SOIL SURVEY OF

Greene County, Illinois

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

Issued December 1974

Major fieldwork for this soil survey was done in the period 1964 to 1967. Soil names and descriptions were approved in 1968. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1968. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Greene County Soil and Water Conservation District.

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

Illinois Agricultural Experiment Station Soil Report No. 93

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

All the soils of Greene 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 a number on the Index to Map Sheets.

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

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all of the soils of the county in numerical order by map symbol. It shows the page where each kind of soil is described and also the page for each management group. It also shows the woodland suitability group, wildlife group, and recreation group in which each 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 from the soil descriptions and from the discussions of the management and woodland groups.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can refer to the section "Wildlife," where the soils are grouped according to their suitability for wildlife.

Recreation specialists can find pertinent information in the section "Recreational Uses of the Soils."

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

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

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

Cover: **Typical area of Limestone rock land and Cherty land. Hamburg soils are on the steep grass-covered slopes above the rock outcrop.**

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SOIL SURVEY OF GREENE COUNTY, ILLINOIS

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FIELDWORK BY C. E. DOWNEY, D. R. GRANTHAM, D. B. PHILLIPS, AND D. L. WALLACE, SOIL CONSERVATION SERVICE

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

GREENE COUNTY, in the southwestern part of Illinois (fig. 1), has an area of 347,520 acres, or 543 square miles. The Illinois River forms the western boundary of the county. In 1960 the population of the county was 17,460. Carrollton, the county seat, has a population of 2,558.

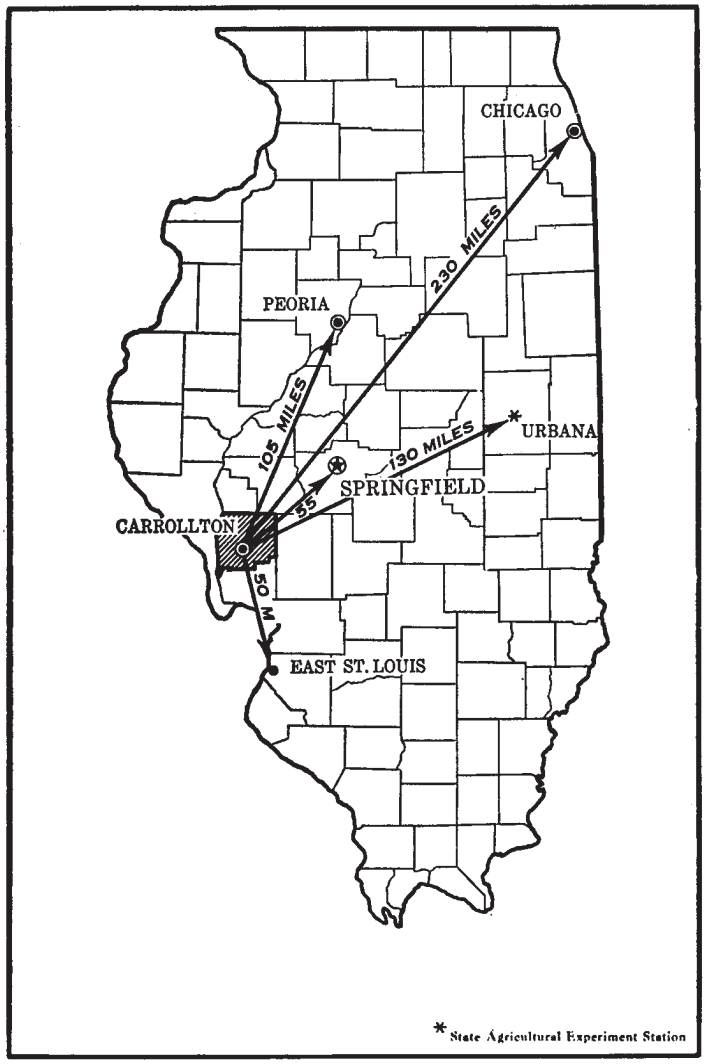

Figure 1.—Location of Greene County in Illinois.

Level to gently sloping silt loams make up most of the county, but strongly sloping to steep silt loams and loams occupy a significant acreage. Most of the soils are on uplands, which are mainly loess underlain by a glacial till plain. All of the major streams drain generally westward into the Illinois River. Water is obtained by drilling into the alluvium on bottom lands and into the creviced limestone on uplands. Much of it is stored in ponds and lakes for use by livestock and communities.

Farming is the main enterprise in Greene County. Corn, soybeans, and wheat are the main crops, but grasses and legumes are also grown. Slightly more than half the farms in the county have livestock. In 1967 about 16 percent of the acreage was in woodland. Several small industries are operated in the county, but more people are in businesses related to farming.

General Nature of the County

This section gives general information about Greene County. The relief and climate are described, and some general facts are given about settlement, farming, industry, and transportation.

Relief, Physiography, and Drainage

Greene County has relatively low relief. Elevation ranges from about 420 feet above sea level on the bottom land of the Illinois River near East Hardin, in the southwestern part of the county, to about 700 feet on uplands in the northeastern part of the county. Nearly level areas in the eastern part of the county are about 600 feet above sea level. Witachek Mound in the southwestern part of the county has an elevation of 720 feet.

Most soils in the county are on uplands. The uplands consist mainly of a glacial till plain covered by loess. The loess varies in thickness, but it is thicker in the western part of the county than it is in the eastern part. The glacial material below the loess averages about 50 feet in thickness. The major bottom-land areas are along Apple and Macoupin Creeks and the Illinois River.

Outwash materials in the valley of the Illinois River are as much as 150 feet thick.

All major streams in the county drain generally to the west and into the Illinois River. The northern part of the county is drained mainly by Apple and Hurricane Creeks, and the southern part is drained by Macoupin Creek.

The principal sources of water are from wells drilled into alluvium on bottom lands and into creviced limestone underlying the uplands. Wells on the uplands range from 150 to 200 feet in depth. In many areas water that is stored in ponds and lakes is used by livestock and to supply community needs.

Climate [1]

Greene County has the continental climate typical of central Illinois. The range in annual temperature is wide and averages about 108° F.—from near 100° in most summers to between −5° and −10° in most winters. Storm centers and associated weather fronts cause frequent changes in temperature, humidity, cloudiness, and wind direction during much of the year. Such changes are least frequent in summer.

Much climatic information is in tables 1, 2, and 3. Table 1 lists temperature and precipitation data. Table 2 gives specific dates for the last freezing temperature in spring and the first in fall for several named freezing temperatures. Table 3 lists the chances of receiving a specified amount of precipitation during a specified period.

As shown in table 1, summers are warm, but continuous warm periods are seldom long. Temperatures reach 100° or higher during about half the summers. Temperatures of 90° or higher occur on about half the days during an average July or August and on about 50 days in an average year.

January normally is the coldest month. February often has days as cold as January, but cold periods in February are generally shorter. The record low temperature of −26° occurred on January 7, 1912. About 90 percent of the winters have temperatures below zero. An average of 115 to 120 days annually have temperatures of 32° or lower.

The number of days between the average date of the last freezing temperature of 32° or below in spring and the first freezing temperature in fall is termed the "growing season." The growing season is approximately 180 days in Greene County, but this term is misleading because the growth of the different crops is affected by different temperatures. Table 2 indicates the probability of occurrence of several different threshold temperatures (*5*) [2]. The temperatures commonly vary considerably between positions on ridges and valleys during radiation freezes, the type of freeze most common in Illinois.

All data on freezing temperatures are based on temperatures in standard thermometer shelter of the National Weather Service, U.S. Department of Commerce, at a height of approximately 5 feet above the ground and in a representative exposure. Lower temperatures than those shown on the thermometer will exist at times nearer the ground and in local areas subject to extreme air drainage.

[1] By WILLIAM L. DENMARK, climatologist for Illinois, Environmental Science Services Administration, National Weather Service, U.S. Department of Commerce.

[2] Italicized numbers in parentheses refer to Literature Cited, p. 82.

TABLE 1.—*Temperature and precipitation*

Month	Temperature				Precipitation			
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average monthly total	One year in 10 will have—		Days with snow cover of 1 inch or more
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—	
	°F.	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Number*
January	40	21	57	−4	1.7	0.4	2.0	9
February	44	24	59	2	1.6	.5	2.2	5
March	53	31	71	16	2.7	.7	4.1	3
April	66	43	83	30	3.4	2.1	4.6	0
May	76	53	89	40	4.1	2.6	6.0	0
June	86	62	93	52	4.4	2.0	6.8	0
July	90	66	93	55	3.2	2.0	7.2	0
August	88	65	93	54	3.1	1.9	6.9	0
September	82	56	91	43	2.8	1.5	6.3	0
October	71	46	85	30	3.0	.6	4.2	0
November	54	33	74	16	2.5	1.4	3.1	[1]
December	43	25	62	0	1.8	.6	2.5	6
Year	66	44	[2] 101	[3] −6	34.3	26.1	43.3	23

[1] Less than 0.5 day.

[2] Average annual maximum.

[3] Average annual minimum.

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

Probability	Dates for given probability and temperature				
	32° F. or lower	28° F. or lower	24° F. or lower	20° F. or lower	16° F. or lower
Spring:					
Average date	April 20	April 4	March 25	March 12	March 4
25 percent chance after	April 29	April 13	April 3	March 21	March 13
10 percent chance after	May 7	April 21	April 11	March 29	March 21
Fall:					
Average date	October 18	October 29	November 11	November 20	December 1
25 percent chance before	October 9	October 20	November 2	November 11	November 22
10 percent chance before	October 2	October 13	October 26	November 4	November 15

TABLE 3.—*Chances of receiving a specified amount of precipitation during a specified period* [1]

Dates	During a 1-week period				During a 2-week period		
	Trace or less	0.40 inch or more	1 inch or more	2 inches or more	Trace or less	1 inch or more	2 inches or more
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
March 1–7	9	42	14	3	2	51	20
March 8–14	6	56	28	9			
March 15–21	11	59	25	5	0	60	25
March 22–28	8	59	28	8			
March 29–April 4	8	53	27	9	2	65	32
April 5–11	2	66	35	12			
April 12–18	6	55	25	7	0	59	28
April 19–25	9	64	32	9			
April 26–May 2	9	64	31	8	0	64	29
May 3–9	8	54	27	9			
May 10–16	8	58	32	12	0	64	35
May 17–23	11	59	34	14			
May 24–30	4	61	33	13	0	66	37
May 31–June 6	7	61	35	13			
June 7–13	9	66	38	14	2	64	34
June 14–20	19	51	27	14			
June 21–27	4	63	37	10	0	64	35
June 28–July 4	15	54	29	16			
July 5–11	19	52	30	10	2	55	27
July 12–18	17	47	24	12			
July 19–25	22	45	22	8	4	43	19
July 26–August 1	20	39	19	7			
August 2–8	17	52	27	7	4	54	28
August 9–15	11	55	29	10			
August 16–22	13	51	26	10	4	48	20
August 23–29	19	43	17	4			
August 30–September 5	19	46	26	10	4	51	27
September 6–12	13	57	29	9			
September 13–19	24	49	24	7	2	50	23
September 20–26	11	52	26	9			
September 27–October 3	24	50	31	14	8	56	30
October 4–10	17	49	25	9			
October 11–17	22	44	17	4	9	40	16
October 18–24	30	40	19	6			
October 25–31	16	43	18	4	6	43	18
November 1–7	22	45	22	7			
November 8–14	20	43	19	5	6	38	15
November 15–21	20	39	16	4			

[1] These probabilities should be used primarily to show the seasonal pattern in expected amounts of rainfall rather than to select, for a special operation, a chance occurrence based on a probability that contrasts with those of the immediately adjacent weeks. As a very rough approximation, the values in the above table are correct to within ±5 to 20 percent and have an expectancy of 95 percent.

The average annual precipitation is about 34 inches, but it has ranged from a low near 21 inches to a high near 49 inches. The average monthly precipitation is about 4 inches in May and June. The average is only about 1¾ inches for the normally driest months of December through February. During recent years there has been an annual average of about 60 days that have one-tenth inch or more precipitation, and about 20 days that have one-half inch or more. Table 3 shows the probability of selected amounts of precipitation during selected one- or two-week periods (*2*).

Because normal rainfall in July and August is not sufficient to meet the needs of vigorously growing field crops, moisture must be stored in the subsoil during the previous fall and winter. Severe droughts are infrequent, but fairly long dry periods during a part of the growing season are not unusual. During these periods crop growth generally is reduced.

Most summer showers or thunderstorms are brief. A single thunderstorm commonly produces more than 1 inch of rain, and the rain occasionally is accompanied by hail and damaging winds. Nearly 5 inches of rain has fallen in a 24-hour period, and nearly 16 inches in a month. Some months in fall and in winter have had less than one-fourth inch of precipitation.

Field crops are most likely to be damaged by hail in June, July, and August. An average of about three hail-producing thunderstorms per year occur in the same location, and less than one during the critical growing period (*4*). Not all hailstorms have stones of enough size or quantity to produce extensive crop damage.

Settlement, Industry, and Farming

Greene County was established in 1821 and at that time included Jersey County. The present boundaries of Greene County were set in 1839. The county has an area of 543 square miles, or about 347,520 acres. After settlement, the population increased until 1870, when it was about 23,000. Since then, the population has declined; and in 1970 it was about 16,700.

The county has a well-developed transportation system. State Highway No. 267 and U.S. Highway No. 67 cross the county from north to south, and State Highway No. 108 crosses from east to west. Main secondary roads are either blacktop or gravel, and every farm is accessible by an all-weather road. Facilities for loading grain on barges are available along the Illinois River, at Hardin near the southwestern part of the county, and at Florence a few miles up the river in Pike County. Railroads also serve the county.

Several small industries are in Greene County, but the greatest number of people are employed in businesses that serve farming. Clay and biological products are manufactured at White Hall. A number of limestone quarries, mainly in the western part of the county, provide crushed rock for roads and more finely ground material for application on fields. Hybrid seed corn is produced in many parts of the county, but production is greater in the valley of the Illinois River near the processing plants (fig. 2).

Farming has been the main enterprise in Greene County since settlement. In 1970 there were 1,051 farms, and the average size was 287 acres. A little more than half of the farms have livestock, and much of the grain produced is fed to livestock.

Corn, soybeans, and wheat are the main crops. In 1970 corn was grown on 86,192 acres, soybeans on 58,929 acres, and wheat on 15,707 acres. About 76,000 acres were used for pasture in 1970.

The number of cattle was 48,100 in 1970. Of these, 1,000 were dairy cattle. In the same year, there were 132,300 swine and 1,600 sheep.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Greene County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they worked throughout the county, they observed steepness, length, and shape of slopes; size and speed of streams; the kinds of native plants or crops; the kinds of rock; 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 to material that has not been changed much by leaching or by the action of roots or plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and *soil phase* are the categories of soil classification most used in a local survey (*13*).

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Titus and McFain, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Fayette silt loam, 4 to 7 percent slopes, eroded, is one of the several phases within the Fayette series.

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

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly

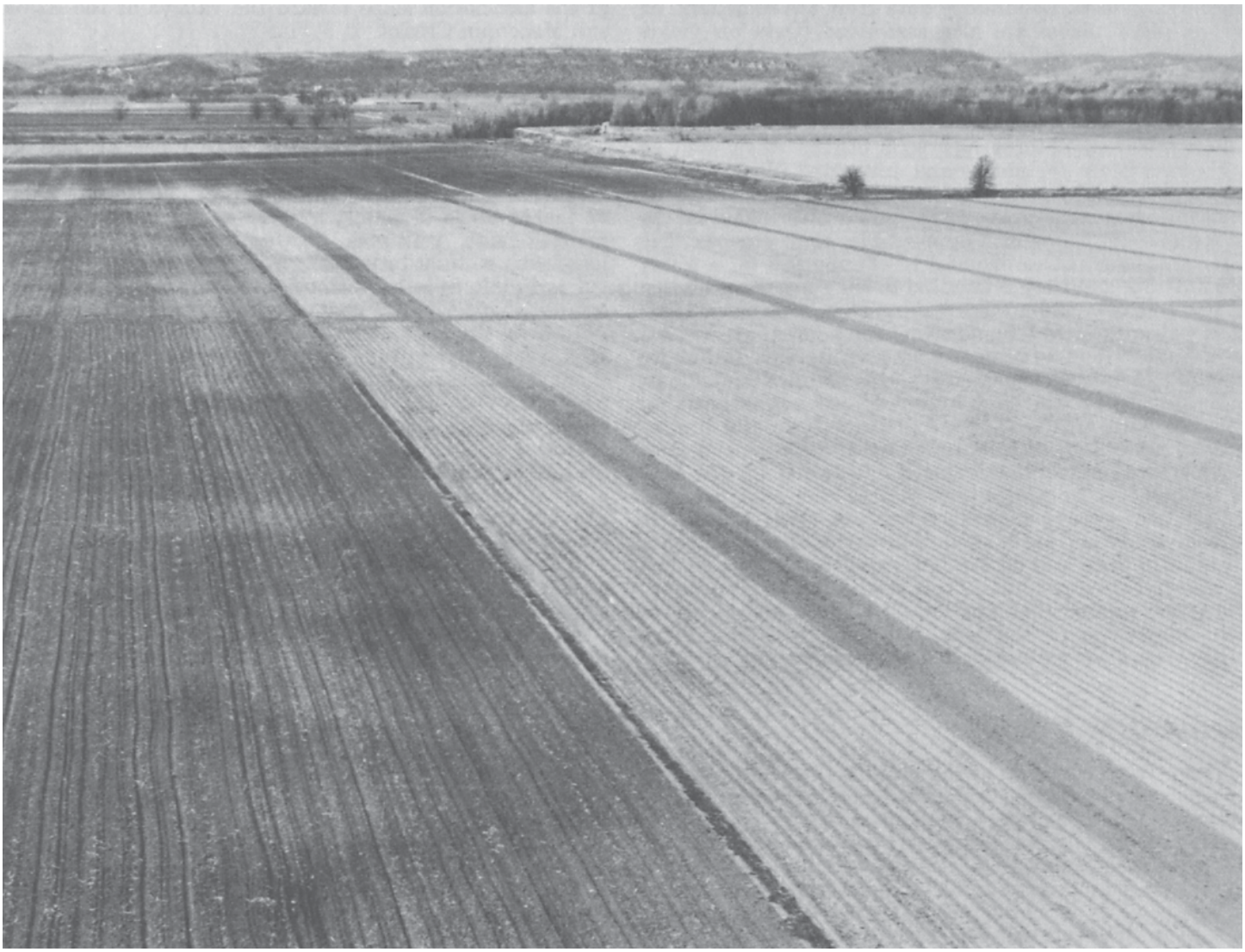

Figure 2.—Area in the Illinois River Valley used for hybrid seed corn. Worthen and Littleton soils in foreground and darker colored, finer textured Titus soils in background.

equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

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

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Sylvan-Bold silt loams, 18 to 30 percent slopes, is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Hickory and Hennepin loams, 18 to 30 percent slopes, is an undifferentiated soil group in this county.

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

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for

engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

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

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

General Soil Map

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

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

The soil associations in Greene County are discussed in the following pages.

1. Muscatine-Clarksdale-Downs Association

Nearly level to strongly sloping, somewhat poorly drained and well-drained soils that formed in loess; on uplands

This association consists of nearly level to rolling soils on broad interstream divides on uplands that range from 560 to 660 feet above sea level. The more sloping areas of the association slope toward the valleys of the Apple and Macoupin Creeks.

This association makes up about 28 percent of the county. About 38 percent of it is Muscatine soils, 20 percent is Clarksdale soils, 15 percent is Downs soils, and the remaining 27 percent is minor soils (fig. 3).

Muscatine soils have slopes of 0 to 4 percent and are somewhat poorly drained. Their surface layer is mainly black silt loam about 18 inches thick. The subsoil, about 32 inches thick, is mainly grayish-brown silty clay loam mottled with yellowish brown. Below the subsoil is light-gray to light brownish-gray silt loam.

Clarksdale soils have slopes of 0 to 4 percent and are somewhat poorly drained. Their surface layer is very dark gray silt loam about 9 inches thick, and the subsurface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil, about 31 inches thick, is mainly grayish-brown silty clay loam mottled with yellowish brown. Below the subsoil is light brownish-gray silt loam.

Downs soils have slopes of 2 to 12 percent and are well drained. These soils are on knolls, ridges, and side slopes along drainageways. The surface layer is very dark grayish-brown silt loam about 8 inches thick, and the subsurface layer is dark grayish-brown silt loam about 3 inches thick. The subsoil is mainly dark yellowish-brown silty clay loam about 37 inches thick. Below the subsoil is light brownish-gray and brown silt loam.

Minor soils in this association are the poorly drained Sable and Virden soils in low areas and the well-drained Tama soils on knolls, ridges, and side slopes of drainageways.

Permeability is moderate to moderately slow in the soils in this association. Available water capacity is high to very high.

Nearly all of this association is used for cultivated crops. Corn is the main crop; but soybeans, wheat, clover, and alfalfa also are grown. Raising and feeding hogs is the main livestock enterprise. These soils are highly productive if properly managed. The main concerns of management are providing artificial drainage on nearly level soils, controlling erosion on sloping soils, and maintaining soil fertility and tilth.

2. Fayette-Sylvan-Bold Association

Gently sloping to very steep, well-drained soils that formed in loess; on uplands

This association consists of gently undulating to rolling soils on interstream divides and of gently undulating to very steep soils on side slopes in stream valleys. The steeper areas in this association are adjacent and parallel to the bluff along the Illinois River.

This association makes up about 20 percent of the county. About 75 percent of it is Fayette soils, 13 percent is intricately intermingled Sylvan and Bold soils, and the remaining 12 percent is minor soils (fig. 4).

Fayette soils have slopes of 2 or more than 30 percent and are well drained. Their surface layer is dark grayish-brown silt loam about 8 inches thick, and their subsurface layer is grayish-brown silt loam about 4 inches thick. The subsoil, about 48 inches thick, is mainly dark-brown silty clay loam. Yellowish-brown silt loam is in the lower few inches.

