam	13	IIIw-14	22
Re	Reelfoot loam	14	IIw-1	21
Rf	Reelfoot sandy loam, overwash	14	IIw-1	21
Sa	Sandy alluvial land	14	------	---
Sh	Sharkey clay	15	IIIw-14	22
Sk	Sharkey sandy loam, overwash	15	IIIw-3	22
Sm	Sharkey silty clay loam	16	IIIw-14	22
Sr	Sharkey-Crevasse complex	16	IIIw-3	22
St	Steele sandy loam	17	IIIs-4	22
Tp	Tiptonville silt loam	18	I-1	21
Wa	Wardell loam	18	IIIw-1b	22
Wd	Wardell sandy clay loam	18	IIIw-1a	22

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