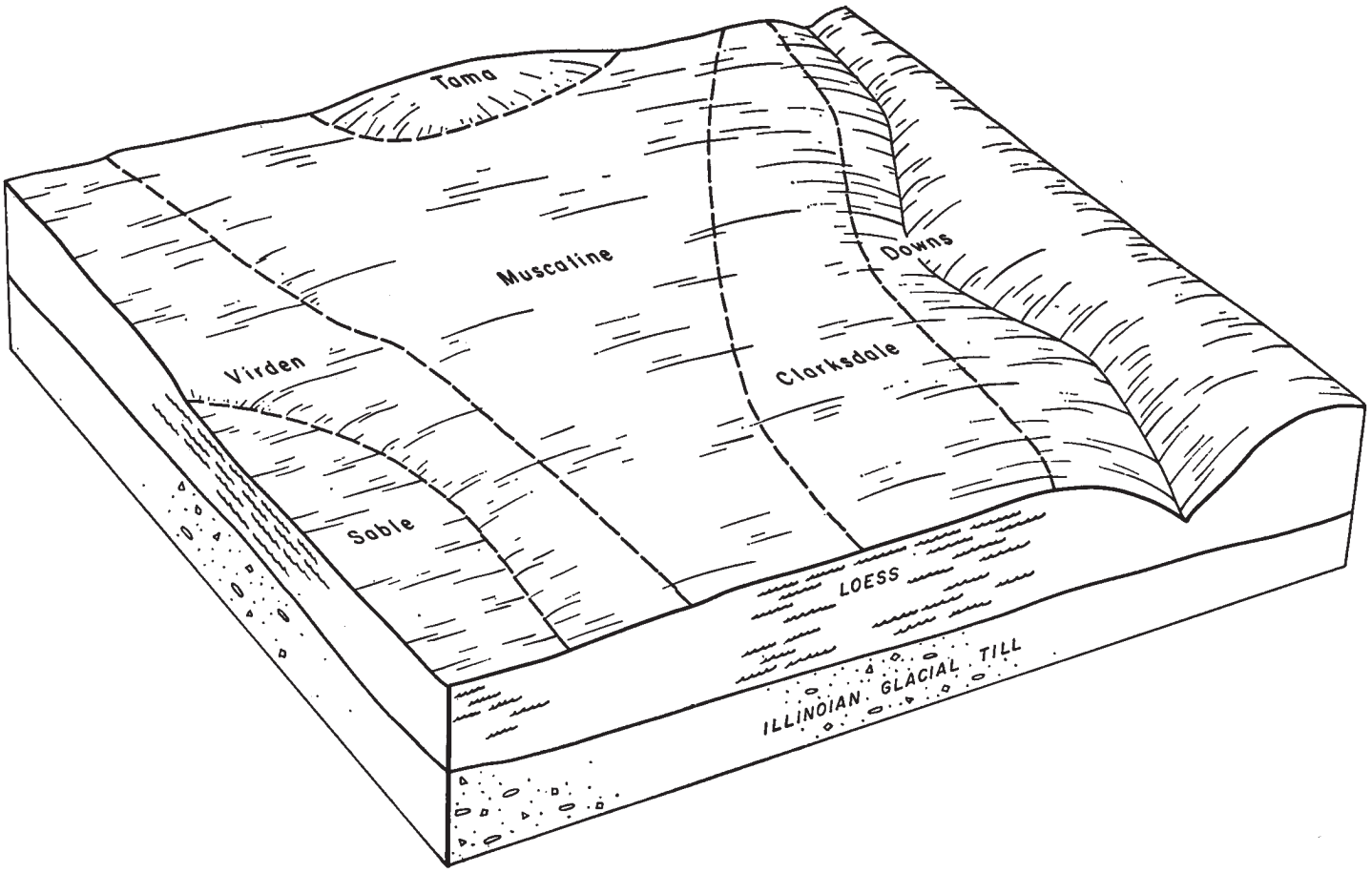

Figure 3.—**Relationship of soils to relief and underlying material in the Muscatine-Clarksdale-Downs association.**

Sylvan soils have slopes of 12 to more than 30 percent and are well drained. These soils are on side slopes along drainageways. Their surface layer is dark-brown silt loam about 8 inches thick. The subsoil, about 26 inches thick, is brown silty clay loam mottled with dark brown and yellowish-brown silt loam mottled with light yellowish brown. Below the subsoil is pale-brown silt loam mottled with dark yellowish brown.

Bold soils have slopes of 12 to more than 30 percent and are well drained. These soils are on the sides of drainageways. Their surface layer is gray silt loam about 8 inches thick. Below the surface layer is light-gray silt loam mottled with yellowish brown.

Minor soils in this association are the moderately well drained and well drained Hickory soils and the well drained to somewhat excessively drained Bloomfield and Hamburg soils. Areas of Limestone rock land and Cherty land also are of minor extent in the association.

Permeability is moderate in the soils in this association. Available water capacity is high.

Nearly two-thirds of this association is cultivated. The remaining one-third is in pasture or woods. Raising and feeding hogs and cattle are the main livestock enterprises. The main concerns of management are controlling erosion on the sloping areas and maintaining soil fertility and tilth.

3. Clinton-Hickory-Hennepin-Keomah Association

Nearly level to very steep, somewhat poorly drained to well drained soils that formed in loess or glacial till; on uplands

This association consists of nearly level to rolling soils on interstream divides and of gently undulating to very steep soils on the sides of drainageways. The more sloping soils of the association are along the Apple and Macoupin Creeks and their tributaries.

This association makes up about 29 percent of the county. About 37 percent of it is Clinton soils, 22 percent is Hickory and Hennepin soils in undifferentiated groups, 18 percent is Keomah soils, and the remaining 23 percent is minor soils (fig. 5).

Clinton soils have slopes of 2 to 12 percent and are moderately well drained. Their surface layer is dark grayish-brown silt loam about 7 inches thick, and the subsurface layer is brown silt loam about 5 inches thick. The subsoil, about 34 inches thick, is mainly brown silty clay loam mottled with strong brown and grayish brown. Below the subsoil is light-gray silt loam mottled with yellowish brown.

Hickory soils have slopes of 18 to more than 30 percent, in an area with Hennepin soils, and are moderately well

Figure 4.—Typical landscape in association 2. Fayette soils are in foreground and the Sylvan and Bold soils are in background.

drained and well drained. Their surface layer is dark grayish-brown loam about 8 inches thick, and the subsurface layer is dark yellowish-brown loam about 5 inches thick. The subsoil, about 37 inches thick, is dark-brown clay loam in the upper part and dark-brown and yellowish-brown clay loam mottled with strong brown and yellowish brown in the lower part. Below the subsoil is grayish-brown sandy loam mottled with brown.

Hennepin soils have slopes of 18 to 30 percent and are well drained. Their surface layer is dark grayish-brown loam about 2 inches thick. The subsoil, about 10 inches thick, is brown light clay loam mottled with dark yellowish brown. Below the subsoil is brown loam to sandy loam mottled with grayish brown.

Keomah soils have slopes of 0 to 4 percent and are somewhat poorly drained. Their surface layer is dark grayish-brown silt loam about 6 inches thick, and the subsurface layer is gray silt loam about 5 inches thick. The subsoil, about 39 inches thick, is mainly dark-brown and grayish-brown silty clay loam mottled with brown, yellowish brown, and light brownish gray. Below the subsoil is gray silt loam mottled with yellowish brown.

Minor soils in this association are the moderately well drained and well drained Hickory soils that have slopes of less than 18 percent, the well-drained Fayette soils, and the poorly drained to very poorly drained Rushville soils on uplands, the somewhat poorly drained Lawson and Wakeland soils, and the well-drained Haymond soils in many small stream valleys. Areas of Shale rock land are also a minor part of this association.

Permeability is moderate and moderately slow in the soils in this association. Available water capacity is moderate to very high.

About one-half of this association is used for cultivated crops and the remaining one-half is in pasture or woods. Raising and feeding cattle and hogs are the main livestock enterprises. The main concerns of management are controlling erosion in sloping areas, providing artificial drainage in nearly level areas, and maintaining soil fertility and tilth.

4. Titus-Petrolia-La Hogue Association

Nearly level to gently sloping, poorly drained and somewhat poorly drained soils that formed in water-deposited sediment; on flood plains

This association consists of nearly level to gently undulating soils on flood plains and terraces in the valley of the Illinois River that range from about 418 to 430 feet above sea level.

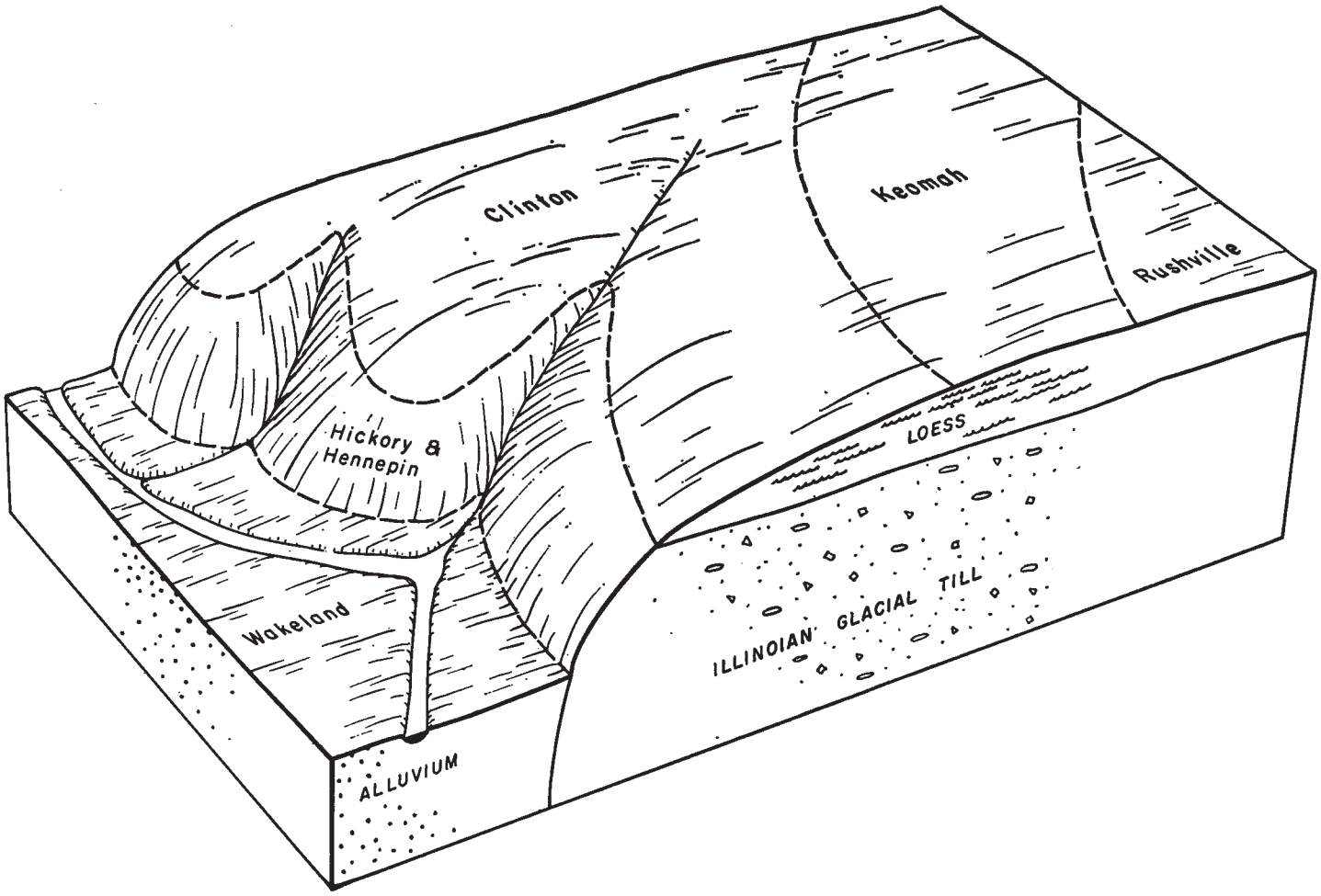

Figure 5.—**Relationship of soils to relief and underlying material in the Clinton-Hickory-Hennepin-Keomah association.**

This association makes up about 15 percent of the county. About 24 percent of it is Titus soils, 9 percent is Petrolia soils, 8 percent is La Hogue soils, and the remaining 59 percent is minor soils (fig. 6).

Titus soils have slopes of 0 to 2 percent and are poorly drained. Their surface layer is black to very dark gray heavy silty clay loam about 14 inches thick. The subsoil, about 25 inches thick, is mainly dark-gray heavy silty clay loam mottled with olive, gray, and dark yellowish brown. Below the subsoil is gray stratified silty clay loam, silt loam, and sand mottled with dark yellowish brown.

Petrolia soils have slopes of 0 to 2 percent and are poorly drained. Their surface layer is very dark grayish brown silty clay loam about 8 inches thick. The subsoil, about 25 inches thick, is mainly dark-gray heavy silty mottled with dark yellowish brown and strong brown.

La Hogue soils have slopes of 0 to 4 percent and are somewhat poorly drained. Their surface layer is very dark brown loam about 13 inches thick. The subsoil, about 37 inches thick, is dark-brown loam in the upper part, sandy clay loam in the middle part, and sandy loam in the lower part. Below the subsoil is a mixed, pale-brown and light yellowish-brown, stratified sand and loamy sand.

Minor soils in this association are the poorly drained and very poorly drained Ambraw, Beaucoup, Darwin, and McFain soils. Also included are the somewhat poorly drained Beardstown, Dupo, Littleton, and Tice soils, and the well drained and moderately well drained Haymond, Onarga, and Worthen soils. The Ambraw, Darwin, and McFain soils are in large areas on flood plains; and the Dupo, Haymond, Littleton, and Worthen soils are near areas of Limestone rock land and Cherty land along the river bluff. The Beaucoup and Tice soils are mainly along the channel of Macoupin Creek, and the Beardstown and Onarga soils occupy a somewhat higher position on sandy terraces of the Illinois River.

Permeability is slow, moderately slow, and moderate in the soils in this association. Available water capacity is moderate to very high.

Most of this association is used for cultivated crops. Large farms dominate the area. Large quantities of hybrid seed corn are grown. The main concerns of management are providing artificial drainage and maintaining soil fertility and tilth.

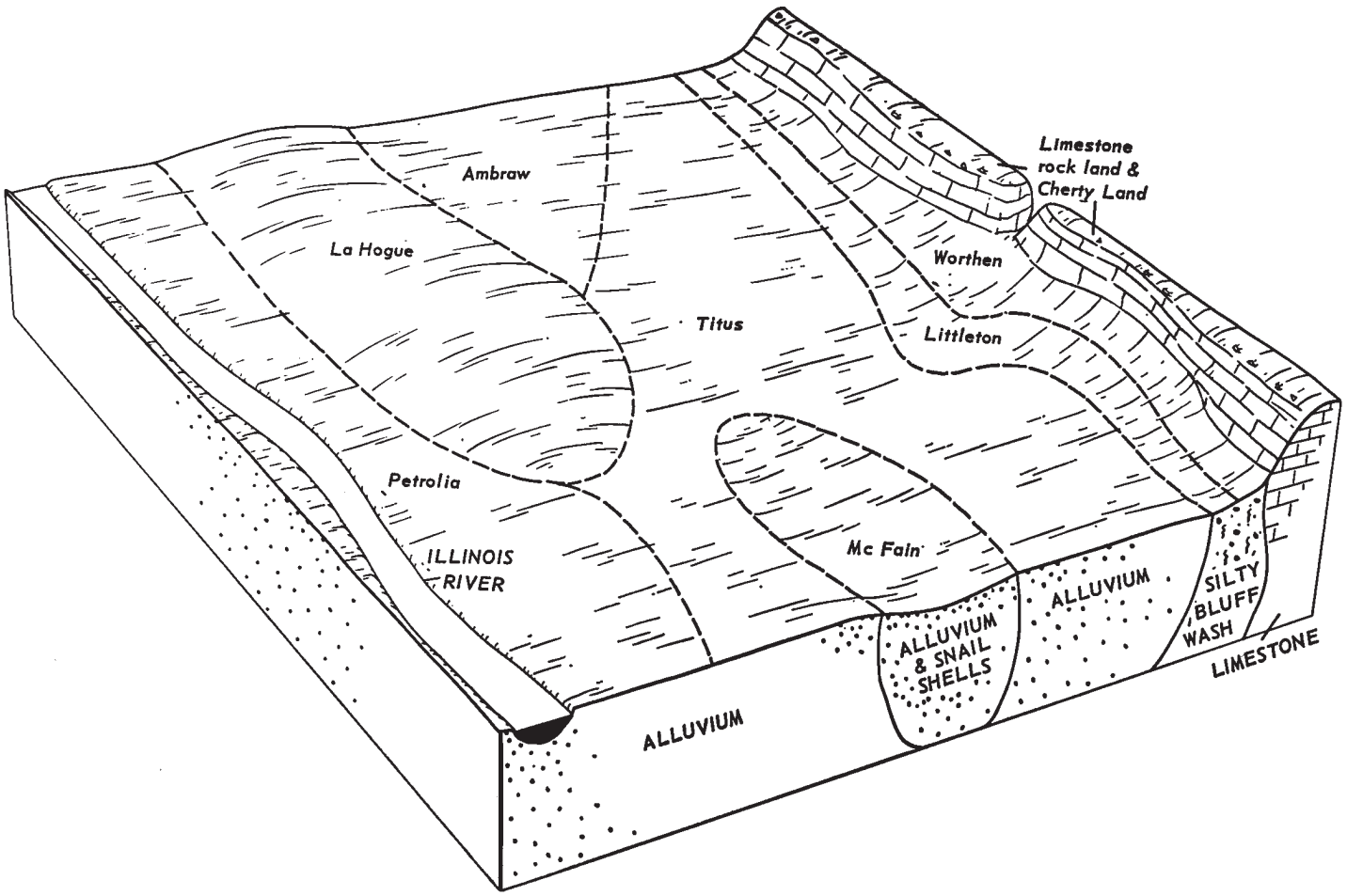

Figure 6.—**Relationship of soils to relief and underlying material in the Titus-Petrolia-La Hogue association.**

5. Lawson-Wakeland-Beaucoup Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in water-deposited sediment; on flood plains

This association consists of nearly level soils on flood plains in the valleys of the Apple and Macoupin Creeks and their tributaries.

This association makes up about 8 percent of the county. About 40 percent of it is Lawson soils, 25 percent is Wakeland soils, 15 percent is Beaucoup soils, and the remaining 20 percent is minor soils.

Lawson soils are somewhat poorly drained. Their surface layer is very dark grayish-brown silt loam about 36 inches thick. Below the surface layer is dark grayish-brown silt loam that has grayish-brown lenses of very fine sand.

Wakeland soils are somewhat poorly drained. Their surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil, about 16 inches thick, is dark grayish-brown silt loam mottled with yellowish brown. Below the subsoil is grayish-brown and brown silt loam mottled with yellowish brown and light brownish gray.

Beaucoup soils are poorly drained. Their surface layer, about 18 inches thick, is very dark brown silty clay loam in the upper part and very dark gray silty clay loam in the lower part. The subsoil, to a depth of about 60 inches, is dark-gray silty clay loam in the upper part and gray silty clay loam mottled with yellowish brown in the lower part.

Minor soils in this association are the well drained and moderately well drained Camden, Haymond, Huntsville, and Proctor soils and the somewhat poorly drained McGary, Starks, and Tice soils. The Haymond, Huntsville, and Tice soils are on flood plains. The Camden, McGary, Proctor, and Starks soils are on foot slopes and on stream terraces.

Permeability is moderate in the soils in this association. Available water capacity is very high.

Most of this association is used for cultivated crops. Grain and livestock farms dominate. Some areas in the middle and lower parts of the valley of Apple Creek have not been cleared for farming, because of frequent flooding and wetness. The main concerns of management are providing artificial drainage to help reduce wetness and maintaining soil fertility and tilth.

Descriptions of the Soils

This section describes the soil series and mapping units in Greene County. Each soil series is described in detail,

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

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

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

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

The acreage and proportionate extent of each mapping unit are shown in table 4. Many of the terms used in describing soils can be found in the Glossary, and more

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

Soil	Acres	Percent	Soil	Acres	Percent
Ambraw clay loam	1, 880	0. 5	Keomah silt loam, 2 to 4 percent slopes	6, 270	1. 8
Beardstown loam	525	. 1	La Hogue loam, 0 to 2 percent slopes	3, 640	1. 0
Beaucoup silty clay loam	8, 840	2. 5	La Hogue loam, 2 to 4 percent slopes	510	. 1
Bloomfield fine sand, 3 to 7 percent slopes	485	. 1	Lawson silt loam	18, 300	5. 4
Bloomfield fine sand, 7 to 18 percent slopes	230	. 1	Limestone rock land and Cherty land, 25 to 70 percent slopes	1, 000	. 3
Bloomfield fine sand, 18 to 45 percent slopes	205	. 1	Littleton silt loam	1, 290	. 4
Camden silt loam, 1 to 6 percent slopes	880	. 2	McFain silty clay	3, 510	1. 0
Camden silt loam, 6 to 10 percent slopes, eroded	675	. 2	McGary silt loam	190	. 1
Clarksdale silt loam, 0 to 2 percent slopes	14, 650	4. 3	Muscatine silt loam, 0 to 2 percent slopes	29, 800	8. 8
Clarksdale silt loam, 2 to 4 percent slopes	5, 100	1. 4	Muscatine silt loam, 2 to 4 percent slopes	7, 250	2. 0
Clinton silt loam, 2 to 4 percent slopes	16, 500	4. 8	Onarga sandy loam	610	. 2
Clinton silt loam, 4 to 7 percent slopes	920	. 3	Petrolia silty clay loam	4, 850	1. 4
Clinton silt loam, 4 to 7 percent slopes, eroded	10, 500	3. 1	Proctor silt loam	235	. 1
Clinton silt loam, 7 to 12 percent slopes	600	. 2	Radford silt loam	680	. 2
Clinton silt loam, 7 to 12 percent slopes, eroded	9, 540	2. 7	Riverwash sand and gravel	110	(1)
Darwin silty clay	1, 000	. 3	Rushville silt loam	775	. 2
Denny silt loam	380	. 1	Sable silty clay loam	6, 200	1. 8
Downs silt loam, 2 to 4 percent slopes	6, 780	1. 9	Sexton silt loam	170	. 1
Downs silt loam, 4 to 7 percent slopes	880	. 3	Shale rock land, 15 to 40 percent slopes	275	. 1
Downs silt loam, 4 to 10 percent slopes, eroded	7, 540	2. 1	Starks silt loam	820	. 2
Dupo silt loam	1, 420	. 4	Sylvan-Bold silt loams, 10 to 18 percent slopes, eroded	1, 750	. 5
Fayette silt loam, 2 to 4 percent slopes	18, 500	5. 5	Sylvan-Bold silt loams, 18 to 30 percent slopes	775	. 2
Fayette silt loam, 4 to 7 percent slops	4, 300	1. 2	Sylvan-Bold silt loams, 18 to 30 percent slopes, eroded	1, 225	. 4
Fayette silt loam, 4 to 7 percent slopes, eroded	6, 140	1. 7	Sylvan-Bold silt loams, 30 to 50 percent slopes	5, 030	1. 4
Fayette silt loam, 7 to 12 percent slopes	1, 270	. 4	Tama silt loam, 2 to 4 percent slopes	1, 490	. 4
Fayette silt loam, 7 to 12 percent slopes, eroded	7, 950	2. 3	Tama silt loam, 4 to 7 percent slopes	2, 610	. 7
Fayette silt loam, 12 to 18 percent slopes	1, 430	. 4	Tice silty clay loam	2, 390	. 7
Fayette silt loam, 12 to 18 percent slopes, eroded	5, 250	1. 5	Titus silty clay loam	12, 600	3. 6
Fayette silt loam, 18 to 30 percent slopes	4, 250	1. 2	Virden silt loam	13, 480	3. 9
Fayette silt loam, 18 to 30 percent slopes, eroded	1, 870	. 5	Wagner silt loam	685	. 2
Fayette silt loam, 30 to 60 percent slopes	6, 450	1. 9	Wakeland silt loam	8, 140	2. 3
Hamburg silt, 20 to 60 percent slopes	800	. 2	Worthen silt loam, 1 to 4 percent slopes	2, 200	. 6
Haymond silt loam	5, 290	1. 5	Worthen silt loam, 4 to 12 percent slopes	500	. 1
Hickory loam, 7 to 12 percent slopes, eroded	940	0. 3	Water	3, 150	. 9
Hickory loam, 12 to 18 percent slopes	2, 970	. 7	Levee	1, 550	. 4
Hickory loam, 12 to 18 percent slopes, eroded	8, 290	2. 4	Lime Quarries	25	(1)
Hickory and Hennepin loams, 18 to 30 percent slopes	14, 300	4. 2	Borrow Area	50	(1)
Hickory and Hennepin loams, 18 to 30 percent slopes, eroded	5, 540	1. 6	Clay Pit	45	(1)
Hickory and Hennepin loams, 30 to 60 percent slopes	2, 520	. 7	Strip Mines	95	(1)
Huntsville silt loam	2, 020	. 6	Miscellaneous	15	(1)
Keomah silt loam, 0 to 2 percent slopes	13, 600	4. 0	Total	347,520	100. 0

[1] Less than 0.05 percent.

detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*13*).

Ambraw Series

The Ambraw series consists of nearly level to depressional, poorly drained soils in the valley of the Illinois River. These soils formed in water-deposited sediment.

In a representative profile the surface layer is black clay loam about 14 inches thick. The subsoil, about 26 inches thick, is dark-gray clay loam and thin strata of sandy loam. The underlying material, to a depth of 60 inches, is mainly dark-gray sandy clay loam.

The content of organic matter is high in these soils. Permeability is moderate to moderately slow, and available water capacity is high.

Representative profile of Ambraw clay loam, in a cultivated field, about 3 miles northwest of Eldred, 111 feet south of NW. corner of NE¼ sec. 18, T. 10 N., R. 13 W.:

Ap—0 to 7 inches, black (10YR 2/1) clay loam; moderate, fine, angular blocky structure; firm; neutral; abrupt, smooth boundary.

A1—7 to 14 inches, black (10YR 2/1) clay loam; moderate, medium, angular blocky structure; firm; neutral; abrupt, smooth boundary.

B1—14 to 17 inches, dark grayish-brown (10YR 4/2) stratified loamy sand and sandy loam; weak, coarse, subangular blocky structure; neutral; abrupt, smooth boundary.

B21g—17 to 24 inches, dark-gray (10YR 4/1) clay loam and thin strata of sandy loam; common, medium, distinct, dark-brown (10YR 4/3) mottles and few, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, subangular blocky structure; firm; neutral; clear, smooth boundary.

B22g—24 to 28 inches, dark-gray (10YR 4/1) clay loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; firm; mildly alkaline; clear, smooth boundary.

B23g—28 to 40 inches, dark-gray (10YR 4/1) clay loam and thin strata of sandy loam; few, medium, faint, dark-gray (N 4/0) mottles; massive; firm; mildly alkaline; abrupt, smooth boundary.

C1g—40 to 43 inches, grayish-brown (10YR 5/2) loamy sand; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; firm; mildly alkaline; abrupt, smooth boundary.

C2g—43 to 60 inches, dark-gray (N 4/0) sandy clay loam; many, medium, prominent, dark yellowish-brown (10YR 4/4) mottles; massive; friable; mildly alkaline.

The Ap and A1 horizons are commonly black, but they range from black to very dark gray and very dark grayish brown. The Ap horizon is clay loam in most places, but it ranges from heavy loam to silty clay loam. The B horizon is dark grayish brown to dark gray. It ranges from mildly alkaline to slightly acid. The C horizon commonly is clay loam to sandy loam containing strata of loamy sand and sand.

Ambraw soils are near Darwin, McFain, and Titus soils and are similar to these soils in natural drainage. Ambraw soils have more sand throughout than Titus soils, and they have a sandy substratum that is missing in Darwin soils. Ambraw soils do not have the snail and mussel shells that are characteristic of McFain soils.

Ambraw clay loam (0 to 2 percent slopes) (302).—This soil is in the valley of the Illinois River.

Included with this soil in mapping are small areas where sand is at a depth of less than 15 inches and small areas where snail and mussel shells are in the underlying sandy material.

If it is adequately drained and fertilized, this soil is well suited to corn and soybeans. Poor natural drainage, fertility, and tilth are the main limitations to use of this soil. Management group IIw–1.

Beardstown Series

The Beardstown series consists of nearly level, somewhat poorly drained soils on terraces in the valley of the Illinois River. These soils formed in water-deposited sediment.

In a representative profile the surface layer is very dark gray loam about 8 inches thick. The subsurface layer is dark grayish-brown loam about 4 inches thick. The subsoil is about 36 inches thick. It is dark-brown, friable heavy loam in the upper 4 inches; mottled, grayish-brown clay loam in the next 7 inches; mottled, grayish-brown sandy clay loam in the next 19 inches; and mottled, grayish-brown sandy loam in the lower 6 inches. The underlying material to a depth of 60 inches is mixed light brownish-gray and yellowish-brown loamy sand.

The content of organic matter is moderate in these soils. Permeability is moderate to moderately slow, and available water capacity is high.

Representative profile of Beardstown loam, in a cultivated field, about 2½ miles west of Hillview, in SW¼ NE¼SE¼NE¼ sec. 31, T. 12 N., R. 13 W., 795 feet due north from center of field road directly in front of house:

Ap—0 to 8 inches, very dark gray (10YR 3/1) loam; moderate, fine and medium, granular structure; friable; few worm casts; many roots; medium acid; abrupt, smooth boundary.

A2—8 to 12 inches, dark grayish-brown (10YR 4/2) loam; weak, medium, granular structure; friable; many roots; medium acid; clean, smooth boundary.

B1—12 to 16 inches, dark-brown (10YR 4/3) heavy loam; many, medium, distinct, grayish-brown (10YR 5/2) mottles; weak, fine and medium, subangular blocky structure; friable; many roots; medium acid; clear, smooth boundary.

B21t—16 to 23 inches, grayish-brown (10YR 5/2) clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; few, medium, distinct, dark-brown (7.5YR 4/4) mottles; weak, medium, subangular blocky structure; firm; many roots; thin, discontinuous, dark-gray (10YR 4/1) clay films; strongly acid; clear, smooth boundary.

B22t—23 to 42 inches, grayish-brown (10YR 5/2) sandy clay loam; common, medium, distinct, dark-brown (7.5YR 4/4), mottles and few, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium and coarse, subangular blocky structure; firm; few roots; thin, discontinuous, dark grayish-brown (10YR 4/2) clay films; strongly acid; gradual, smooth boundary.

B3—42 to 48 inches, grayish-brown (10YR 5/2) sandy loam; common, medium, yellowish-brown (10YR 5/6) mottles and few, medium, distinct, dark-brown (7.5YR 4/4) mottles; weak, medium and coarse, subangular blocky structure; friable; thin, discontinuous, dark grayish-brown (10YR 4/2) clay films; strongly acid; gradual, smooth boundary.

IIC—48 to 60 inches, mixed light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/6) loamy sand; single grain; friable; strongly acid to medium acid.

The Ap horizon ranges from black to very dark grayish brown, and the A2 horizon ranges from dark grayish brown to gray. The Ap horizon commonly is loam, but it ranges from silt loam to light clay loam. The B horizon ranges from

brown to grayish brown and from clay loam to heavy loam and some sandy loam. The B horizon is medium acid to very strongly acid. The C horizon ranges from loamy sand to loam and is stratified in some places.

Beardstown soils are similar to La Hogue and Littleton soils in natural drainage. All these soils are on terraces in the valley of the Illinois River. Beardstown soils have a dark-colored Ap horizon similar to that of La Hogue soils, but the A2 horizon of Beardstown soils is missing in La Hogue and Littleton soils. Beardstown soils have more sand throughout than Littleton soils.

Beardstown loam (0 to 2 percent slopes) (188).—This soil occurs along the Illinois River.

Included with this soil in mapping are small areas that have more clay in the surface layer and areas that have poorer drainage. These included areas are mostly in the southern part of the river valley. Also included are small areas where the sandy underlying material is nearer the surface than that in this Beardstown soil.

This soil is well suited to corn, soybeans, and other grain grown in the county. Wetness is a slight limitation in some areas, but maintaining soil fertility and tilth are the main concerns of management. Management group I–3.

Beaucoup Series

The Beaucoup series consists of nearly level, poorly drained soils. Most of these soils are in the valleys of the Apple and Macoupin Creeks, but a few are in the valley of the Illinois River. These soils formed in water-deposited sediment.

In a representative profile the surface layer is about 18 inches thick. It is very dark brown silty clay loam in the upper 7 inches and very dark gray silty clay loam in the lower 11 inches. The subsoil, to a depth of about 60 inches, is mottled, dark-gray silty clay loam in the upper 20 inches and mottled, gray silt loam in the lower 22 inches.

The content of organic matter is moderate in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Beaucoup silty clay loam, in a cultivated field, about 2 miles west of Eldred, 1,123 feet north and 162 feet east of SW. corner of sec. 30, T. 10 N., R. 13 W.:

Ap—0 to 7 inches, very dark brown (10YR 2/2) silty clay loam; weak, medium, granular structure; firm; medium acid to slightly acid; abrupt, smooth boundary.

A1—7 to 18 inches, very dark gray (N 3/0) silty clay loam; strong, medium and fine, angular blocky structure; firm; neutral; clear, smooth boundary.

B21g—18 to 38 inches, dark-gray (5Y 4/1) silty clay loam; common, fine, faint, gray (10YR 5/1) mottles and few, fine, prominent, dark yellowish-brown (10YR 4/4) mottles; weak, medium, prismatic structure that parts to moderate, medium, angular blocky structure; firm; many coarse pores; neutral; gradual, smooth boundary.

B22g—38 to 60 inches, gray (10YR 5/1) silt loam; common, fine, prominent, yellowish-brown (10YR 5/4) mottles; weak, medium, prismatic structure that parts to moderate, medium, angular blocky structure; friable; many coarse pores; few, disintegrated mussel shells; mildly alkaline.

The Ap horizon ranges from black to very dark brown, and the A1 horizon ranges from black to very dark gray. The combined thickness of the Ap and A1 horizons ranges from about 12 to 24 inches. The B horizon ranges from dark gray to gray. It ranges from slightly acid to mildly alkaline.

Beaucoup soils are more poorly drained than nearby Tice soils. They are similar to the Darwin, Petrolia, and Titus soils in natural drainage, but Beaucoup soils contain less clay than Titus and Darwin soils and have a thicker dark-colored A horizon than Petrolia soils.

Beaucoup silty clay loam (0 to 2 percent slopes) (70).—This soil formed in water-deposited sediment.

Included with this soil in mapping are small areas that have a thin recent overwash of light-colored silt loam. Also included are small areas, mainly in the valley of Apple Creek, that have a thicker surface layer than this Beaucoup soil.

If it is adequately drained and fertilized, this soil is well suited to corn, soybeans, and other grain crops commonly grown in the county. Improving drainage and maintaining fertility and tilth are the main concerns of management. Management group IIw–1.

Bloomfield Series

The Bloomfield series consists of gently sloping to very steep, well-drained and somewhat excessively drained soils in the valley of the Illinois River and on the adjacent bluffs. These soils formed in water- and wind-deposited sandy material under mixed hardwood trees.

In a representative profile the surface layer is dark-brown fine sand about 6 inches thick, and the subsurface layer is light yellowish-brown fine sand about 18 inches thick. The subsoil is dark-brown loamy sand to sandy loam about 6 inches thick. Below the subsoil, to a depth of 60 inches, is yellowish-red sandy loam and light yellowish-brown medium sand in about equal parts in bands about one-half inch thick.

The content of organic matter is low in these soils. Permeability is moderately rapid to rapid, and available water capacity is low.

Representative profile of Bloomfield fine sand, 3 to 7 percent slopes, about 6 miles south of Eldred, near the center of NE¼NE¼ sec. 28, T. 9 N., R. 13 W.:

Ap—0 to 6 inches, dark-brown (10YR 4/3) fine sand and few areas of black (10YR 2/1) fine sand; single grain; loose; slightly acid to neutral; abrupt, smooth boundary.

A2—6 to 24 inches, light yellowish-brown (10YR 6/4) fine sand; single grain; loose; slightly acid to neutral; abrupt, smooth boundary.

B—24 to 30 inches, dark-brown (7.5YR 4/4) loamy sand to light sandy loam; weak, medium, subangular blocky structure; loose to very friable; medium acid to slightly acid.

B&A2—30 to 60 inches, yellowish-red (5YR 4/6) sandy loam and light yellowish-brown (10YR 6/4) medium sand in equal parts in one-half inch bands; weak, medium, subangular blocky structure and single grain; very friable and loose; medium acid.

The Ap horizon ranges from dark brown to dark grayish brown, and the A2 horizon ranges from brown to light yellowish brown. The Ap and A2 horizons commonly are fine sand, but they range from fine sand to loamy sand. The B horizon (lamellae) commonly is sandy loam, but it ranges from sandy loam to loamy sand or heavy sandy loam.

Bloomfield soils are near Onarga soils on terraces in the valley of the Illinois River and are near Hamburg soils on the bluff adjacent to the valley. Bloomfield soils have more sand in the upper 30 inches than the Hamburg and Onarga soils. They have a lighter colored surface layer than Onarga soils and have a B horizon that is missing in Hamburg soils.

Bloomfield fine sand, 3 to 7 percent slopes (53C).—This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas, mainly in the valley of the river west of Hillview, that have a dark-colored surface layer and slope of less than 3 percent.

If this Bloomfield soil is adequately fertilized, it is well suited to watermelons and cantaloupes. It is not well suited to cultivated crops commonly grown in the county, because of low available water capacity. Somewhat excessive drainage and low natural fertility and available water capacity are the main limitations to the use of this soil. Management group IVs–1.

Bloomfield fine sand, 7 to 18 percent slopes (53D).—The profile of this soil is similar to that described as representative for the series.

Included with this soil in mapping are small areas, mainly on the bluff adjacent to the valley of the Illinois River, that are silty and calcareous.

Somewhat excessive drainage, low natural fertility and available water capacity, and steepness of slope are the main limitations to use of this soil. Management group VIs–1.

Bloomfield fine sand, 18 to 45 percent slopes (53F).—This soil is steeper than other Bloomfield soils in the county.

Included with this soil in mapping are small areas, mainly on the bluff adjacent to the valley of the Illinois River, that are silty and calcareous. Also included are small areas that have limestone rock outcrop.

Somewhat excessive drainage, low natural fertility and available water capacity, and steepness of slope are the main limitations to use of this soil. Management group VIIs–1.

Bold Series

The Bold series consists of moderately steep to very steep, well-drained soils on uplands. These soils formed in loess under hardwoods. They occupy a narrow belt along with Sylvan soils and are adjacent to and immediately east of the bluff along the Illinois River.

In a representative profile the surface layer is gray silt loam about 8 inches thick. Below the surface layer, to a depth of 60 inches, is light-gray silt loam mottled with yellowish brown (fig. 7).

The content of organic matter is low in these soils. Permeability is moderate, and available water capacity is high.

Representative profile of Bold silt loam in an area of Sylvan-Bold silt loams, 10 to 18 percent slopes, eroded, in a clover field about 2 miles south of Hillview, 372 feet south and 261 feet east of the NW. corner of SW¼, SE¼ sec. 3, T. 11 N., R. 13 W., about midway between the top of the slope and small stream:

Ap—0 to 8 inches, gray (10YR 5/1) silt loam; common, fine distinct areas of very pale brown (10YR 7/3); cloddy structure; friable; calcareous.

C—8 to 60 inches, light-gray (10YR 7/2) coarse silt loam; many, fine, prominent, yellowish-brown (10YR 5/6) mottles; structureless, except for some tendency to break out in plates; very friable; few dark-brown (7.5YR 4/4) coatings in fine pores and few cracks.

The A horizon ranges from gray to yellowish brown, and the C horizon ranges from light gray to yellowish brown.

Bold soils are similar to Sylvan soils in natural drainage and are next to these soils on the landscape. Bold soils have less clay and are less acid in the upper 2 feet than Sylvan

Figure 7.—Profile of a Bold silt loam. The slightly dark surface layer is the only evidence of soil development.

soils. They are similar to Hamburg soils, but Bold soils have a lighter colored surface layer, contain more clay throughout, and occupy a different position on the landscape.

Bold soils are mapped as part of a soil complex with Sylvan soils. For descriptions of individual mapping units, refer to Sylvan-Bold silt loams.

Camden Series

The Camden series consists of nearly level to strongly sloping, well drained and moderately well drained soils on stream terraces and foot slopes. These soils formed in water- and wind-deposited material under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick, and the subsurface layer is dark yellowish-brown silt loam about 7 inches thick. The subsoil is about 45 inches thick. The upper 5 inches is dark yellowish-brown heavy silt loam; the next 13 inches is dark-brown light silty clay loam; the next 11 inches is dark-brown light clay loam mottled with brown; and the lower 16 inches is brown, stratified silt loam, sandy loam, and clay loam mottled with grayish brown. Below the subsoil is grayish-brown, stratified light silty clay loam, clay loam, and silt loam mottled with dark yellowish brown.

The content of organic matter is low in these soils. Permeability is moderate, and available water capacity is high.

Representative profile of Camden silt loam, 1 to 6 percent slopes, in a cultivated field, about 3 miles south of Carrollton, 192 feet west and 60 feet south of NE. corner of sec. 11, T. 9 N., R. 12 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam and some fine sand; weak, fine, granular structure; friable; moderately alkaline; abrupt, smooth boundary.

A2—8 to 15 inches, dark yellowish-brown (10YR 4/4) silt loam and some sand; moderate, medium, platy structure; friable; moderately alkaline; clear, smooth boundary.

B1—15 to 20 inches, dark yellowish-brown (10YR 4/4) heavy silt loam and some sand; moderate, medium, subangular blocky structure; friable to firm; brown (10YR 5/3) silt coatings on peds; neutral; clear, smooth boundary.

B21t—20 to 33 inches, dark-brown (7.5YR 4/4), light silty clay loam and some sand; moderate, medium to coarse, subangular blocky structure; firm to friable; few patches of light-gray (10YR 6/1) silt coatings; strongly acid to medium acid; gradual, smooth boundary.

IIB22t—33 to 44 inches, dark-brown (7.5YR 4/4), light silty clay loam to clay loam; many, fine, faint, brown (10YR 5/3) mottles; moderate, coarse, subangular blocky structure; firm to friable; strongly acid; gradual, smooth boundary.

IIB3—55 to 60 inches, brown (10YR 5/3) silt loam and sandy loam to clay loam in nearly horizontal bands; many, fine, distinct, grayish-brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure; friable; dark-brown (7.5YR 4/4) clay films in widely spaced cracks; few fine pebbles in horizontal bands; strongly acid to medium acid; gradual, smooth boundary.

IIC–60 to 76 inches, grayish-brown (2.5Y 5/2), stratified light silty clay loam, clay loam, and silt loam; common, fine, prominent, dark yellowish-brown (10YR 4/4) mottles and few, fine, prominent, black (10YR 2/1) mottles; massive; friable.

The Ap horizon commonly is silt loam, but it ranges from silt loam to light silty clay loam in some eroded profiles. Depth to the IIB22t horizon ranges from 30 to 48 inches. The B horizon ranges from strongly acid to neutral. Depth to the C horizon ranges from 40 to more than 60 inches.

Camden soils are on terraces with Starks soils, but Camden soils have better natural drainage than Starks soils. They are similar to Proctor and Worthen soils in natural drainage and occupy similar positions on the landscape. Camden soils have a thinner and lighter colored surface layer than the Proctor and Worthen soils. They also have an A2 horizon that is missing in Proctor soils, and they have more clay in the subsoil than Worthen soils.

Camden silt loam, 1 to 6 percent slopes (134B).—This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas where the surface layer is thicker than that in this soil. Also included in some places are soils mottled with grayish brown in the lower part of the subsoil.

This soil is suited to crops commonly grown in the county. Some areas are in pasture or in woods. Controlling erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–1.

Camden silt loam, 6 to 10 percent slopes, eroded (134D2).—The profile of this soil is similar to that described as representative for the series, but the surface layer is about 8 inches thinner.

Included with this soil in mapping are some areas where slopes are shorter than in this soil and are more than 10 percent.

This soil is suited to most crops commonly grown in the county. Some areas are in pasture or in woods. Slope and the hazard of erosion are the main limitations to use of this soil. Management group IIIe–1.

Clarksdale Series

The Clarksdale series consists of nearly level to gently sloping, somewhat poorly drained soils on uplands. These soils formed in loess.

In a representative profile the surface layer is very dark gray silt loam about 9 inches thick, and the subsurface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil, about 31 inches thick, is mainly grayish-brown heavy silty clay loam mottled with yellowish brown and streaked with very dark gray. The underlying material, to a depth of 60 inches, is light brownish-gray silt loam mottled with yellowish brown.

The content of organic matter is moderate in these soils. Permeability is moderately slow, and available water capacity is very high.

Representative profile of Clarksdale silt loam, 0 to 2 percent slopes, in a cultivated field, about 5 miles northeast of Greenfield, 442 feet west and 267 feet north of the SE. corner of SW¼SW¼ sec. 1, T. 11 N., R. 10 W.:

Ap—0 to 9 inches, very dark gray (10YR 3/1) silt loam; weak, fine and medium, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A2—9 to 17 inches, dark grayish-brown (10YR 4/2) silt loam and dry coatings of light gray (10YR 7/2); moderate, medium and thick, platy structure; friable; neutral; clear, smooth boundary.

B21t—17 to 27 inches, mixed grayish-brown (10YR 5/2) and dark-brown (10YR 4/3) heavy silty clay loam; moderate, medium and fine, subangular blocky structure; fine, thick, continuous, very dark gray (10YR 3/1) coatings on peds; many root channels filled with very dark gray (10YR 3/1); strongly acid; gradual, smooth boundary.

B22t—27 to 38 inches, grayish-brown (10YR 5/2) heavy silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, angular blocky structure; firm; thick, continuous, very dark gray (10YR 3/1) coatings on peds; many roots filled with very dark gray (10YR 3/1); many iron and manganese concretions; strongly acid; gradual, smooth boundary.

B3t—37 to 48 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, angular blocky structure; firm; thin, discontinuous, dark-gray (10YR 4/1) coatings on peds; few roots; few iron and manganese concretions; slightly acid; gradual, smooth boundary.

C—48 to 60 inches, light brownish-gray (10YR 6/2) silt loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; neutral.

The Ap horizon ranges from black to very dark grayish brown, and the A2 horizon ranges from very dark gray to grayish brown. The B horizon is mainly grayish brown, and the ped coatings of this horizon range from black to dark gray. The B horizon ranges from slightly acid to strongly acid.

Clarksdale soils are on a landscape with Downs and Muscatine soils. Clarksdale soils are more poorly drained than Downs soils. They are similar to the Muscatine soils in natural drainage, but they have a lighter colored surface layer than Muscatine soils. Clarksdale soils are similar to Keomah soils in natural drainage, but they have a darker colored surface layer than Keomah soils.

Clarksdale silt loam, 0 to 2 percent slopes (257A).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas that have a grayer subsoil and are more poorly drained than this soil.

If this soil is adequately drained and fertilized, it is well suited to crops commonly grown in the county. Maintaining fertility and tilth are the main concerns of management. Management group I–2.

Clarksdale silt loam, 2 to 4 percent slopes (257B).—The profile of this soil is similar to that described as representative for the series.

Included with this soil in mapping are some areas of soils where the surface layer is thinner than that in the profile described as representative for the series. In these areas, a part of the original surface layer has been washed away and the remaining part is mixed with material in the subsurface soil into a plow layer that lies directly on the subsoil.

This soil is well suited to most crops commonly grown in the county. Controlling erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–2.

Clinton Series

The Clinton series consists of gently sloping to strongly sloping, moderately well drained soils on uplands, mainly in the eastern half of the county. These soils formed in loess under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick, and the subsurface layer is brown silt loam about 5 inches thick. The subsoil, about 34 inches thick, is mainly brown silty clay loam mottled with light brownish gray and strong brown, and yellowish brown in the lower part. The underlying material is light-gray silt loam mottled with yellowish brown and strong brown.

The content of organic matter is low in these soils. Permeability is moderately slow, and available water capacity is high to very high.

Representative profile of Clinton silt loam, 2 to 4 percent slopes, in a cultivated field, about 1 mile southeast of Greenfield in SE¼SE¼ sec. 10, T. 10 N., R. 10 W., 588 feet north of junction of farm land and public road, and 483 feet east of gate into field:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2—7 to 12 inches, brown (10YR 5/3) silt loam; weak, thin, platy structure that parts to weak, very fine, subangular blocky; friable; medium acid; clear, smooth boundary.

B1—12 to 16 inches, brown (10YR 5/3) heavy silt loam; moderate, fine and medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B21t—16 to 23 inches, brown (10YR 5/3) silty clay loam; strong, medium, subangular blocky structure; firm; white (10YR 8/1) coatings on peds when dry; very strongly acid; gradual, smooth boundary.

B22t—23 to 36 inches, brown (10YR 5/3) silty clay loam; few, fine, distinct, light brownish-gray (10YR 6/2) and strong-brown (7.5YR 5/8) mottles; moderate, coarse, prismatic structure that parts to moderate, medium to coarse, subangular blocky; firm; grayish-brown (10YR 5/2) clay films on peds; very strongly acid; diffuse, smooth boundary.

B23t—36 to 46 inches, light-gray (10YR 6/1) light silty clay loam; many, medium, prominent, yellowish-brown (10YR 5/6) and strong-brown (7.5YR 5/8) mottles and few, fine, prominent, black (N 2/0) mottles; weak, coarse, angular blocky structure; friable; few grayish-brown (10YR 52) clay films on peds; very strongly acid; gradual, smooth boundary.

C—46 to 70 inches, light-gray (N 6/0) silt loam; many, coarse, prominent, yellowish-brown (10YR 5/6) and strong-brown (7.5YR 5/8) mottles; massive; friable; neutral.

The Ap horizon ranges from dark grayish brown in uneroded areas to brown and yellowish brown in eroded areas. The combined thickness of the Ap and A2 horizons ranges from 7 to about 12 inches, depending upon the amount of erosion. The B horizon ranges from medium acid to very strongly acid.

Clinton soils are near Keomah soils, but they have better natural drainage and are more sloping than Keomah soils. They are similar to Fayette soils, but they are not so well drained as those soils.

Clinton silt loam, 2 to 4 percent slopes (18B).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas where the content of clay in the subsoil is lower than that in this soil.

If this Clinton soil is adequately fertilized and protected from erosion, it is well suited to most crops commonly grown in the county. Controlling erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–1.

Clinton silt loam, 4 to 7 percent slopes (18C).—The profile of this soil is similar to that described as representative for the series.

Included with this soil in mapping are some areas where the content of clay in the subsoil is lower than that in the profile described as representative for the series.

If this soil is fertilized and adequately protected from erosion, it is well suited to most crops commonly grown in the county. Controlling erosion and maintaining fertility are the main concerns of management. Management group IIe–1.

Clinton silt loam, 4 to 7 percent slopes, eroded (18C2).—This soil has a profile similar to that described as representative for the series, but the combined thickness of the surface layer and the subsurface layer is about 5 to 9 inches thinner.

Included with this soil in mapping are severely eroded areas where the plow layer consists mainly of silty clay loam subsoil material. Also included are some areas that have a lower content of clay in the subsoil than that in the profile described as representative for the series. Some areas that have gray mottles in the upper part of the subsoil were also included.

This soil is suited to most crops commonly grown in the county. The hazard of erosion is the main limitation to use of this soil. Management group IIe–1.

Clinton silt loam, 7 to 12 percent slopes (18D).—This soil has a profile similar to that described as representative for the series, but its surface layer is about 2 to 4 inches thinner.

Included with this soil in mapping are some areas that have a lower content of clay in the subsoil than that in the profile described as representative for the series.

Most of this strongly sloping soil is in pasture or woods. If it is adequately fertilized and protected from erosion, it is suited to crops commonly grown in the county. Slope and the hazard of erosion are the main limitations to use and management of this soil if it is cultivated. Management group IIIe–1.

Clinton silt loam, 7 to 12 percent slopes, eroded (18D2).—This soil has a profile similar to that described as representative for the series, but the combined thickness of the surface layer and the subsurface layer is about 5 to 9 inches thinner.

Included with this soil in mapping are severely eroded areas where the plow layer consists mainly of silty clay loam subsoil material. Also included are some areas where the content of clay in the subsoil is lower than that in the profile described as representative for the series. Some areas that have gray mottles in the upper part of the subsoil are also included.

This soil is suited to crops commonly grown in the county if it is adequately fertilized and protected from erosion. Strongness of slopes and the hazard of erosion are the main limitations to use and management of this soil. Management group IIIe–1.

Darwin Series

The Darwin series consists of nearly level, poorly drained soils in the valley of the Illinois River. These soils formed in water-deposited clayey sediment.

In a representative profile the surface layer is black silty clay about 11 inches thick. The subsoil is about 39 inches thick. It is mixed very dark gray and dark gray heavy silty clay in the upper 8 inches and gray heavy silty clay mottled with olive brown and dark yellowish brown in the lower 31 inches. The underlying material, to a depth of more than 70 inches, is light-gray silty clay loam mottled with olive brown.

The content of organic matter is high in these soils. Permeability is very slow, and available water capacity is moderate.

Representative profile of Darwin silty clay, in a cultivated field, about 5 miles south of Hillview, near center of SW¼ sec. 21, T. 11 N., R. 13 W., 288 feet west of center line of blacktop road:

A1—0 to 11 inches, black (10YR 2/1) silty clay; strong, fine, angular blocky structure; firm, neutral; clear, smooth boundary.

B21g—11 to 19 inches, mixed very dark gray (5Y 3/1) and dark-gray (5Y 4/1) heavy silty clay; few, fine, distinct, olive-brown (2.5Y 4/4) mottles; strong, fine, angular blocky structure; firm; small columnar areas filled with dark-colored surface soil; slightly acid to neutral; diffuse, smooth boundary.

B22g—19 to 43 inches, gray (5Y 5/1) heavy silty clay; few, fine, distinct, olive-brown (2.5Y 4/4) mottles; weak, coarse, prismatic structure that parts to moderate, fine and very fine, angular blocky; firm; mildly alkaline; diffuse, smooth boundary.

B23g—43 to 50 inches, gray (5Y 5/1) heavy silty clay; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, prismatic structure that parts to moderate, medium, angular blocky; firm; some very smooth faces intersecting prismatic structure at an angle of 45 degrees; moderately alkaline; diffuse, smooth boundary.

Cg—50 to 76 inches, light-gray (5Y 6/1) silty clay loam; few, fine, distinct, olive-brown (2.5Y 4/4) mottles; weak to moderate, medium and coarse, angular blocky structure; firm; many soft concretions of lime; moderately alkaline.

The A horizon ranges from black to very dark grayish brown, and the B horizon ranges from very dark gray to light gray. The A and B horizons range from heavy silty clay to clay. The B horizon ranges from slightly acid to moderately alkaline.

Darwin soils are near Ambraw, McFain, and Titus soils and are similar to those soils in natural drainage. Darwin soils have a higher content of clay throughout the profile than the Ambraw and Titus soils, and they lack the underlying stratified sediment that is characteristic of the Ambraw, McFain, and Titus soils.

Darwin silty clay (0 to 2 percent slopes) (71).—This soil formed in water-deposited clayey sediment.

Included with this soil in mapping are some areas where the surface layer is grayer than that of this soil. Also included are some areas that are more sandy than this soil.

If this soil is protected from flooding and is drained and fertilized, it is suited to most crops commonly grown in the county. Wheat and clover are the main crops, but corn and soybeans are grown to a limited extent. Poor natural drainage, very slow permeability, susceptibility to flooding, and a high content of clay are the main limitations to use and management of this soil. Management group IIIw–2.

Denny Series

The Denny series consists of nearly level, poorly drained soils that formed in loess. These soils are on uplands, mainly in small depressions within larger areas of dark-colored prairie soils.

In a representative profile the surface layer is very dark gray silt loam about 8 inches thick. The subsurface layer is about 10 inches thick. It is gray silt loam mottled with light gray in the upper 6 inches, and dark-gray silt loam mottled with gray and dark brown in the

lower 4 inches. The subsoil is about 36 inches thick. The upper 14 inches is dark-gray heavy silty clay loam and silty clay mottled with gray and dark brown. The lower 22 inches is gray and light-gray silty clay loam mottled with yellowish brown and strong brown. The underlying material, to a depth of more than 60 inches, is light-gray heavy silt loam mottled with strong brown.

The content of organic matter is moderate in these soils. Permeability is slow, and available water capacity is high.

Representative profile of Denny silt loam, in a cultivated field, about 6 miles east of Carrollton, 324 feet north and 102 feet east of SW. corner SE¼SE¼ sec. 14, T. 10 N., R. 11 W.:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A21—8 to 14 inches, gray (10YR 5/1) silt loam; many, fine, faint, light-gray (10YR 6/1) mottles; few, fine, distinct, very dark gray (10YR 3/1) mottles; and few, fine, prominent, brown to dark-brown (7.5YR 4/4) mottles; moderate, medium to thin, platy structure; friable; medium acid to slightly acid; clear, smooth boundary.

A22—14 to 18 inches, dark-gray (10YR 4/1) silt loam; many, fine, faint, gray (10YR 5/1) mottles and few, fine, distinct, dark-brown (7.5YR 4/4) mottles; weak, medium, subangular blocky structure; friable; medium acid to slightly acid; clear, smooth boundary.

B21tg—18 to 23 inches, dark-gray (10YR 4/1) heavy silty clay loam; few, fine, faint, gray (10YR 5/1) mottles; strong, medium, angular blocky structure; firm to friable; few fine pores lined with very dark gray (10YR 3/1); medium acid; clear, smooth boundary.

B22tg—23 to 32 inches, dark-gray (10YR 4/1) silty clay; few, fine, prominent, dark-brown (7.5YR 4/4) mottles; moderate, medium, prismatic structure that parts to strong, medium, angular blocky; firm, common, very dark gray (10YR 3/1) clay films and organic coatings; many fine pores filled with very dark gray (10YR 3/1); medium acid; gradual, smooth boundary.

B31tg—32 to 39 inches, gray (10YR 5/1) silty clay loam; many, fine, prominent, yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure that parts to moderate, medium, angular blocky; firm; many dark-gray (10YR 4/1) clay films; many fine pores lined with very dark gray (10YR 3/1); medium acid to slightly acid; gradual, smooth boundary.

B32tg—39 to 54 inches, light-gray (5Y 6/1) silty clay loam; many, fine, prominent, strong-brown (7.5YR 5/6) mottles; weak, coarse, angular blocky structure; firm; many root cracks filled with very dark gray (10YR 3/1); gray (10YR 5/1) clay films in cracks; slightly acid to neutral; gradual, smooth boundary.

Cg—54 to 70 inches, light-gray (5Y 6/1) heavy silt loam; common, coarse, prominent, strong-brown (7.5YR 5/6) mottles; massive; friable to firm; few pores lined with very dark gray (10YR 3/1); neutral.

The Ap horizon ranges from black to very dark grayish brown. The A2 horizon ranges from grayish brown to dark gray, and the B horizon ranges from dark gray to light olive gray. The B horizon ranges from medium acid to mildly alkaline.

Denny soils are near Muscatine soils, but they are more poorly drained and have a lighter colored surface layer than Muscatine soils. Denny soils are similar to Rushville soils in natural drainage, but they have a darker colored surface layer than Rushville soils.

Denny silt loam (0 to 2 percent slopes) (45).—This soil is in small depressions within large areas of darker colored soils.

Included with this soil in mapping are some areas where the surface layer is thicker and darker than that in this soil.

If this soil is adequately drained and fertilized, it is suited to crops commonly grown in the county. Improving drainage and maintaining fertility and tilth are the main concerns of management. Management group IIw–1.

Downs Series

The Downs series consists of gently sloping to moderately sloping, well-drained soils on uplands. These soils formed in loess.

In a representative profile the surface layer is very dark grayish-brown silt loam about 8 inches thick, and the subsurface layer is dark grayish-brown silt loam about 3 inches thick. The subsoil is about 37 inches thick. The upper 3 inches is dark-brown light silty clay, the next 24 inches is dark yellowish-brown silty clay loam mottled with strong brown, and the lower 10 inches is mixed grayish-brown and dark-brown light silty clay loam. The underlying material, to a depth of more than 60 inches, is mixed light brownish-gray and brown silt loam.

The content of organic matter is moderate in these soils. Permeability is moderate, and available water capacity is high.

Representative profile of Downs silt loam, 2 to 4 percent slopes, in a cultivated field, about 3 miles southeast of Hillview, 258 feet west and 234 feet south of NE. corner of SE¼NE¼ sec. 11, T. 11 N., R. 13 W.:

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

A2—8 to 11 inches, dark grayish-brown (10YR 4/2) silt loam; weak, thin, platy structure that parts to weak, fine, subangular blocky; friable; neutral; clear, smooth boundary.

B1t—11 to 14 inches, dark-brown (10YR 4/3) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B21t—14 to 25 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; dark-brown (10YR 3/3) clay films on peds; strongly acid; gradual, smooth boundary.

B22t—25 to 38 inches, dark yellowish-brown (10YR 4/4) silty clay loam; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; moderate, medium to coarse, subangular blocky structure; firm; dark grayish-brown (10YR 4/2) clay films; strongly acid; gradual, smooth boundary.

B3t—38 to 48 inches, mixed grayish-brown (10YR 5/2) and dark-brown (7.5YR 4/4) light silty clay loam; weak, coarse, angular blocky structure; firm to friable; grayish-brown (10YR 5/2) coatings on peds; medium acid; gradual, smooth boundary.

C—48 to 62 inches, mixed light brownish-gray (10YR 6/2) and brown (7.5YR 5/4) silt loam; massive; friable; moderately alkaline.

The Ap horizon ranges from very dark gray to very dark grayish brown, and the A2 horizon ranges from dark grayish brown to brown. The B horizon ranges from dark brown to strong brown. Reaction ranges from strongly acid in the B horizon to moderately alkaline in the C horizon.

Downs soils are on a landscape with Clarksdale soils, but they are better drained than Clarksdale soils. Downs soils

are similar to Fayette soils in natural drainage, but they have a darker colored surface layer than Fayette soils.

Downs silt loam, 2 to 4 percent slopes (386B).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas that have gray mottles less than 30 inches from the surface.

This soil is well suited to most crops commonly grown in the county. Maintaining fertility and tilth and controlling further erosion are the main concerns of management. Management group IIe–1.

Downs silt loam, 4 to 7 percent slopes (386C).—The profile of this soil is similar to that described as representative for the series.

Included with this soil in the mapping are some areas that have gray mottles less than 30 inches from the surface.

This soil is well suited to most crops commonly grown in the county. Maintaining fertility and tilth and controlling erosion are the main concerns of management. Management group IIe–1.

Downs silt loam, 4 to 10 percent slopes, eroded (386C2).—The profile of this soil is similar to that described as representative for the series, but the combined thickness of the surface layer and the subsurface layer is about 4 to 8 inches thinner.

Included with this soil in mapping are severely eroded areas that have little or no original material in the surface layer or the subsurface layer. These areas, which make up about 10 percent of the mapped areas, have a plow layer that consists mainly of the material in the subsoil. Also included are some areas where gray mottles are less than 30 inches from the surface.

This soil is suited to most crops commonly grown in the county. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIIe–1.

Dupo Series

The Dupo series consists of nearly level, somewhat poorly drained soils in the valley of the Illinois River. These soils formed in water-deposited silty sediment and in underlying, darker colored, clayey sediment of a buried soil.

In a representative profile the surface layer, about 8 inches thick, is dark grayish-brown silt loam over about 20 inches of mixed dark-brown and dark grayish-brown silt loam. The next layer, or buried soil, is about 32 inches thick. It is very dark gray silty clay loam mottled with reddish brown in the upper 8 inches, and very dark gray silty clay in the lower 24 inches.

The content of organic matter is low in these soils. Permeability is moderately slow to slow, and available water capacity is high.

Representative profile of Dupo silt loam, in a cultivated field, approximately 1 mile west of Hillview, 150 feet east and 40 feet north of SW. corner of SE¼SW¼ sec. 29, T. 12 N., R. 13 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; moderately alkaline: abrupt, smooth boundary.

C—8 to 28 inches, dark-brown (10YR 4/3) and dark grayish-brown (10YR 4/2) silt loam; few, fine, prominent, yellowish-red (5YR 5/6) mottles; moderate, thin, platy structure that parts to moderate, fine, angular blocky; friable; few, thin, distinct, very dark gray (10YR 3/1) strata and common, thin, distinct, light-gray (10YR 7/2) strata; moderately alkaline; clear, smooth boundary.

IIA11b—28 to 36 inches, very dark gray (N 3/0) silty clay loam; few, very fine, prominent, reddish-brown (5YR 4/4) mottles; strong, fine, angular blocky structure; firm; many pores; moderately alkaline; gradual, smooth boundary.

IIA12b—36 to 40 inches, very dark gray (N 3/0) silty clay; weak, fine and medium, angular blocky structure; firm; many wormholes; few smooth faces; moderately alkaline.

The Ap and C horizons range from dark gray to grayish brown. The buried horizons range from black to very dark gray. Depth to the IIA11b horizon ranges from about 20 to 40 inches. Reaction ranges from medium acid to moderately alkaline throughout the profile.

Dupo soils are on bottom lands near Radford and Wakeland soils, and they are similar to these soils in natural drainage. Dupo soils contain less organic matter and are lighter colored than Radford soils. Dupo soils have a buried clayey soil within 20 to 40 inches of the surface that is lacking in Wakeland soils.

Dupo silt loam (0 to 2 percent slopes) (180).—This soil is in the valley of the Illinois River.

Included with this soil in mapping are some areas where depth to the dark-colored buried soil is more than 40 inches. Also included are some areas that have sandy strata in the upper 20 to 40 inches.

This soil is suited to most crops commonly grown in the county. Improving drainage, protecting the soils from flooding, and maintaining fertility and tilth are the main concerns of management. Management group IIw–2.

Fayette Series

The Fayette series consists of gently sloping to very steep, well-drained soils on uplands. They formed in loess under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick, and the subsurface layer is grayish-brown silt loam about 4 inches thick (fig. 8). The subsoil is about 48 inches thick. It is dark yellowish-brown light silty clay loam mottled with dark brown in the upper 5 inches, dark-brown silty clay loam in the next 39 inches, and yellowish-brown heavy silt loam in the lower 4 inches.

The content of organic matter is low in these soils. Permeability is moderate, and available water capacity is high to very high.

Representative profile of Fayette silt loam, 2 to 4 percent slopes, in a pasture, approximately 4 miles south of Hillview in NW¼NW¼ sec. 22, T. 11 N., R. 13 W., 6 feet north of road right-of-way, and 6 feet west of fence near bend in road:

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

A2—8 to 12 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint, dark-brown (10YR 4/3) mottles; weak, fine, subangular blocky structure; friable; very strongly acid; abrupt, smooth boundary.

B1—12 to 17 inches, dark yellowish-brown (10YR 4/4) light silty clay loam, some areas of dark brown (10YR 4/3); weak, fine, subangular blocky structure; friable; extremely acid; clear, smooth boundary.

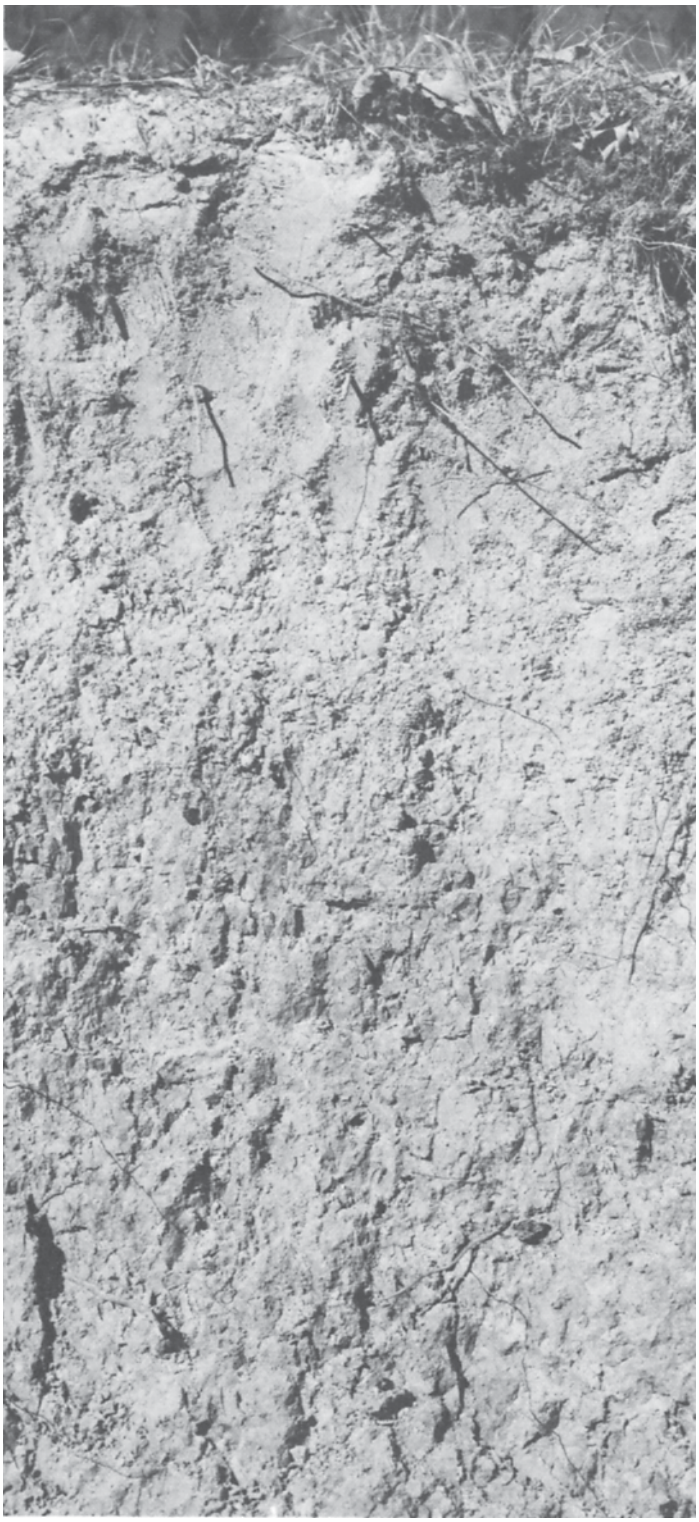

Figure 8.—**Profile of a Fayette silt loam that has a light-colored surface layer.**

B21t—17 to 25 inches, dark-brown (7.5YR 4/4) silty clay loam; weak, medium, prismatic structure that parts to strong, medium, subangular blocky; firm to friable; coatings of light gray (10YR 6/1) on peds when dry; very strongly acid; gradual, smooth boundary.

B22t—25 to 42 inches, dark-brown (7.5YR 4/4) silty clay loam; compound, strong, coarse, prismatic structure and moderate, medium to coarse, subangular blocky structure; firm; dark-brown (7.5YR 4/4) clay films on all structural aggregates but thicker on vertical faces than on horizontal faces; very strongly acid; gradual, smooth boundary.

B31t—42 to 56 inches, dark-brown 7.5YR 4/4) light silty clay loam; moderate, coarse, prismatic structure; friable to firm; dark-brown (7.5YR 3/2) clay films on peds; very strongly acid; gradual, smooth boundary.

B32—56 to 60 inches, yellowish-brown (10YR 5/4) heavy silt loam; weak, coarse, subangular blocky structure; friable; dark-brown (7.5YR 3/2) clay films on peds; strongly acid; diffuse, smooth boundary.

The Ap horizon ranges from dark grayish brown to dark brown. The A2 horizon ranges from dark grayish brown to grayish brown. The B horizon ranges from yellowish brown to dark brown. The B horizon ranges from strongly acid to extremely acid.

Fayette soils and the Clinton, Downs, and Tama soils formed in similar material. Fayette soils have better natural drainage than Clinton soils. Fayette soils are similar to Downs and Tama soils in natural drainage, but their surface layer is lighter colored and contains less organic matter than that of those soils.

Fayette silt loam, 2 to 4 percent slopes (280B).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas that have gray mottles in the subsoil.

If this soil is adequately fertilized and protected from erosion, it is well suited to most crops commonly grown in the county. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–1.

Fayette silt loam, 4 to 7 percent slopes (280C).—The profile of this soil is similar to that described as representative for the series, but this soil is more sloping.

Included with this soil in mapping are some areas that have gray mottles in the subsoil. Also included are some areas where the surface layer is thinner than that in the profile described as representative for the series.

If this soil is adequately fertilized and protected from erosion, it is well suited to most crops commonly grown in the county. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–1.

Fayette silt loam, 4 to 7 percent slopes, eroded (280C2).—The profile of this soil is similar to that described as representative for the series, but the combined thickness of the surface layer and the subsurface layer is about 5 to 9 inches thinner.

Included with this soil in mapping are severely eroded areas where little or no original surface soil and subsurface soil are remaining. In these areas the plow layer consists mainly of silty clay loam originally in the subsoil.

This soil is suited to crops commonly grown in the county. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–1.

Fayette silt loam, 7 to 12 percent slopes (280D).—The profile of this soil is similar to that described as representative for the series, but the surface layer is about 2 to 4 inches thinner, and depth to silt loam is about 48 inches.

Included with this soil in mapping are some areas that have gray mottles in the subsoil.

This soil is suited to cultivated crops grown in the county, but most of it is in pasture or woods. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIIe–1.

Fayette silt loam, 7 to 12 percent slopes, eroded (280D2).—This soil has a profile similar to that described as representative for the series, but the combined thickness of its surface layer and its subsurface layer is about 5 to 9 inches thinner. Also depth to silt loam is about 48 inches.

Included with this soil in mapping are severly eroded areas that have little or no original surface soil remaining. In these areas the plow layer consists mainly of silty clay loam originally in the subsoil. Also included are some areas that have gray mottles in the subsoil.

This soil is suited to most crops commonly grown in the county. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIIe–1.

Fayette silt loam, 12 to 18 percent slopes (280E).—This moderately steep soil has a profile that is similar to the representative profile, but its surface layer is about 4 inches thinner. Also, depth to silt loam is about 40 inches.

Included with this soil in mapping are some areas where glacial till is in the lower part of the profile.

Many areas of this soil are in woods or in pasture (fig. 9) and hay. This soil is poorly suited for most cultivated crops grown in the county because of moderate steepness of slope and the hazard of erosion. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IVe–1.

Fayette silt loam, 12 to 18 percent slopes, eroded (280E2).—The profile of this soil is similar to that described as representative for the series, but it is about 2 feet thinner. Also, depth to silt loam is about 40 inches. The combined thickness of the surface layer and subsurface layer in this soil is about 5 to 9 inches thinner than that in the profile described as representative for the series. In some small areas the plow layer consists mainly of material originally in the subsoil.

Figure 9.—**Pasture on an area of Fayette soils. Soil losses are kept to a minimum if pasture is well managed.**

Included with this soil in mapping are areas where calcareous silt loam is near the surface. Also included are some areas where glacial till is in the lower part of the profile.

This soil is poorly suited to most cultivated crops in the county because of moderate steepness of slope and the hazard of erosion. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IVe–1.

Fayette silt loam, 18 to 30 percent slopes (280F).—This steep soil has a profile similar to that described as representative for the series, but it is about 30 inches thinner. Also, depth to silt loam is about 30 inches.

Included with this soil in mapping are areas that have calcareous silt loam within 2 feet of the surface. Also included are some areas where glacial till is in the lower part of the profile and some areas that have chert and limestone.

Most of this soil is in woods or in permanent pasture. Because of steepness of slope, this soil is not suited to cultivated crops. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group VIe–1.

Fayette silt loam, 18 to 30 percent slopes, eroded (280F2).—This soil has a profile similar to that of the soil described as representative for the series, but the combined thickness of its surface layer and subsurface layer is about 5 to 9 inches thinner. Also, depth to underlying silt loam is about 30 inches.

Included with this soil in mapping are areas that have calcareous silt loam near the surface. Also included are some areas where glacial till, chert, and limestone outcrop on the lower slopes.

Most areas of this Fayette soil have been cleared and are heavily pastured. If this soil is well managed, it is suited to woodland. It is not suited to cultivated crops commonly grown in the county, because of steepness of slope. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group VIe–1.

Fayette silt loam, 30 to 60 percent slopes (280G).—This very steep soil has a profile similar to that described as representative for the series, but it is about 3 feet thinner. Depth to underlying silt loam is about 2 feet.

Included with this soil in mapping are areas where glacial till, chert, and limestone outcrops on the lower slopes.

Most areas of this soil are in woodland. This soil is not suited to cultivated crops commonly grown in the county. Steepness and the hazard of erosion are the main limitations to use of this soil. Management group VIIe–1.

Hamburg Series

The Hamburg series consists of steep to very steep, somewhat excessively drained soils on uplands, mainly on exposed ridgetops on the bluff of the Illinois River. These soils formed in loess. The native vegetation was mainly prairie grasses.

In a representative profile the surface layer is dark-brown silt about 6 inches thick. Below the surface layer, to a depth of more than 60 inches, is light yellowish-brown silt.

The content of organic matter is low in these soils, and they are calcareous throughout the profile. Permeability is moderately rapid, and available water capacity is moderate.

Representative profile of Hamburg silt, 20 to 60 percent slopes, in a pasture of native grass, 600 feet east of NW. corner of SW¼NE¼ sec. 4, T. 9 N., R. 13 W.:

A1—0 to 6 inches, dark-brown (10YR 4/3) silt; moderate, fine and medium, granular structure; friable; soft lime concretions; moderately alkaline; abrupt, irregular boundary.

C—6 to 60 inches, light yellowish-brown (10YR 6/4) silt; massive; friable; lime concretions as much as 1 inch in diameter; moderately alkaline.

The A1 horizon ranges from dark grayish brown to dark brown. Texture ranges from silt loam to very fine sand throughout the profile. Reaction ranges from neutral to moderately alkaline.

Hamburg soils have a profile similar to that of Bold soils, but they have a darker colored surface layer, contain less clay throughout, and occupy a different position on the landscape. Hamburg soils are near Bloomfield soils, and they are similar to those soils in natural drainage but are less sandy throughout.

Hamburg silt, 20 to 60 percent slopes (30G).—This soil is mainly on exposed ridgetops on the bluff of the Illinois River.

Included with this soil in mapping are some dunelike sandy areas and some rock outcrops too small to show. Also included are some areas where the underlying material is redder than that of this soil.

This Hamburg soil is not suited to cultivated crops. Some areas are used for pasture, but most areas are used as wildlife habitat and for scenic purposes (fig. 10). Management group VIIe–1.

Haymond Series

The Haymond series consists of nearly level, well-drained soils. Most of these soils are in the valleys of small creeks, but a few are in the valley of the Illinois River. These soils formed mainly in water-deposited sediment.

In a representative profile the surface layer is dark-brown silt loam about 7 inches thick. The subsoil, about 21 inches thick, is dark-brown silt loam that has thin lenses of very dark gray and dark gray fine sand. The underlying material is dark yellowish-brown sandy loam in the upper 18 inches. It is dark grayish-brown silt loam and some thin lenses of fine sand in the lower 14 inches.

The content of organic matter is low in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Haymond silt loam, in a pasture, about 1 mile southeast of Carrollton, 144 feet east and 150 feet south of NW. corner of SW¼ sec. 25, T. 10 N., R. 12 W.:

Ap—0 to 7 inches, dark-brown (10YR 4/3) silt loam and some fine sand; few, fine, distinct areas of very dark grayish brown (10YR 3/2); weak, medium, granular structure; friable; neutral; gradual, smooth boundary.

B—7 to 28 inches, dark-brown (10YR 4/3) silt loam and some thin lenses of very dark gray (10YR 3/1) and dark gray (10YR 4/1) fine sand; weak, medium,

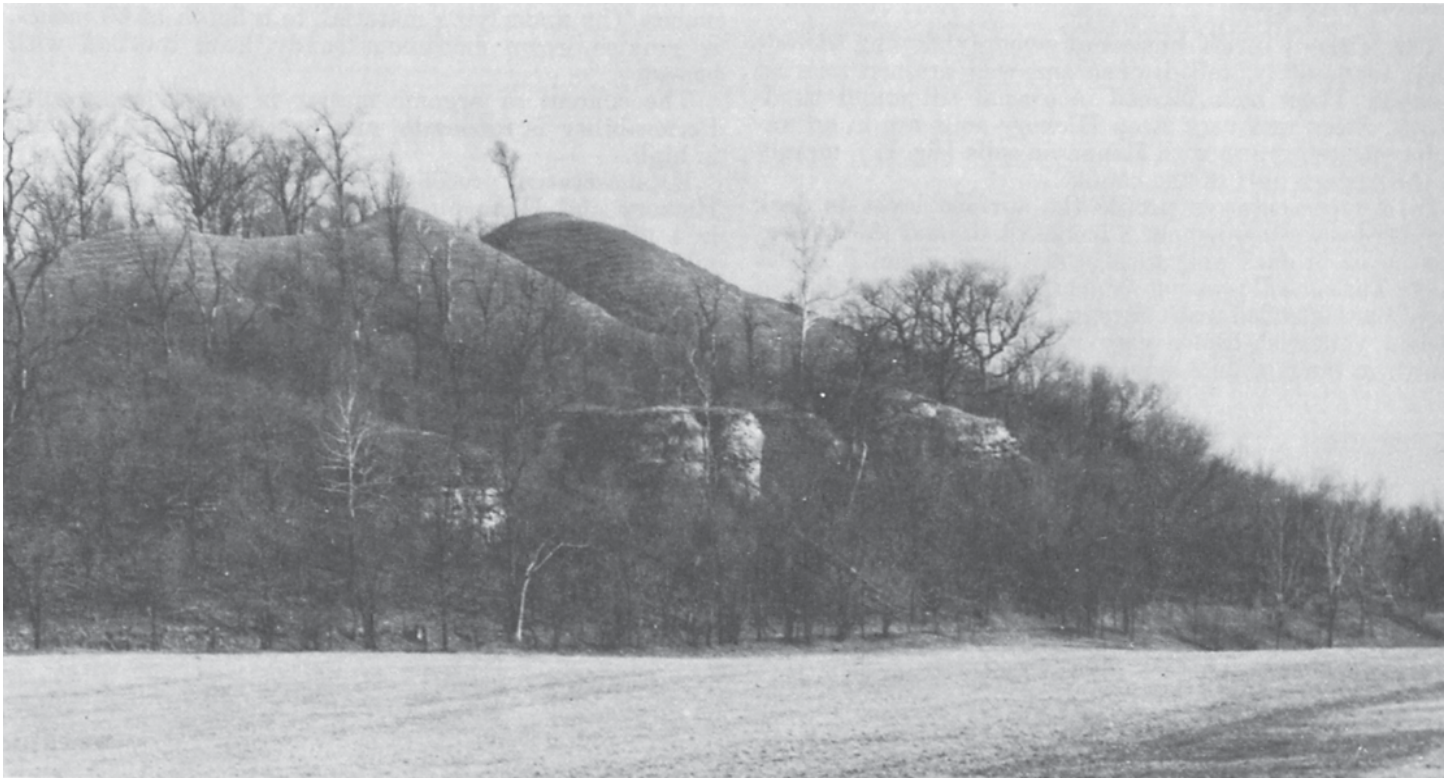

Figure 10.—A Hamburg soil on the grassy peaks on a bluff along the Illinois River.

subangular blocky structure; breaks along strata lines; friable; neutral; gradual, smooth boundary.

C1—28 to 46 inches, dark yellowish-brown (10YR 4/4) sandy loam; massive; breaks along strata lines; friable; neutral; gradual, smooth boundary.

C2—46 to 60 inches, dark grayish-brown (10YR 4/2) silt loam and some lenses of fine sand; massive; friable; neutral.

The Ap horizon ranges from dark grayish brown to brown. The B horizon ranges from 10 to 24 inches in thickness. The C horizon has gray mottles in some places.

Haymond soils are on bottom lands near Wakeland soils, but they have better natural drainage than those soils. Haymond soils are similar to Huntsville soils in natural drainage, but they have a thinner and lighter colored surface layer than Huntsville soils.

Haymond silt loam (0 to 2 percent slopes) (331).—This soil formed mainly in water-deposited sediment.

Included with this soil in mapping are some soils that are gray at a depth of less than 30 inches and some soils that have chert fragments throughout the profile.

If this soil is protected from flooding and adequately fertilized, it is well suited to most crops commonly grown in the county. Maintaining fertility and tilth, and controlling flooding are the main concerns of management. Management group I–1.

Hennepin Series

The Hennepin series consists of steep to very steep, well-drained soils on uplands. These soils formed in glacial till under hardwoods. They are in an undifferentiated group with the Hickory soils, mainly in the eastern half of the county.

In a representative profile the surface layer is dark grayish-brown loam about 2 inches thick. The subsoil, about 10 inches thick, is brown light clay loam mottled with dark yellowish brown. The underlying material, to a depth of 60 inches, is a brown calcareous loam to sandy loam mottled with grayish brown.

The content of organic matter is low. Permeability and available water capacity are moderate.

Representative profile of Hennepin loam in an area of Hickory and Hennepin loams, 30 to 60 percent slopes, in a pasture, about 1 mile southeast of Carrollton, 465 feet east and 192 feet south of NW. corner of SW¼ sec. 25, T. 10 N., R. 12 W., midway between the top and bottom of steep slope:

A1—0 to 2 inches, dark grayish-brown (10YR 4/2) loam that has a few pebbles; moderate to strong, medium. granular structure; friable; moderately alkaline; abrupt, irregular boundary.

B2—2 to 12 inches, brown (10YR 5/3) light clay loam that has a few pebbles; some common, fine, faint areas of dark yellowish brown (10YR 4/4); weak, fine. subangular blocky structure; friable; moderately alkaline; clear, broken boundary.

C—12 to 60 inches, brown (10YR 5/3) loam to sandy loam; many, fine, faint areas of grayish brown (10YR 5/2); massive, but tends to break into fine angular blocks; friable; moderately alkaline.

The A1 horizon ranges from silt loam to loam. Depth to the C horizon ranges from about 10 to 20 inches. Reaction ranges from slightly acid to moderately alkaline.

Hennepin soils are on slopes with Hickory soils and are similar to those soils in natural drainage, but the combined thickness of the A and B horizons is thinner in Hennepin soils than in Hickory soils.

Hickory Series

The Hickory series consists of strongly sloping to very steep, moderately well drained and well drained soils on uplands. These soils formed in glacial till under hardwoods. Steep and very steep Hickory soils are in an undifferentiated group with Hennepin soils (fig. 11), mainly in the eastern half of the county.

In a representative profile the surface layer is dark grayish-brown loam about 8 inches thick, and the subsurface layer is dark yellowish-brown loam about 5 inches thick. The subsoil is about 37 inches thick. It is dark-brown clay loam mottled with strong brown in the upper 21 inches, yellowish-brown clay loam mottled with strong brown in the middle 9 inches, and yellowish-brown sandy clay loam mottled with strong brown in the lower 7 inches. The underlying material, to a depth of 60 inches, is grayish-brown calcareous sandy loam mottled with brown.

The content of organic matter is low in these soils. Permeability is moderate, and available water capacity is high.

Representative profile of Hickory loam, in an area of Hickory and Hennepin loams, 18 to 30 percent slopes, in a road cut about one-half mile southwest of Athensville, 800 feet north of the center of NE¼ sec. 34, T. 12 N., R. 10 W., on east side of right-of-way:

A1—0 to 8 inches, dark grayish-brown (10YR 4/2) loam; weak, fine, granular structure; friable; medium acid; abrupt, wavy boundary.

Figure 11.—Typical landscape of Hickory and Hennepin loams in background and Haymond soils in a small area in foreground.

A2—8 to 13 inches, dark yellowish-brown (10YR 4/4) loam and a few pebbles; weak, fine, platy structure that parts to weak, fine, subangular blocky; friable; medium acid; clear, smooth boundary.

B1t—13 to 18 inches, dark-brown (7.5YR 4/4) light clay loam; moderate, fine, subangular blocky structure; firm; few thin clay films; strongly acid; clear, smooth boundary.

B21t—18 to 27 inches, dark-brown (7.5YR 4/4) heavy clay loam; moderate to strong, medium, subangular blocky structure; firm; continuous, dark-brown (7.5YR 4/4) clay films; strongly acid; clear, smooth boundary.

B22t—27 to 34 inches, dark-brown (7.5YR 4/4) heavy clay loam; common, medium, faint, strong-brown (7.5YR 4/8) mottles; moderate, medium, subangular blocky structure; firm; continuous, dark-brown (7.5YR 3/2) clay films; strongly acid; gradual, smooth boundary.

B23t—34 to 43 inches, yellowish-brown (10YR 5/4) light clay loam; few, medium, faint, strong-brown (7.5YR 5/6) mottles; weak, medium to coarse, subangular blocky structure; friable; continuous, dark-brown (7.5YR 3/2) clay films; strongly acid; gradual, smooth boundary.

B3t—43 to 50 inches, yellowish-brown (10YR 5/4) sandy clay loam; few, medium, faint, strong-brown (7.5YR 5/6) mottles; weak, coarse, subangular blocky structure; friable; nearly continuous, dark-brown (7.5YR 3/2) clay films; strongly acid; gradual, smooth boundary.

C—50 to 60 inches, grayish-brown (10YR 5/2) sandy loam; common and many, distinct, brown (10YR 5/3) mottles; massive; moderately alkaline; about 5 percent pebbles.

The combined thickness of the A1 and A2 horizons ranges from about 8 to 16 inches. The B horizon ranges from slightly acid to very strongly acid. Depth to the C horizon commonly ranges from about 40 to 60 inches. The C horizon ranges from sandy loam to clay loam.

Hickory soils are similar to Clinton, Fayette, and Hennepin soils in natural drainage. They have thicker combined A and B horizons than the Hennepin soils. Hickory soils formed mainly in glacial till, but the Fayette and Clinton soils formed in loess.

Hickory loam, 7 to 12 percent slopes, eroded (8D2).—This soil has a profile similar to that described as representative for the series, but the combined thickness of the surface layer and the subsurface layer is about 6 to 10 inches thinner.

Included with this soil in mapping are soils that formed partly in loess. Also included are some areas where the surface layer consists mainly of material formerly in the subsoil.

This soil is poorly suited to most cultivated crops commonly grown in the county because of strongness of slope. The hazard of further erosion and poor fertility and tilth are the main limitations to use of this soil. Management group IIIe–1.

Hickory loam, 12 to 18 percent slopes (8E).—This soil has a profile similar to that described as representative for the series.

Included with this soil in mapping are soils that formed in loess, mainly on upper slopes. Also included are soils that have shale in the lower part of the profile.

Most of this soil is in woodland. This soil is poorly suited to the cultivated crops commonly grown in the county because of moderate steepness of slope. Controlling erosion is the main concern of management. Management group IVe–1.

Hickory loam, 12 to 18 percent slopes, eroded (8E2).—This soil has a profile similar to that described as representative for the series, but the combined thickness of the surface layer and the subsurface layer is 6 to 10 inches thinner.

Included with this soil in mapping are some areas where the surface layer consists mainly of material formerly in the subsoil. Also included are some areas where calcareous glacial till is at a depth of less than 40 inches and some areas where the soils have shale in the lower part of the profile.

This soil is poorly suited to the cultivated crops commonly grown in the county. The hazard of further erosion and moderate steepness of slope are the main limitations to use and management of this soil. Management group IVe–1.

Hickory and Hennepin loams, 18 to 30 percent slopes (958F).—The Hickory soil has the profile described as representative for the Hickory series, and the Hennepin soil has a profile similar to that described as representative for the Hennepin series. These soils occur together but not in a regular pattern. Some areas of each soil are large enough to be mapped separately, but such mapping would serve no useful purpose. Individual areas consist entirely of Hickory soil, of Hennepin soil, or of both.

Included with these soils in mapping are soils that formed in sandstone or shale.

Most areas of these soils are wooded. Because they are steep, these soils are not suited to cultivated crops. Steepness of slope and the hazard of erosion are the main limitations to use and management of these soils. Management group VIe–1.

Hickory and Hennepin loams, 18 to 30 percent slopes, eroded (958F2).—These soils occur together but not in a regular pattern. Some areas of each soil are large enough to be mapped separately, but such mapping would serve no useful purpose. Individual areas consist entirely of Hickory soil, of Hennepin soil, or of both.

Included with these soils in mapping are areas where the surface layer consists mainly of material formerly in the subsoil. Also included are soils that have sandstone or shale in the lower part of the profile.

Most areas of these soils have been cleared and are heavily pastured. These soils are not suited to cultivated crops. Steepness of slope and the hazard of further erosion are the main limitations to use and management of these soils. Management group VIe–1.

Hickory and Hennepin loams, 30 to 60 percent slopes (958G).—The Hickory soil has a profile similar to that described as representative for the Hickory series, and the Hennepin soil has the profile described as representative for the Hennepin series. These soils occur together but not in a regular pattern. Some areas of each are large enough to be mapped separately if such mapping were needed. Individual areas consist entirely of Hickory soil, of Hennepin soil, or of both.

Included with these soils in mapping are small areas where the soils formed in material weathered from sandstone and shale.

Most areas of these soils are wooded. Because they are very steep, these soils are not suited to cultivated crops. Steepness of slope is the main limitation to use and management of these soils. Management group VIIe–1.

Huntsville Series

The Huntsville series consists of nearly level, moderately well drained and well drained soils that are mainly in areas along Macoupin Creek. These soils formed in water-deposited sediment.

In a representative profile the surface layer is about 26 inches thick. It is very dark brown silt loam in the upper 17 inches, very dark grayish-brown silt loam in the next 5 inches, and very dark grayish-brown silt loam mottled with dark brown in the lower 4 inches. The underlying material, to a depth of 60 inches, is dark-brown silt loam in the upper 14 inches and yellowish-brown very fine sandy loam in the lower 20 inches.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Huntsville silt loam, in a cultivated field, approximately 2 miles east of Rockbridge, in NE¼NE¼ sec. 35, T. 10 N., R. 10 W., 200 feet east from east bridge and 200 feet south of center of road:

A11—0 to 17 inches, very dark brown (10YR 2/2) silt loam, weak, medium, subangular blocky structure; friable; neutral; diffuse, smooth boundary.

A12—17 to 22 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, subangular blocky structure; friable; very dark brown (10YR 2/2) coatings on structural aggregates; slightly acid; diffuse, smooth boundary.

A13—22 to 26 inches, very dark grayish-brown (10YR 3/2) silt loam; many, medium, faint, dark-brown (10YR 4/3) mottles; weak, medium, subangular blocky structure; friable; few, thin, light-gray (10YR 6/1) coatings on structural aggregates; slightly acid; diffuse, smooth boundary.

C1—26 to 40 inches, dark-brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable; few, thin, light-gray (10YR 6/1), silty coatings and very dark grayish-brown (10YR 3/2) organic coatings on structural aggregates; slightly acid; diffuse, smooth boundary.

C2—40 to 60 inches, yellowish-brown (10YR 5/4) very fine sandy loam; massive; very friable; slightly acid.

The A horizon ranges from black to dark brown, and it is from 24 to 40 inches thick. The C horizon ranges from silt loam to fine sandy loam. Reaction ranges from neutral to mildly alkaline throughout the profile.

Huntsville soils are near Lawson soils on bottom lands, but they have better natural drainage than those soils. Huntsville soils are similar to the Haymond and Worthen soils in natural drainage and texture throughout the profile; but they have a thicker and darker colored surface layer than Haymond soils, and they lack a B horizon that is characteristic of Worthen soils.

Huntsville silt loam (0 to 2 percent slopes) (77).—This soil formed in water-deposited sediment.

Included with this soil in mapping are some areas that are more sandy throughout the profile than this soil. Also included are some soils that are grayer than this soil.

This soil is well suited to most crops commonly grown in the county. Controlling occasional flooding, which is generally of very short duration, and maintaining fertility and tilth are the main concerns of management. Management group I–1.

Keomah Series

The Keomah series consists of nearly level to gently sloping, somewhat poorly drained soils on uplands. These soils formed in loess under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick, and the subsurface layer is gray silt loam about 5 inches thick. The subsoil is about 39 inches thick. It is brown heavy silt loam mottled with yellowish brown in the upper 5 inches; dark-brown silty clay loam mottled with light brownish gray and yellowish brown in the next 10 inches; grayish-brown silty clay loam mottled with strong brown and yellowish red in the next 11 inches; and light brownish-gray heavy silt loam mottled with yellowish brown in the lower 13 inches. The underlying material, to a depth of more than 60 inches, is light-gray silt loam mottled with yellowish brown.

The content of organic matter is low in these soils. Permeability is moderately slow, and available water capacity is high to very high.

Representative profile of Keomah silt loam, 0 to 2 percent slopes, in a plowed field, approximately 4 miles north and 3 miles west of Greenfield, 60 feet west and 60 feet south of NE. corner of NW¼ sec. 13, T. 11 N., R. 11 W.:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine and medium, granular structure; friable; moderately alkaline; abrupt, smooth boundary.

A2—6 to 11 inches, gray (10YR 5/1) silt loam; many, fine, faint areas of light gray (10YR 6/1); moderate, thick, platy structure; friable; some very dark gray (10YR 3/1) iron concretions; neutral; clear, smooth boundary.

B1—11 to 16 inches, brown (10YR 5/3) heavy silt loam; few, fine, prominent, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; coatings of white (10YR 8/1) silt on peds when dry; strongly acid; gradual, smooth boundary.

B21t—16 to 26 inches, dark-brown (10YR 4/3) silty clay loam; many, fine, distinct, light grayish-brown (10YR 6/2) mottles and common, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine and medium, prismatic structure that parts to moderate, medium, angular blocky; firm; dark grayish-brown (2.5Y 4/2) clay films that are thicker on vertical cleavage planes than on horizontal planes; strongly acid; gradual, smooth boundary.

B22t—26 to 37 inches, grayish-brown (2.5Y 5/2) silty clay loam; many, medium, prominent, strong-brown (7.5YR 5/6) and yellowish-red (5YR 5/6) mottles; moderate, coarse, prismatic structure that parts to moderate, coarse, angular blocky; firm; dark-gray (10YR 4/1) clay films on peds; strongly acid; gradual, smooth boundary.

B3t—37 to 50 inches, light brownish-gray (10YR 6/2) heavy silt loam; many, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; firm; dark-gray (10YR 4/1) clay films in cracks; many fine pores lined with very dark gray (10YR 3/1); medium acid; gradual, smooth boundary.

C—50 to 62 inches, light-gray (10YR 6/1) silt loam; many, medium, prominent, yellowish-brown (10YR 5/4) mottles; massive; friable; many fine pores lined with very dark gray (10YR 3/1); neutral.

The Ap and A2 horizons range from dark grayish brown to gray, and the combined thickness of the Ap and A2 horizons ranges from about 8 to 15 inches. The B horizon ranges from dark brown to light brownish gray and from

heavy silt loam to heavy silty clay loam. The B horizon ranges from medium acid to strongly acid.

Keomah soils are near the Clinton, Rushville, and Sable soils on the landscape. They are more poorly drained than Clinton soils and better drained than the Rushville and Sable soils. Keomah soils have a lighter colored surface layer than Sable soils (fig. 12). They are similar to Clarksdale soils in natural drainage, but they have a lighter colored surface layer than those soils.

Keomah silt loam, 0 to 2 percent slopes (17A).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas that have less clay in the subsoil than this soil. Also included are some areas that are dark colored in the upper part of the subsoil.

If this soil is adequately drained and fertilized, it is suited to crops commonly grown in the county. Somewhat poor natural drainage is the main limitation to use and management of this soil. Management group IIw–3.

Keomah silt loam, 2 to 4 percent slopes (17B).—This soil has a profile similar to that described as representative for the series, but the combined thickness of its surface layer and subsurface layer is about 2 to 4 inches thinner.

Included with this soil in mapping are some areas where the subsoil has less clay than that in the profile described as representative for the series.

This soil is suited to most crops commonly grown in the county. Controlling erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–2.

La Hogue Series

The La Hogue series consists of nearly level to gently sloping, somewhat poorly drained soils on sandy terraces in the valley of the Illinois River. These soils formed in water-deposited sediment. They are the principal soils on what is known locally as the "sand ridge."

In a representative profile the surface layer is very dark brown loam about 13 inches thick. The subsoil is about 37 inches thick. It is dark-brown loam mottled with dark grayish brown in the upper 5 inches; dark-brown heavy loam mottled with dark grayish brown in the next 6 inches; dark-brown sandy clay loam mottled with dark and strong brown in the next 12 inches; and dark-brown sandy loam mottled with strong brown, reddish brown, and yellowish red in the lower 14 inches. The underlying material, to a depth of more than 70 inches, is mixed pale-brown, light yellowish-brown, and dark-brown stratified sand and loamy sand.

The content of organic matter is moderate in these soils. Permeability and available water capacity are moderate.

Representative profile of La Hogue loam, 0 to 2 percent slopes, in a cultivated field, about 2 miles northwest of Hillview, 60 feet south of center of road at NW. corner of SW¼ sec. 20, T. 12 N., R. 13 W.:

Ap—0 to 7 inches, very dark brown (10YR 2/2) loam; weak, medium, granular structure; friable; abundant roots; neutral; abrupt, smooth boundary.

A1—7 to 13 inches, very dark brown (10YR 2/2) loam; moderate, medium, granular structure; friable; abundant roots; neutral; clear, smooth boundary.

B1—13 to 18 inches, dark-brown (10YR 3/3) loam; few, fine, faint, dark grayish-brown (10YR 4/2) mottles;

Figure 12.—**Contrasting light-colored Keomah soils and dark-colored Sable soils.**

weak, fine, subangular blocky structure that parts to weak, medium, granular; friable; discontinuous coatings of very dark gray (10YR 3/1) organic matter and clay; plentiful roots; common iron and manganese concretions; medium acid; gradual, smooth boundary.

B21t—18 to 24 inches, dark-brown (10YR 4/3) heavy loam; common, fine, faint, dark grayish-brown (10YR 4/2) mottles; weak, medium subangular blocky structure; firm; discontinuous organic coatings of very dark gray (10YR 3/1) clay; common iron and manganese concretions; plentiful roots; strongly acid; clear, smooth boundary.

B22t—24 to 31 inches, dark-brown (7.5YR 4/2) light sandy clay loam; few, fine, faint, dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; discontinuous dark-brown (7.5YR 3/2) clay films; common iron and manganese concretions; plentiful roots; strongly acid; clear, smooth boundary.

B23t—31 to 36 inches, dark-brown (7.5YR 4/2) sandy clay loam; few, fine, faint, dark-brown (7.5YR 4/4) mottles and distinct strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; firm, discontinuous, dark-brown (7.5YR 3/2) clay films; few iron and manganese concretions; few roots; strongly acid; clear, smooth boundary.

B31t—36 to 43 inches, dark-brown (7.5YR 4/2) heavy sandy loam; few, fine, faint, dark-brown (7.5YR 4/4) mottles and distinct strong-brown (7.5YR 5/6) mottles; weak, coarse, subangular blocky structure; firm; patchy dark-brown or brown (7.5YR 4/2) clay films; few iron and manganese concretions; few roots; strongly acid; gradual, smooth boundary.

B32—43 to 50 inches, dark-brown (7.5YR 4/4) sandy loam; few, fine, distinct, reddish-brown (5YR 4/4) and yellowish-red (5YR 4/6) mottles; weak, coarse, angular blocky structure; friable; few iron and manganese concretions; strongly acid; clear, smooth boundary.

C—50 to 73 inches, mixed pale-brown (10YR 6/3), light yellowish-brown (10YR 6/4), and dark-brown (7.5YR 4/4) stratified sand and loamy sand; massive; loose in sand layers and very friable in loamy sand layers; medium acid.

The A horizon ranges from about 10 to 24 inches in thickness and from black to very dark grayish brown in color. Depth to the C horizon ranges from about 40 to more than 60 inches.

La Hogue soils are near Onarga soils on terraces, but they are more poorly drained than those soils. They have natural drainage similar to that of Beardstown and Littleton soils that also are on terraces. La Hogue soils lack an A2 horizon characteristic of Beardstown soils, and they have more sand throughout than the Littleton soils.

La Hogue loam, 0 to 2 percent slopes (102A).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas where the subsoil is grayer than that in this soil. Also included are some areas where the subsoil is more sandy and less clayey than that in this soil.

This soil is suited to most crops commonly grown in the county. Although this soil is somewhat poorly drained, a lack of water during some growing seasons is the main limitation to use and management. Management group I–3.

La Hogue loam, 2 to 4 percent slopes (102B).—This soil has a profile similar to that described as representative for the series, but its surface layer is about 2 to 5 inches thinner. This soil is mainly on the narrow break from the sand ridge to the lower level flood plain.

Included with this soil in mapping are some areas that are better drained, areas that are more strongly sloping, and areas that are more sandy and less clayey than in the profile described as representative for the series. Also included are some soils near the bottom of slopes, that have a grayer subsoil than the soil described as representative for the series. Some areas of these soils are seepy during periods of high rainfall.

Most of this soil is not so well suited to cultivated crops as La Hogue loam, 0 to 2 percent slopes, but it is generally cropped with that soil. Some areas have been planted to trees, and some are used for pasture. Short slopes, droughtiness, and low fertility and poor tilth are the main limitations to use of this soil. Management group IIe–2.

Lawson Series

The Lawson series consists of nearly level, somewhat poorly drained soils in valleys of creeks throughout the county. These soils formed in water-deposited sediment.

In a representative profile the surface layer is very dark grayish-brown silt loam about 36 inches thick. The underlying material, to a depth of 60 inches, is dark grayish-brown silt loam streaked with grayish-brown lenses of very fine sand.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Lawson silt loam, in a cultivated field, about 1½ miles east of Kane, 60 feet east and 190 feet north of center of east bridge abutment, in SE¼SE¼ sec. 28, T. 9 N., R. 11 W.:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A1—8 to 36 inches, very dark grayish-brown (10YR 3/2) silt loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, thick, platy structure that parts to moderate, fine, granular and subangular blocky; friable; moderately alkaline.

C—36 to 60 inches, dark grayish-brown (10YR 4/3) silt loam, few, fine, faint, grayish-brown (10YR 5/2) lenses of very fine sand; weak, medium, platy structure that parts to weak, fine, granular; friable; moderately alkaline.

The A horizon ranges from black to very dark grayish brown and is about 24 to 50 inches thick. Reaction ranges from mildly alkaline to moderately alkaline throughout the profile.

Lawson soils are near Huntsville soils on bottom lands, but they are more poorly drained than those soils. Lawson soils are similar to Wakeland soils in natural drainage and in texture throughout the profile, but Lawson soils have a thicker, darker colored A horizon that contains more organic matter.

Lawson silt loam (0 to 2 percent slopes) (451).—This soil formed in water-deposited sediment.

Included with this soil in mapping are some areas where the surface layer is less than 24 inches thick and some areas that have a sandy loam surface layer. Many of these areas are indicated on the map by the standard sand spot symbol.

This soil is well suited to most cultivated crops grown in the county. It is subject to periodic or seasonal flooding. Controlling flooding and maintaining fertility and tilth are the main concerns of management. Management group I–3.

Limestone Rock Land and Cherty Land

Limestone rock land and Cherty land, 25 to 70 percent slopes (94G) consists of rock outcrops that line the east wall of the Illinois River Valley, stony talus slopes that are below the wall, and stony slopes along some narrow valleys leading into the upland from the valley of the river.

Included with this land in mapping are areas of neutral to limy silty alluvium. This alluvium has washed from higher, adjacent, silty soils; and it is mixed with large to small limestone and chert fragments.

This land has had little or no soil formation. The surface layer is slightly darkened in some limestone areas, and there is a leached profile several feet thick in some cherty areas.

Some areas on lower slopes are cleared and are pastured, but most areas are in brushy growth or are wooded. The stands consist mainly of low-value trees. This land type is severely limited for wildlife and recreational development, though it does have scenic value. Limestone quarries are in areas of this land type. Management group VIIs–2.

Littleton Series

The Littleton series consists of nearly level, somewhat poorly drained soils that formed in water-deposited sediment in the valley of the Illinois River adjacent to the bluff.

In a representative profile the surface layer is very dark grayish-brown and very dark brown silt loam about 25 inches thick. The subsoil, about 23 inches thick, is dark grayish-brown silt loam mottled with dark yellowish brown in the upper 17 inches and grayish-brown silt loam mottled with dark yellowish brown in the lower 6 inches. The underlying material, to a depth of more than 60 inches, is mixed gravish-brown, yellowish-brown, and dark yellowish-brown silt loam.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Littleton silt loam, in a cultivated field, about 2 miles north of Eldred, in SE¼SW¼ sec. 16, T. 10 N., R. 13 W., from center line of Eldred and Hillview blacktop road at junction of field road, 819 feet west along field road, and 35 feet north into field:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; porous; mildly alkaline; abrupt, smooth boundary.

A1—9 to 17 inches, very dark brown (10YR 2/2) silt loam; moderate, fine and medium, granular structure; friable; porous; neutral; gradual, smooth boundary.

A3—17 to 25 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, angular and subangular blocky structure; friable; porous; neutral; gradual, smooth boundary.

B2—25 to 42 inches, dark grayish-brown (10YR 4/2) heavy silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, angular blocky structure that parts to weak, medium, subangular blocky; friable; thin, discontinuous, dark-brown (10YR 3/3) organic coatings; porous; mildly alkaline; gradual, smooth boundary.

B3—42 to 48 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, subangular blocky structure; friable; porous; mildly alkaline; gradual. smooth boundary.

C—48 to 60 inches, mixed grayish-brown (10YR 5/2), yellowish-brown (10YR 5/6), and dark yellowish-brown (10YR 4/4) silt loam; massive; friable, mildly alkaline.

The Ap horizon ranges from black to very dark grayish brown. It is generally about 24 inches thick, but it ranges from 24 to 40 inches. Reaction ranges from neutral to mildly alkaline throughout the profile.

Littleton soils are near Worthen soils on the landscape, but they are more poorly drained than those soils. Littleton soils are similar to the Lawson and La Hogue soils in natural drainage; but they have a weakly developed B horizon that is not characteristic of Lawson soils, and they have less sand throughout than La Hogue soils.

Littleton silt loam (0 to 2 percent slopes) (81).—This soil is in the valley of the Illinois River adjacent to the bluff. Included with this soil in mapping are some areas where the surface layer is less than 24 inches thick and some small areas that have clayey sediment at a depth of 40 to 60 inches. Also included are some areas where slopes are greater than 2 percent.

This soil is well suited to cultivated crops commonly grown in the county. Maintaining fertility and tilth are the main concerns of management. Management group I–3.

McFain Series

The McFain series consists of nearly level to depressional, very poorly drained and poorly drained soils in the valley of the Illinois River. These soils formed in lakebed sediment that contains many fragments of snail shells and mussel shells.

In a representative profile the surface layer is black light silty clay about 18 inches thick. The subsoil is about 14 inches thick. It is mixed grayish-brown very fine sandy loam mottled with yellowish-red and black silty clay in columnar krotovinas, both in about equal parts. This layer contains fragments of white snail shells and mussel shells. The underlying material, from a depth of 32 inches to about 60 inches, is grayish-brown fine sandy loam mottled with dark brown in the upper 8 inches and dark grayish-brown light silty clay loam mottled with dark brown in the lower 20 inches. This layer contains many fragments of snail shells and mussel shells.

The content of organic matter is high in these soils. Permeability is slow in the upper 18 inches and moderate at a depth of about 18 inches to 60 inches. Available water capacity is high.

Representative profile of McFain silty clay, in a cultivated field, about 2 miles west of Eldred, 1,800 feet west and 400 feet south of NE. corner of sec. 30, T. 10 N. R. 13 W., 81 feet north and 21 feet east of gate post:

Ap—0 to 8 inches, black (10YR 2/1) light silty clay; weak to moderate, fine, subangular blocky structure and weak, fine, crumb structure; firm; neutral; abrupt, smooth boundary.

A12—8 to 18 inches, black (10YR 2/1) light silty clay; weak, fine and very fine, angular blocky structure; firm; few, thin, white snail shells and mussel shells; moderately alkaline; abrupt, smooth boundary.

IIBg—18 to 32 inches, approximately one-half of the mass of this horizon is grayish-brown (2.5Y 5/2) very fine sandy loam; common, coarse, prominent, yellowish-red (5YR 5/8) mottles; massive; friable; com-

mon fragments of white snail shells and mussel shells; the other half of this horizon is made up of columnar krotovinas, about 2 to 3 inches in diameter, of black (10YR 2/1) silty clay; massive; firm; few, thin, white snail shells; moderately alkaline; clear, smooth boundary.

IIC1g—32 to 40 inches, grayish-brown (2.5Y 5/2) fine sandy loam; few, fine, prominent, dark-brown (7.5YR 4/4) mottles; massive; very friable; many fine snail shells and mussel shells; few large mussel shells; few krotovinas; moderately alkaline; abrupt, irregular boundary.

IIC2g—40 to 60 inches, dark grayish-brown (2.5Y 4/2) light silty clay loam; few, fine, prominent, dark-brown (7.5YR 4/4) mottles; massive; friable to firm; moderately alkaline.

The A horizon is about 12 to 20 inches thick and ranges from neutral to mildly alkaline. It is commonly silty clay, but it ranges from silty clay to silty clay loam. The A horizon ranges from black to very dark gray. The B horizon ranges from silty clay to silt loam and sandy loam. The C horizon ranges from fine sandy loam to silty clay loam. Snail and mussel shells and shell fragments are throughout the profile, but they are more abundant in the B and C horizons.

McFain soils are near Ambraw, Darwin, and Titus soils and are similar to those soils in natural drainage. McFain soils contain snail and mussel shells that are not characteristic of these soils. They have more clay in the surface layer than Ambraw and Titus soils and are sandier in the lower subsoil and underlying material than Darwin soils.

McFain silty clay (0 to 2 percent slopes) (248).—This soil formed in lakebed sediment that contains many fragments of snail shells and mussel shells.

Included with this soil in mapping are some areas that are sandier throughout the profile than this soil.

This soil is well suited to most cultivated crops commonly grown in the county if it is adequately drained and fertilized. A system of tile and surface drainage is a satisfactory means of draining this soil. Improving drainage and maintaining fertility and tilth are the main concerns of management. Management group IIw–1.

McGary Series

The McGary series consists of nearly level, somewhat poorly drained soils on stream terraces, mainly in the valley of the Macoupin Creek near the valley of the Illinois River. These soils formed in water-deposited clayey sediment under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsoil is about 29 inches thick. It is grayish-brown light silty clay in the upper 6 inches, light brownish-gray silty clay in the next 17 inches, and mixed reddish-brown and light brownish-gray silty clay in the lower 6 inches. The underlying material is gray silty clay mottled with strong brown.

The content of organic matter is low in these soils. Permeability is slow to very slow, and available water capacity is moderate.

Representative profile of McGary silt loam, in a cultivated field, 460 feet west and 400 feet north of center of SW¼ sec. 1, T. 8 N., R. 13 W.:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

B21t—6 to 12 inches, grayish-brown (2.5Y 5/2) light silty clay; moderate, medium, subangular blocky structure; firm; strongly acid; gradual, smooth boundary.

B2t—12 to 29 inches, light brownish-gray (10YR 6/2) silty clay; weak, medium, subangular blocky structure; firm; strongly acid; clear, smooth boundary.

B3t—29 to 35 inches, mixed reddish-brown (2.5YR 4/4) and light brownish-gray (10YR 6/2) silty clay; weak, coarse, subangular blocky structure; firm; neutral; clear, smooth boundary.

C—35 to 50 inches, light-gray (10YR 6/1) silty clay; common, fine, prominent, strong-brown (7.5YR 5/8) mottles; massive; firm; some grit in lower part; few soft limestone concretions; mildly alkaline.

The A horizon ranges from gray to dark grayish brown and is about 6 to 12 inches thick. The B horizon ranges from light gray to grayish brown. It ranges from strongly acid to mildly alkaline. The calcareous C horizon ranges from mildly alkaline to moderately alkaline.

McGary soils are near Wagner soils on the landscape. McGary soils are better drained and contain less organic matter in the surface layer than Wagner soils. McGary soils are similar to Starks soils in natural drainage, but they contain more clay in the subsoil and underlying material than those soils.

McGary silt loam (0 to 2 percent slopes) (173).—This soil formed in water-deposited clayey sediment under hardwoods.

Included with this soil in mapping are some areas that are more sloping and some areas that have a thinner surface layer than this soil.

This McGary soil is mainly suited to cultivated crops, and it is generally used for this purpose. Some areas are in pasture or woods. Slow to very slow permeability, and somewhat poor drainage, low fertility, and poor tilth are the main limitations to use and management of this soil. Management group IIIw–1.

Muscatine Series

The Muscatine series consists of nearly level to gently sloping, somewhat poorly drained soils on uplands. These soils formed in loess under prairie grasses.

In a representative profile the surface layer is black silt loam and silty clay loam about 18 inches thick. The subsoil is about 32 inches thick. It is mainly grayish-brown silty clay loam mottled with yellowish brown in the upper 22 inches and grayish-brown silt loam mottled with yellowish brown in the lower 10 inches. The underlying material, to a depth of 60 inches, is light-gray silt loam mottled with yellowish brown.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Muscatine silt loam, 0 to 2 percent slopes, in a road bank, just west of gravel road, 693 feet north of SE. corner of sec. 29, T. 12 N., R. 12 W.:

A11—0 to 6 inches, black (10YR 2/1) silt loam; moderate, fine, crumb structure; friable, very strongly acid; clear, smooth boundary.

A12—6 to 14 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; strongly acid; clear, smooth boundary.

A13—14 to 18 inches, black (10YR 2/1) light silty clay loam; moderate, medium to coarse, granular structure; friable; strongly acid; clear, smooth boundary.

B1—18 to 21 inches, very dark gray (10YR 3/1) silty clay loam; common, medium, distinct, dark grayish-brown (10YR 4/2) mottles; moderate, fine, subangular blocky structure; slightly firm; strongly acid; clear, smooth boundary.

B21t—21 to 27 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium, faint, yellowish-brown (10YR

5/4) mottles; moderate, medium, subangular blocky structure; nearly continuous very dark gray (10YR 3/1) organic and clay films on peds; few small iron and manganese concretions; firm; strongly acid; clear, smooth boundary.

B22t—27 to 35 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium to coarse, subangular blocky structure; firm; nearly continuous very dark gray (10YR 3/1) organic matter and clay films on peds; common small iron and manganese concretions; medium acid; clear, smooth boundary.

B31t—35 to 40 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak to moderate, coarse, angular blocky structure; firm; nearly continuous very dark gray (10YR 3/1) organic and clay films on peds; common medium iron and manganese concretions; medium acid; clear, smooth boundary.

B32—40 to 50 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, angular blocky structure; slightly firm; few very dark gray (10YR 3/1) organic and clay films on peds; common medium iron and manganese concretions; slightly acid; clear, smooth boundary.

C1—50 to 60 inches, light-gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; slightly acid.

The A horizon ranges from black to very dark grayish brown and is about 12 to 20 inches thick. It is commonly silt loam, but it ranges from silt loam to light silty clay loam. The B2 horizon ranges from medium acid to very strongly acid.

Muscatine soils are on a landscape with Clarksdale, Downs, Sable, Tama, and Virden soils. Muscatine soils are more poorly drained than Downs and Tama soils. Their surface layer is darker than that of Clarksdale soils, and it contains more organic matter. Muscatine soils are better drained than Sable and Virden soils.

Muscatine silt loam, 0 to 2 percent slopes (41A).—This soil has the profile described as representative for the Muscatine series.

Included with this soil in mapping are some areas where the subsoil is grayer than that in this soil. Also included are some small areas that have a light-colored subsurface layer.

Most of this soil is well suited to cultivated crops, and it is intensively used for this purpose. Maintenance of fertility and tilth are the main concerns of management. Management group I–2.

Muscatine silt loam, 2 to 4 percent slopes (41B).—This soil has a profile similar to that described as representative for the series, but the surface layer is about 2 to 4 inches thinner.

Included with this soil in mapping are some areas where the subsoil is browner than that of this soil. These areas are better drained than those of this soil.

This soil is well suited to cultivated crops commonly grown in the county. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IIe–2.

Onarga Series

The Onarga series consists of nearly level, well drained and moderately well drained soils on terraces in the valley of the Illinois River. These soils formed in water-deposited sediment under prairie grasses and are mainly on what is locally known as the "sand ridge."

In a representative profile the surface layer is about 12 inches thick. It is very dark brown sandy loam in the upper 8 inches and very dark grayish-brown and dark-brown sandy loam in the lower 4 inches. The subsoil is about 33 inches thick. It is dark-brown heavy sandy loam in the upper 11 inches, dark-brown light sandy clay loam in the next 7 inches, and dark-brown sandy loam in the lower 15 inches. The underlying material, to a depth of 60 inches, is mixed brown, strong-brown, and yellowish-brown medium sand.

The content of organic matter is moderate in these soils. Permeability is moderate to moderately rapid, and available water capacity is moderate.

Representative profile of Onarga sandy loam, in a cultivated field, about 3 miles northwest of Hillview, 86 feet east and 46 feet north of center of sec. 17, T. 12 N., R. 13 W.:

Ap—0 to 8 inches, very dark brown (10YR 2/2) sandy loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A1—8 to 12 inches, very dark grayish-brown (10YR 3/2) and dark-brown (10YR 3/3) sandy loam, small areas of very dark brown (10YR 2/2); weak, fine, subangular blocky structure; friable; neutral; clear smooth boundary.

B1—12 to 17 inches, dark-brown (10YR 3/3) heavy sandy loam; weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B21t—17 to 23 inches, dark-brown (7.5YR 4/4) heavy sandy loam; weak to moderate, medium, subangular blocky structure; firm; discontinuous dark-brown (7.5YR 4/2) clay films; a few soft iron concretions; strongly acid; gradual, smooth boundary.

B22t—23 to 30 inches, dark-brown (7.5YR 4/4) light sandy clay loam and fine gravel; weak. medium, subangular blocky structure; firm to friable; few, patchy, dark-brown (7.5YR 4/2) clay films; few soft iron and manganese concretions; medium acid; clear, smooth boundary.

B31—30 to 37 inches, dark-brown (7.5YR 4/4) sandy loam and fine gravel; weak, coarse, subangular blocky structure; friable; few soft iron and manganese concretions; medium acid; gradual, smooth boundary.

B32—37 to 45 inches, dark-brown (7.5YR 4/4) sandy loam; weak, coarse, angular and subangular blocky structure; very friable; medium acid; gradual, smooth boundary.

C—45 to 60 inches, mixed brown (7.5YR 5/4), strong-brown (7.5YR 5/6), and yellowish-brown (10YR 5/4) medium sand and very few thin bands of dark-brown (7.5YR 4/4) loamy sand; single grain; loose; medium acid.

The A horizon ranges from black to very dark brown. It is commonly sandy loam, but it ranges from sandy loam to fine sandy loam and loam. Depth to the C horizon ranges from about 36 to 50 inches.

Onarga soils are near La Hogue and Bloomfield soils on terraces in the valley of the Illinois River. Onarga soils are better drained than La Hogue soils, and they have a darker colored surface layer and more clay in the upper 30 inches than Bloomfield soils.

Onarga sandy loam (0 to 2 percent slopes) (150).—This soil formed in water-deposited sediment under prairie grasses.

Included with this soil in mapping are some areas that have a surface layer of fine sandy loam. Also included are some areas that are less than 36 inches deep over loose sand.

This soil is suited to most crops grown in the county. Because it is somewhat droughty, the growth of most crops is limited unless this soil is irrigated. Moderate available water capacity is the main limitation to use and management of this soil. Management group IIs–1.

Petrolia Series

The Petrolia series consists of nearly level, poorly drained soils that are mainly in an irregular belt immediately east of the Illinois River. These soils formed in water-deposited sediment under bottom-land hardwoods.

In a representative profile the surface layer is very dark grayish-brown silty clay loam about 8 inches thick. The subsoil, about 56 inches thick, is mainly gray silty clay loam mottled with dark yellowish brown and strong brown.

The content of organic matter is low in these soils. Permeability is moderately slow, and available water capacity is high to very high.

Representative profile of Petrolia silty clay loam, in a cultivated field, about 5 miles southwest of Hillview, in sec. 12, T. 11 N., R. 14 W., 3,800 feet south and 100 feet east from point where road at north edge of section turns south and follows levee:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, crumb structure; friable; slightly acid; abrupt, smooth boundary.

B21g—8 to 14 inches, dark-gray (10YR 4/1) silty clay loam; many, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, fine and medium, angular blocky and subangular blocky structure; firm; slightly acid; clear, smooth boundary.

B22g—14 to 42 inches, gray (10YR 5/1) silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; strong, medium, prismatic structure that parts to moderate, medium, angular and subangular blocky; prism faces are gray without mottles; neutral; gradual, smooth boundary.

B3g—42 to 64 inches, gray (10YR 5/1) silty clay loam; few, fine, prominent, strong-brown (7.5YR 5/8) mottles; weak, coarse, subangular blocky structure; firm; neutral.

The A horizon ranges from very dark grayish brown to dark gray. The B horizon is mainly gray and is about 30 to 60 inches thick.

Petrolia soils are near the Ambraw, Beaucoup, and Titus soils; and they are similar to these soils in natural drainage. Petrolia soils are less sandy throughout than Ambraw soils, and they have a lighter colored and thinner A horizon than Beaucoup and Titus soils.

Petrolia silty clay loam (0 to 2 percent slopes) (288).—This soil formed in water-deposited sediment under bottom-land hardwoods.

Included with this soil in mapping are some areas along old sloughs that are steeper than this soil. Also included are some areas where fragments of snail shells and mussel shells are in the lower part of the profile.

This soil is suited to most crops grown in the county. Construction of levees has practically eliminated the hazard of flooding on this soil. Reducing periodic or seasonal wetness and maintaining fertility and tilth are the main concerns of management. Seasonal wetness can be reduced by use of tile and surface drainage systems if suitable outlets can be obtained. Management group IIw–1.

Proctor Series

The Proctor series consists of nearly level, moderately well drained and well drained soils on stream terraces, mainly in the valley of the Macoupin Creek. These soils formed in wind- and water-deposited sediment under prairie grasses.

In a representative profile the surface layer is about 13 inches thick. It is very dark grayish-brown silt loam and some fine sand in the upper 9 inches and dark-brown silt loam and some sand in the lower 4 inches. The subsoil is about 44 inches thick. It is dark yellowish-brown silty clay loam and some sand in the upper 14 inches, dark-brown light silty clay loam and some sand in the next 10 inches, and dark yellowish-brown loam mottled with light brownish gray in the lower 20 inches. The underlying material, to a depth of more than 60 inches, is dark-brown stratified loam, sandy loam, silt loam, and silty clay loam mottled with light brownish gray and yellowish brown.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is high.

Representative profile of Proctor silt loam, in a cultivated field, about 4 miles north of Kane, 100 feet west and 30 feet north of center of sec. 7, T. 9 N., R. 11 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam and some fine sand; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A3—9 to 13 inches, dark-brown (10YR 3/3) heavy silt loam and some sand; moderate to weak, fine, subangular blocky structure; friable; neutral; gradual, smooth boundary.

B1—13 to 17 inches, dark yellowish-brown (10YR 4/4) light silty clay loam and some sand; moderate, fine and medium, subangular blocky structure; friable to firm; coatings of dark brown (10YR 3/3) on peds; neutral; gradual, smooth boundary.

B21t—17 to 27 inches, dark yellowish-brown (10YR 4/4) medium silty clay loam and some sand; moderate to strong, medium, subangular blocky structure; firm to friable; dark-brown (7.5YR 3/2) clay films on peds; slightly acid; gradual, smooth boundary.

B22t—27 to 37 inches, dark-brown (7.5YR 4/4) light silty clay loam and some sand; moderate, medium and coarse, angular blocky structure; friable to firm; dark-brown (7.5YR 3/2) clay films; medium acid; gradual, smooth boundary.

IIB3—37 to 57 inches, dark yellowish-brown (10YR 4/4) loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, coarse, angular blocky structure; friable; dark-brown (7.5YR 3/2) clay films and some grainy coats on peds when dry; medium acid; gradual, smooth boundary.

IIC—57 to 80 inches, dark-brown (10YR 4/3) stratified silt loam, loam, sandy loam, and silty clay loam; few, fine, distinct, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/6) mottles; massive and bands of single grain; friable; slightly acid; few dark-brown (7.5YR 3/2) clay films in cracks.

The A horizon ranges from black to dark brown and is about 10 to 16 inches thick. Depth to loamy material ranges from about 28 to 40 inches. Depth to the C horizon ranges from about 40 to more than 60 inches.

Proctor, Camden, and Worthen soils, which are on stream terraces and foot slopes, are similar in natural drainage. Proctor soils have a darker and thicker surface layer and strata of coarse material in the C horizon than Camden soils. They also lack an A2 horizon that is characteristic of Camden soils. Proctor soils have a thinner surface layer and are more clayey in the subsoil than Worthen soils.

Proctor silt loam (0 to 2 percent slopes) (148).—This soil formed in wind- and water-deposited sediment under prairie grasses.

Included with this soil in mapping are some areas where the subsoil is grayer than that in this soil. Also included are some areas where slope is as much as 4 percent.

This soil is well suited to crops commonly grown in the county. Maintaining fertility and tilth are the main concerns of management. Management group I–1.

Radford Series

The Radford series consists of nearly level, somewhat poorly drained soils. Areas of these soils are mainly in the valleys of small streams that extend into prairie areas on uplands, but some areas are in the valley of the Illinois River west of Hillview. These soils formed in water-deposited sediment.

In a representative profile the surface layer is about 24 inches thick. It is very dark grayish-brown silt loam in the upper 8 inches and very dark gray silt loam mottled with reddish brown in the lower 16 inches. The next layer, an older buried surface layer, is about 24 inches thick. It is very dark gray silty clay loam mottled with dark reddish brown in the upper 10 inches and black silty clay loam mottled with very dark gray in the lower 14 inches.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is high.

Representative profile of Radford silt loam, in a cultivated field, about one-half mile northwest of Hillview, 600 feet west and 150 feet north of SE. corner of NE¼ sec. 28, T. 12 N., R. 13 W.:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine and medium, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A12—8 to 24 inches, very dark gray (10YR 3/1) silt loam and thin strata of gray (10YR 6/1); common, fine, prominent, reddish-brown (5YR 4/3) mottles; weak, fine, angular blocky structure; friable; mildly alkaline; gradual, smooth boundary.

IIA13b—24 to 34 inches, very dark gray (N 3/0) silty clay loam; common, fine, prominent, dark reddish-brown (5YR 3/3) mottles; moderate, fine, angular blocky structure; firm; mildly alkaline; clear, smooth boundary.

IIA14b—34 to 48 inches, black (N 2/0) silty clay loam, few large areas of very dark gray (N 3/0); moderate, very fine, angular blocky structure; firm; mildly alkaline.

The silty material is about 20 to 40 inches thick. The Ap horizon ranges from black to very dark grayish brown. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

Radford soils are on bottom lands near Dupo, Lawson, and Wakeland soils and are similar to those soils in natural drainage. Radford soils are darker colored and contain more organic matter in the surface layer than Dupo and Wakeland soils. They contain a buried soil that is not characteristic of Lawson or Wakeland soils.

Radford silt loam (0 to 2 percent slopes) (74).—This soil formed in water-deposited sediment.

Included with this soil in mapping are some areas, mainly in the valley of the Illinois River, where the older buried soil contains more clay than that in this soil.

This Radford soil is well suited to most cultivated crops grown in the county. Reducing wetness caused by periodic, brief flooding from streams and maintaining fertility and tilth are the main concerns of management. Management group I–3.

Riverwash Sand and Gravel

Riverwash sand and gravel (123) consists of coarse, loose, sandy and gravelly material along or near the Illinois River in the vicinity of old levee breaks. Large amounts of sand and gravel have been deposited over relatively small irregular areas as a result of the levee breaks. Some areas of this land type are along the river bank, and the size and shape of these areas can change entirely with each new flood.

Riverwash sand and gravel has essentially no farming value. It has little or no plant nutrient reserve or holding capacity. Permeability is rapid, and available water capacity is very low. Areas along the river bank support a growth of willows during extended periods of high water. Where this land is accessible, it is a source of sand or gravel for local use. Management group VIIs–2.

Rushville Series

The Rushville series consists of nearly level, poorly drained and very poorly drained soils on uplands. These soils formed in loess.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer, about 5 inches thick, is light-gray silt loam mottled with dark yellowish brown. The next 3 inches are gray and light-gray mottled silt loam. The subsoil is about 38 inches thick. It is gray silty clay loam mottled with strong brown and dark yellowish brown in the upper 13 inches, grayish-brown silt loam mottled with strong brown and yellowish red in the middle 16 inches, and light-gray heavy silt loam mottled with strong brown and yellowish red in the lower 9 inches. The underlying material, to a depth of more than 70 inches, is light-gray silt loam mottled with dark brown.

The content of organic matter is low in these soils. Permeability is slow to very slow, and available water capacity is high.

Representative profile of Rushville silt loam, in a cultivated field, about 7 miles northeast of Roodhouse, 348 feet north and 141 feet west of center of NE¼ sec. 1, T. 12 N., R. 11 W.:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; distinct areas of gray (10YR 5/1); weak, fine, granular structure; friable; slightly acid to neutral; abrupt, smooth boundary.

A2—7 to 12 inches, light-gray (10YR 6/1 silt loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, thin, platy structure; friable; very strongly acid; abrupt, smooth boundary.

A&Bg—12 to 15 inches, gray (10YR 5/1) and light-gray (10YR 6/1) heavy silt loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; strong, fine and medium, angular blocky structure; friable to firm; peds heavily coated with silt grains that are white (10YR 8/1) when dry; very strongly acid; abrupt, smooth boundary.

B21tg—15 to 28 inches, gray (10YR 5/1) heavy silty clay loam; common, fine, prominent, strong-brown (7.5YR 5/6) mottles; strong, medium, prismatic structure

that parts to moderate, fine and medium, angular blocky; firm; nearly continuous, grayish-brown (2.5Y 5/2) clay films; very strongly acid; smooth boundary.

B22tg—28 to 44 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, medium, prominent, strong-brown (7.5YR 5/8) and yellowish-red (5Y 5/8) mottles; moderate, medium to coarse, prismatic structure that parts to angular blocky; firm; dark-gray (10YR 4/1) clay films in cracks; very strongly acid; gradual, smooth boundary.

B3g—44 to 53 inches, light-gray (5Y 6/1) heavy silt loam; many, coarse, prominent, strong-brown (7.5YR 5/8) and yellowish-red (5YR 5/8) mottles; weak, coarse, prismatic structure; firm to friable; mildly alkaline; gradual, smooth boundary.

Cg—53 to 77 inches, light-gray (10YR 6/1) silt loam; many, firm to coarse, prominent, dark-brown (7.5YR 4/4) mottles; massive; friable; moderately alkaline.

The Ap and A2 horizons range from dark grayish brown to light brownish gray. The B2 horizon ranges from silty clay loam to silty clay. It is very strongly acid to medium acid. Depth to the C horizon ranges from 40 to more than 60 inches. The C horizon is medium acid to moderately alkaline.

Rushville soils occur with Keomah and Sable soils. Rushville soils are more poorly drained than Keomah soils and have a thinner, lighter colored surface layer than Sable soils. Rushville soils are similar to Sexton soils on stream terraces, but they are less clayey in the underlying material than those soils.

Rushville silt loam (0 to 2 percent slopes) (16).—This soil is on uplands.

Included with this soil in mapping are areas where the soil is dark colored in the upper part of the subsoil. Also included, mainly near the bluff of the Illinois River, are depressions about 1 acre to 2 acres in size. These depressions are closed.

The Rushville soil is suited to most crops grown in the county. Slow to very slow permeability, seasonal wetness, low fertility, and poor tilth are the main limitations to use of this soil. A system of surface drains is a satisfactory way of improving drainage if suitable outlets are available. Management group IIIw–1.

Sable Series

The Sable series consists of nearly level to depressional, poorly drained soils on uplands. These soils formed in loess under prairie or marsh grasses.

In a representative profile the surface layer is black silty clay loam about 16 inches thick. The subsoil is about 29 inches thick. It is black silty clay loam in the upper 5 inches, dark-gray silty clay loam in the next 10 inches, and grayish-brown silty clay loam mottled with yellowish brown in the lower 14 inches. The underlying material, to a depth of more than 60 inches, is light-gray silt loam mottled with yellowish brown.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Sable silty clay loam, in a cultivated field, approximately 2 miles southwest of Carrollton, 660 feet south and 40 feet west of NE. corner of NW¼SW¼ sec. 28, T. 10 N., R. 12 W.:

A11—0 to 11 inches, black (10YR 2/1) silty clay loam; moderate, medium, granular structure; firm; moderately alkaline; clear, smooth boundary.

A12—11 to 16 inches, black (10YR 2/1) silty clay loam; strong, very fine and fine, angular blocky structure arranged in weak fine and medium prisms; firm; neutral; gradual, smooth boundary.

B1—16 to 21 inches, black (10YR 2/1) silty clay loam; moderate, medium, prismatic structure that parts to moderate, fine and medium, angular blocky; firm; mildly alkaline; gradual, smooth boundary.

B2g—21 to 31 inches, dark-gray (10YR 4/1) silty clay loam; strong, medium, prismatic structure that parts to moderate, medium, angular blocky; firm; coatings of black (10YR 2/1) on peds; many worm passages; few black iron concretions; mildly alkaline; gradual, smooth boundary.

B3g—31 to 45 inches, grayish-brown (2.5Y 5/2) silty clay loam; many, fine, prominent, yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure; firm to friable; gray (5Y 5/1) coatings on peds; vertical streaks of very dark gray (10YR 3/1); neutral; gradual, smooth boundary.

Cg—45 to 60 inches, light-gray (5Y 6/1) silt loam; many, fine, prominent, yellowish-brown (10YR 5/6) mottles; massive; friable; many pores; few fine veins filled with very dark gray (10YR 3/1); mildly alkaline.

The A horizon is about 15 to 24 inches thick and ranges from black to very dark gray. The B horizon ranges from slightly acid to mildly alkaline. Depth to the C horizon ranges from about 36 to 60 inches.

Sable soils are near Keomah, Muscatine, and Virden soils on the landscape. Sable soils are more poorly drained and are more clayey in the surface layer than Keomah and Muscatine soils. They have a darker colored surface layer than Keomah soils. Sable soils have a thicker surface layer and are less clayey in the upper part of the subsoil than Virden soils, which are similar to Sable soils in natural drainage.

Sable silty clay loam (0 to 2 percent slopes) (68).—This soil is in low, dark-colored areas next to areas of Clarksdale, Keomah, and Muscatine soils on uplands.

Included with this soil in mapping are some areas that have a thin surface layer of silt loam.

This Sable soil is well suited to all cultivated crops grown in the county and is used for this purpose. Improving periodic or seasonal wetness and maintaining fertility and tilth are the main concerns of management. A system of tile drains and surface ditches is a satisfactory way to improve drainage. Management group IIw–1.

Sexton Series

The Sexton series consists of nearly level, poorly drained soils on stream terraces, mainly at the lower end of the valley of Macoupin Creek. These soils formed in water-deposited sediment under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick, and the subsurface layer is light-gray silt loam about 10 inches thick. The subsoil, about 37 inches thick, is mainly gray silty clay loam mottled with dark yellowish brown. The underlying material, to a depth of 60 inches, is gray silty clay loam mottled with dark yellowish brown.

The content of organic matter is low in these soils. Permeability is slow, and available water capacity is high.

Representative profile of Sexton silt loam, in a cultivated field, approximately 2 miles northeast of Kane, 50 feet west and 50 feet south of center of N¼ corner, sec. 16, T. 9 N., R. 11 W.:

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

A2—8 to 18 inches, light-gray (10YR 6/1) silt loam; many, fine, prominent, brown (7.5YR 5/4) and strong-brown (7.5YR 5/8) mottles; weak, thick, platy structure; friable; mildly alkaline; clear, smooth boundary.

B1g—18 to 23 inches, light-gray (10YR 6/1) light silty clay loam; many, fine, distinct, brown (10YR 5/3) mottles; weak, coarse, angular blocky structure; friable; strongly acid; clear, smooth boundary.

B2tg—23 to 40 inches, gray (10YR 5/1) heavy silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, prismatic structure; firm; strongly acid; gradual, smooth boundary.

B3tg—40 to 55 inches, gray (10YR 5/1) medium silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, very coarse, subangular blocky structure; firm; few, fine, very dark gray (10YR 3/1) veins; medium acid to slightly acid.

Cg—55 to 60 inches, gray (10YR 5/1) silty clay loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; medium acid to slightly acid.

The combined thickness of the Ap and A2 horizons ranges from about 10 to 20 inches. The B horizon is about 30 to more than 50 inches thick. The B1 and B2 horizons range from medium acid to strongly acid. Depth to the C horizon ranges from about 40 inches to 60 inches.

Sexton soils and Rushville soils, on uplands, are similar in natural drainage, and they have a similar surface layer and subsoil; but Sexton soils are more clayey in the underlying material than those soils. Sexton soils are more poorly drained and are more clayey in the subsoil than Starks soils, which are on stream terraces.

Sexton silt loam (0 to 2 percent slopes) (208).—This soil is on stream terraces.

Included with this soil in mapping are some areas where the plow layer is darker and thicker than that in this soil. Also included are some areas that have more clay in the subsoil.

This soil is suited to most crops grown in the county. Ponding, slow permeability, low fertility, and poor tilth are the main limitations to use and management of this soil. Surface ditches along with adequate outlets lessen the hazard of water damage to crops. Management group IIIw–1.

Shale Rock Land

Shale rock land, 15 to 40 percent slopes (95F) consists mainly of shale. It is mainly in the northeast corner of the county in sec. 12, T. 12 N., R. 10 W.

Included with this unit in mapping are some shallow soils that formed in shale. The color of the surface layer of these soils varies within a short distance. Some areas have a dark-colored surface layer, but others have a light-colored surface layer and are underlain by gray or reddish-brown to dusky-red material. The underlying shale is neutral in reaction or it is calcareous. Some eroded areas have shale at the surface.

Some of the less steep and uneroded areas of Shale rock land are used for pasture and woodland. This land type generally has severe limitations to use as wildlife habitat and for recreational purposes. Management group VIIs–2.

Starks Series

The Starks series consists of nearly level, somewhat poorly drained soils on stream terraces. These soils formed in wind- or water-deposited silty material over water-deposited loamy material. They formed under hardwoods.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer, about 13 inches thick, is light brownish-gray silt loam mottled with dark yellowish brown and dark brown. The subsoil is about 40 inches thick. It is brown heavy silt loam mottled with dark yellowish brown in the upper 5 inches; brown light silty clay loam mottled with dark brown and strong brown in the next 9 inches; dark yellowish-brown and dark-brown silty clay loam and some sand mottled with light gray in the next 10 inches; and dark-brown light silty clay loam and some sand mottled with light brownish gray in the lower 16 inches. The underlying material, at a depth below 60 inches, is yellowish-brown stratified silt loam, silty clay loam, and very fine sandy loam mottled with grayish brown and light gray.

The content of organic matter is low in these soils. Permeability is moderate to moderately slow, and available water capacity is high to very high.

Representative profile of Starks silt loam, in a cultivated field, about 3 miles north of Kane, 42 feet east and 30 feet south of NW. corner of NE¼NW¼ sec. 16, T. 9 N., R. 11 W.:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine and medium, granular structure; friable; moderately alkaline; abrupt, smooth boundary.

A2—7 to 20 inches, light brownish-gray (10YR 6/2) silt loam; many, fine, prominent, dark yellowish-brown (10YR 4/4) and dark-brown (7.5YR 4/4) mottles; weak, thick, platy structure; friable; many fine pores; mildly alkaline; gradual, smooth boundary.

B1—20 to 25 inches, grayish-brown (10YR 5/2) heavy silt loam; common, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; friable; many fine and medium pores; strongly acid; gradual, smooth boundary.

B21t—25 to 34 inches, brown (10YR 5/3) light silty clay loam; many, fine distinct, dark-brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) mottles; moderate, medium, prismatic structure that parts to moderate, fine and medium, angular blocky; firm; patchy dark grayish-brown (10YR 4/2) to grayish-brown (10YR 5/2) clay films; soft, black iron concretions; strongly acid; gradual, smooth boundary.

IIB22t—34 to 44 inches, dark yellowish-brown (10YR 4/4) and dark-brown (7.5YR 4/4) silty clay loam and some sand; common, fine, prominent, light-gray (10YR 6/1) mottles; moderate, coarse, prismatic structure; firm; soft, black iron concretions; brown (7.5YR 5/2) clay films; strongly acid; gradual, smooth boundary.

IIB3t—44 to 60 inches, dark-brown (7.5YR 4/4) light silty clay loam and some sand; many, fine, prominent, light brownish-gray (10YR 6/2) mottles; massive; firm; few cracks with brown (7.5YR 5/2) clay films; medium acid; diffuse, smooth boundary.

IIC—60 to 72 inches, yellowish-brown (10YR 5/4) stratified silt loam, silty clay loam, and very fine sandy loam; many, fine, distinct, grayish-brown (10YR 5/2) mottles and few, fine, prominent, light-gray (10YR 6/1) mottles; massive; friable; many pores lined with very dark gray (10YR 3/1); neutral to mildly alkaline.

The Ap horizon ranges from dark grayish brown to grayish brown. The A2 horizon ranges from dark grayish brown to light brownish gray. Combined thickness of the Ap and A2 horizons ranges from about 10 to 20 inches. Depth to loamy material ranges from about 25 to 40 inches.

Starks soils are near Camden and Sexton soils on stream terraces. Starks soils are more poorly drained than Camden soils, and they are better drained than Sexton soils. They are similar to Beardstown soils in natural drainage, but Starks soils have a lighter colored surface layer and are less sandy throughout the profile than those soils.

Starks silt loam (0 to 2 percent slopes) (132).—This soil is on stream terraces.

Included with this soil in mapping are some areas where slope is as much as 4 percent. In some places the subsoil is more clayey and grayer than that in this soil. Also included are some areas where the surface layer is thicker than that of this soil.

This soil is suited to crops commonly grown in the county. Some areas receive runoff from adjacent uplands. Diversions are used in some areas to intercept runoff. Improving drainage and maintaining fertility and tilth are the main concerns of management. Management group IIw–3.

Sylvan Series

The Sylvan series consists of strongly sloping to very steep, well-drained soils on uplands. These soils formed in loess under a cover of hardwoods. They occupy a narrow belt along with Bold soils and are adjacent to and immediately east of the bluff of the Illinois River.

In a representative profile the surface layer is dark-brown silt loam about 8 inches thick. The subsoil is about 26 inches thick. It is brown silty clay loam in the upper 10 inches and yellowish-brown silt loam mottled with light yellowish brown in the lower 16 inches. The underlying material, to a depth of more than 60 inches, is pale-brown silt loam mottled with dark yellowish brown.

The content of organic matter is low in Sylvan soils. Permeability is moderate, and available water capacity is high.

Representative profile of Sylvan silt loam, in an area of Sylvan-Bold silt loams, 10 to 18 percent slopes, eroded, in a clover field about 2 miles south of Hillview, 372 feet south and 75 feet east of NW. corner of SW¼SE¼ sec. 3, T. 11 N., R. 13 W.:

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; few, fine, distinct areas of yellowish brown (10YR 5/4); weak, fine, subangular blocky structure; friable to firm; medium acid; abrupt, smooth boundary.

B2t—8 to 18 inches, brown (7.5YR 5/4) light silty clay loam; moderate, fine and medium, subangular blocky structure; friable to firm; thin, discontinuous, dark-brown (10YR 4/3) clay films; medium acid; gradual, smooth boundary.

B31—18 to 24 inches, yellowish-brown (10YR 5/4) heavy silt loam; few, fine, faint, light yellowish-brown (10YR 6/4) mottles; weak, coarse, subangular blocky structure; friable; patchy dark-brown (10YR 4/3) clay films; medium acid; gradual, smooth boundary.

B32—24 to 34 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, light yellowish-brown (10YR 6/4) mottles; weak, coarse, subangular blocky structure; friable; patchy dark-brown (10YR 4/3) clay films; medium acid; diffuse, smooth boundary.

C—34 to 60 inches, pale-brown (10YR 6/3) silt loam; many, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; very friable; moderately alkaline.

The A horizon ranges from dark grayish brown to dark brown. The B horizon ranges from silt loam to silty clay loam. Depth to the C horizon ranges from about 20 to 40 inches.

Sylvan soils are associated with Fayette and Bold soils, and they are similar to those soils in natural drainage. Sylvan soils have a thinner subsoil than Fayette soils, and they have more clay in the upper 2 feet than Bold soils.

Sylvan-Bold silt loams, 10 to 18 percent slopes, eroded (962E2).—Sylvan soils make up about 70 percent of this mapping unit, and Bold soils about 30 percent. Each kind of soil has the profile described as representative for its series.

Included with these soils in mapping are some areas where the surface layer is thinner than that in the profile described as representative for their respective series. Also included are some areas that have more clay in the surface layer than these soils. These areas are indicated on the soil map by the symbol for clay spot.

The soils in this unit are poorly suited to most cultivated crops because of steepness of slopes and the hazard of erosion. Controlling further erosion and maintaining fertility and tilth are the main concerns of management. Management group IVe–1.

Sylvan-Bold silt loams, 18 to 30 percent slopes (962F).—Sylvan soils make up about 60 percent of this mapping unit, and Bold soils about 40 percent. Each kind of soil has a profile similar to that described as representative for its series, but the surface layer is 2 to 4 inches thicker.

Included in mapping are areas where chert and limestone outcrop.

These soils are too steep for cultivated crops. Most areas are in woods, but a few are in permanent pasture. Steepness of slope and the hazard of erosion are the main limitations to use and management of these soils. Management group VIe–1.

Sylvan-Bold silt loams, 18 to 30 percent slopes, eroded (962F2).—Sylvan soils make up about 60 percent of this mapping unit and Bold soils about 40 percent.

Included with these soils in mapping are severely eroded areas that make up about 40 percent of the acreage of this unit. Also included are some areas where chert and limestone outcrop.

These soils are too steep for cultivated crops. Erosion is a severe hazard. Most areas have been cleared, and excessive cultivation and grazing have accelerated erosion. Planting trees and improving pastures are ways to help control erosion. Management group VIe–1.

Sylvan-Bold silt loams, 30 to 50 percent slopes (962G).—Sylvan soils make up about 60 percent of this mapping unit, and Bold soils about 40 percent. Each kind of soil has a profile similar to the one described as representative for its series, but the surface layer is 2 to 4 inches thicker.

These very steep soils are not suited to cultivated crops. Most areas are in woodland. These soils are better suited to use as woodland and wildlife habitat than to other uses. Limitations are severe for recreational uses. Management group VIIe–1.

Tama Series

The Tama series consists of gently sloping to moderately sloping, well-drained soils on uplands. These soils formed in loess under prairie grasses.

In a representative profile the surface layer is very dark brown silt loam about 12 inches thick. The subsoil

is about 39 inches thick. It is very dark grayish-brown heavy silt loam in the upper 4 inches; dark-brown silty clay loam mottled with dark yellowish brown in the next 6 inches; dark yellowish-brown silty clay loam in the next 17 inches; and brown light silty clay loam mottled with dark brown in the lower 12 inches. The underlying material, to a depth of more than 60 inches, is grayish-brown silt loam mottled with strong brown.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is high to very high.

Representative profile of Tama silt loam, 2 to 4 percent slopes, in a pasture, approximately 2 miles southwest of Carrollton, 186 feet east and 595 feet north of SW. corner of NE¼NE¼ sec. 28, T. 10 N., R. 12 W.:

Ap—0 to 7 inches, very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A1—7 to 12 inches, very dark brown (10YR 2/2) silt loam; strong, fine, subangular blocky structure; friable; neutral; clear, smooth boundary.

B1—12 to 16 inches, very dark grayish-brown (10YR 3/2) heavy silt loam; strong, fine, subangular blocky structure; friable to firm; coatings of black (10YR 2/1) on ped exteriors; slightly acid; gradual, smooth boundary.

B21t—16 to 22 inches, dark-brown (10YR 3/3) silty clay loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; strong, medium, subangular blocky structure; firm to friable; coatings of very dark grayish brown (10YR 3/2) on ped exteriors; slightly acid; gradual, smooth boundary.

B22t—22 to 39 inches, dark yellowish-brown (10YR 4/4) silty clay loam; strong, medium, prismatic structure that parts to strong, medium, subangular blocky; firm to friable; coatings of dark brown (10YR 3/3) on peds; few areas coated with black (10YR 2/1) clay films; strongly acid; gradual, smooth boundary.

B3—39 to 51 inches, brown (10YR 5/3) light silty clay loam; few, fine, distinct, brown to dark-brown (7.5YR 4/4) mottles; weak, coarse, prismatic structure; friable to firm; areas of dark-brown (10YR 3/3) clay films and few small areas of black (10YR 2/1) clay films; strongly acid; gradual, smooth boundary.

C—51 to 81 inches, grayish-brown (10YR 5/2) silt loam; many, fine, prominent, strong-brown (7.5YR 5/6) mottles; massive; friable; medium acid.

The A horizon ranges from black to very dark grayish brown and is about 10 to 16 inches thick. The A horizon ranges from silt loam to light silty clay loam. The B horizon ranges from slightly acid to strongly acid. Depth to C horizon ranges from about 36 to 60 inches.

Tama soils are near Downs and Muscatine soils on the landscape. Tama soils are better drained than Muscatine soils, and they have a thicker surface layer than Downs soils. Also, they lack an A2 horizon that is characteristic of Downs soils.

Tama silt loam, 2 to 4 percent slopes (36B).—This soil is on slight knolls and in areas adjacent to drainageways. It has the profile described as representative for the series.

Included with this soil in mapping are some areas where the subsoil is grayer than that of this soil.

This soil is well suited to all cultivated crops grown in the county. Maintaining fertility and tilth and controlling further erosion are the main concerns of management. Management group IIe–1.

Tama silt loam, 4 to 7 percent slopes (36C).—This soil occupies positions on convex ridges and at the head of drainageways.

Included with this soil in mapping are areas where the surface layer is thinner than that in the profile described as representative for the series. Also included are some areas, mainly near White Hall, where slope is as much as 10 percent.

This soil is suited to crops commonly grown in the county. Moderate steepness, the hazard of erosion, low fertility, and poor tilth are the main limitations to use and management of this soil. Management group IIe–1.

Tice Series

The Tice series consists of nearly level, somewhat poorly drained soils in areas mainly along the Macoupin Creek. These soils formed in water-deposited sediment.

In a representative profile the surface layer is about 20 inches thick. It is very dark grayish-brown light silty clay loam in the upper 7 inches and very dark brown silty clay loam in the lower 13 inches. The subsoil is about 40 inches thick. It is dark grayish-brown silty clay loam mottled with dark brown in the upper 15 inches, grayish-brown silty clay loam mottled with red and olive brown in the next 13 inches, and gray light silty clay loam mottled with strong brown and yellowish brown in the lower 12 inches. The underlying material is light-gray silt loam and thin strata of yellowish-brown fine sand.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Tice silty clay loam, in a cultivated field, about 3 miles north of Kane, 426 feet east and 72 feet north of center of sec. 7, T. 9 N., R. 11 W.:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; weak, fine and medium, granular structure; firm; neutral; abrupt, smooth boundary.

A1—7 to 20 inches, very dark brown (10YR 2/2) silty clay loam; moderate, medium to coarse, angular blocky structure; firm; neutral; gradual, smooth boundary.

B21—20 to 35 inches, dark grayish-brown (10YR 4/2) silty clay loam; few to common, fine, prominent, dark-brown (7.5YR 4/4) mottles; weak, coarse, prismatic structure; firm; many pores; many, hard, round iron concretions; slightly acid to neutral; gradual, smooth boundary.

B22—35 to 48 inches, grayish-brown (2.5Y 5/2) silty clay loam; few to common, fine, prominent, red (2.5YR 4/6) mottles and few, fine, distinct, olive-brown (2.5Y 4/4) mottles; moderate, fine, angular blocky structure; firm; smooth faces of peds are dark grayish brown (2.5Y 4/2); medium acid to slightly acid; diffuse, smooth boundary.

B3—48 to 60 inches, gray (10YR 5/1) light silty clay loam; many, fine, prominent, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) mottles; massive; firm; few cracks having smooth faces; medium acid; diffuse, smooth boundary.

C—60 to 82 inches, light-gray (10YR 6/1) silt loam and many thin strata of yellowish-brown (10YR 5/6) fine sand; massive; firm to friable; many fine pores lined with very dark gray (10YR 3/1); slightly acid to neutral.

The A horizon ranges from black to dark brown and is about 10 to 20 inches thick. Depth to the C horizon ranges from about 30 to 60 inches. The C horizon ranges from medium acid to mildly alkaline.

Tice soils are on bottom lands near Beaucoup and Lawson soils. They are better drained than Beaucoup soils and are more clayey than Lawson soils.

Tice silty clay loam (0 to 2 percent slopes) (284).—This soil is in areas along Macoupin Creek.

Included with this soil in mapping are some areas that have a lighter colored surface layer than this soil and some areas, particularly north of Jalapa, where the subsoil is grayer than part of this soil. Also included are some areas, mainly along old channels, that are steeper than this soil.

This soil is well suited to crops commonly grown in the county. It is subject to periodic flooding, but flooding generally is of short duration. Tile drains are effective in removing excess water in some areas. Maintaining fertility and tilth are the main concerns of management. Management group I–3.

Titus Series

The Titus series consists of nearly level, poorly drained soils in the valley of the Illinois River. These soils formed in water-deposited sediment.

In a representative profile the surface layer, about 14 inches thick, is mainly black heavy silty clay loam. The subsoil is about 25 inches thick. It is dark-gray heavy silty clay loam mottled with olive in the upper 14 inches and gray heavy silty clay loam mottled with dark yellowish brown in the lower 11 inches. The underlying material, to a depth of more than 60 inches, is gray stratified silty clay loam, silt loam, sand, and sandy loam mottled with dark yellowish brown.

The content of organic matter is high in these soils. Permeability is slow, and available water capacity is high.

Representative profile of Titus silty clay loam, in a cultivated field, about 4 miles northwest of Eldred, about 50 feet south and 20 feet east of road at NE. corner of NW¼NE¼ sec. 12, T. 10 N., R. 14 W.:

Ap—0 to 7 inches, black (10YR 2/1) heavy silty clay loam; weak, medium, angular blocky structure; firm; slightly acid; abrupt, smooth boundary.

A12—7 to 11 inches, black (10YR 2/1) heavy silty clay loam; moderate, fine, angular blocky structure; firm; neutral; clear, smooth boundary.

A3—11 to 14 inches, very dark gray (N 3/0) heavy silty clay loam; moderate, fine, angular blocky structure; firm; neutral; gradual, smooth boundary.

B2g—14 to 28 inches, dark-gray (5Y 4/1) heavy silty clay loam; few, fine, distinct, olive (5Y 4/4) mottles; weak, fine, prismatic structure that parts to weak, medium, angular blocky; firm; thin, continuous, gray (5Y 5/1) clay films or slickensides; neutral; diffuse, smooth boundary.

B3g—28 to 39 inches, gray (5Y 5/1) heavy silty clay loam; common, fine, prominent, dark yellowish-brown (10YR 4/4) mottles; weak, medium, angular blocky structure; firm; few, thin, discontinuous, dark-gray (N 4/0) coatings; neutral; diffuse, smooth boundary.

Cg—39 to 62 inches, gray (5Y 5/1) stratified silty clay loam, silt loam, sand, and sandy loam; common, fine, prominent, dark yellowish-brown (10YR 4/4) mottles; massive; firm; neutral.

The A horizon ranges from black to dark olive gray. It is about 10 to 23 inches thick and ranges from heavy silty clay loam to light silty clay. The B horizon ranges from slightly acid to mildly alkaline. Depth to the C horizon ranges from about 30 to 60 inches.

Titus soils are near the Ambraw, Darwin, and Petrolia soils and are similar to those soils in natural drainage. Titus soils are less sandy throughout than Ambraw soils, have a darker colored and thicker surface layer than Petrolia soils, and are less clayey throughout than Darwin soils.

Titus silty clay loam (0 to 2 percent slopes) (404).—This soil is in the valley of the Illinois River.

Included with this soil in mapping are some areas that have a thin, silty overwash. Also included are some areas where slope is more than 2 percent.

This soil is suited to most cultivated crops grown in the county and is used for this purpose. It is subject to periodic ponding. If suitable outlets are available, a system of tile drains and surface ditches is an effective way to drain this soil. Improving drainage and maintaining fertility and tilth are the main concerns of management. Management group IIw–1.

Virden Series

The Virden series consists of nearly level, poorly drained soils on uplands. These soils formed in loess under prairie grasses.

In a representative profile the surface layer is about 13 inches thick. It is black silt loam in the upper 8 inches and black light silty clay loam in the lower 5 inches. The subsoil is about 40 inches thick. It is very dark gray heavy silty clay loam mottled with dark yellowish brown, dark grayish brown, and yellowish brown in the upper 10 inches; dark grayish-brown silty clay loam mottled with light olive brown and yellowish brown in the next 14 inches; grayish-brown light silty clay loam mottled with light olive brown and yellowish brown in the next 7 inches; and mixed grayish-brown and light brownish-gray heavy silt loam mottled with light olive brown and yellowish brown in the lower 9 inches. The underlying material, to a depth of more than 60 inches, is light brownish-gray silt loam mottled with light olive brown and yellowish brown.

The content of organic matter is high in these soils. Permeability is moderate to moderately slow, and available water capacity is high to very high.

Representative profile of Virden silt loam, in a cultivated field, about 5 miles northeast of Carrollton, 30 feet south and 60 feet west of NE. corner of sec. 16, T. 10 N., R. 11 W.:

Ap—0 to 8 inches, black (10YR 2/1) silt loam; weak, thin, platy structure parting to weak, fine, granular structure; friable; many roots; moderately alkaline; abrupt, smooth boundary.

A1—8 to 13 inches, black (10YR 2/1) light silty clay loam; moderate, fine, granular structure; friable to firm; many roots; moderately alkaline; clear, smooth boundary.

B21t—13 to 18 inches, very dark gray (10YR 3/1) heavy silty clay loam; few, fine, distinct, dark yellowish-brown (10YR 3/4) mottles and few, fine, distinct, dark-brown (7.5YR 3/2) mottles; weak, medium, prismatic structure that parts to moderate, fine and medium, angular blocky; very firm; black (10YR 2/1) clay and organic coatings; many roots; slightly acid; clear, smooth boundary.

B22t—18 to 23 inches, very dark gray (10YR 3/1) heavy silty clay loam; few, medium, distinct, dark grayish-brown (10YR 4/2) mottles and few, fine, prominent, yellowish-brown (10YR 5/8) mottles; moderate, medium, prismatic structure that parts to moderate, fine and medium, subangular blocky; very firm; thick, continuous, black (10YR 2/1) clay and organic coatings; many roots; neutral; gradual, smooth boundary.

B23t—23 to 37 inches, dark grayish-brown (2.5Y 4/2) silty clay loam; many, coarse, distinct, light olive-brown (2.5Y 5/4) mottles and common, medium, prominent, yellowish-brown (10YR 5/8) mottles; moderate, coarse, prismatic structure that parts to weak, medium, prismatic that parts to weak, fine, angular blocky; firm; thick, continuous, black (10YR 2/1) and very dark gray (10YR 3/1) clay and organic coatings; many roots; medium acid; gradual, smooth boundary.

B31t—37 to 44 inches, grayish-brown (2.5Y 5/2) light silty clay loam; many, coarse, distinct, light olive-brown (2.5Y 5/4) mottles and common, medium, prominent, yellowish-brown (10YR 5/8) mottles; weak, coarse, prismatic structure; friable to firm; thin dark-gray (10YR 5/1) clay and organic coatings, mostly on vertical faces; many roots; numerous pores lined with very dark gray (10YR 3/1); many very dark brown (10YR 2/2) iron concretions; slightly acid; clear, smooth boundary.

B32—44 to 53 inches, mixed grayish-brown (2.5Y 5/2) and light brownish-gray (2.5Y 6/2) heavy silt loam; many, coarse, distinct, light olive-brown (2.5Y 5/4) mottles and many, medium, prominent, yellowish-brown (10YR 5/8) mottles; weak, very coarse, prismatic structure; friable; thin, discontinuous, dark-gray (10YR 4/1) clay and organic coatings, mostly on vertical faces; neutral; gradual, smooth boundary.

C—53 to 70 inches, light brownish-gray (2.5Y 6/2) silt loam; many, coarse, distinct, light olive-brown (2.5Y 5/4) mottles and many, coarse, prominent, yellowish-brown (10YR 5/8) mottles; massive; friable; few pores or root channels lined with dark gray (10YR 4/1); neutral; gradual, smooth boundary.

The A horizon ranges from black to very dark gray. It is about 11 to 16 inches thick and ranges from silt loam to silty clay loam. The B horizon is about 35 to 60 inches thick. It ranges from medium acid to mildly alkaline. Depth to the C horizon ranges from about 25 to 60 inches.

Virden soils are on landscapes with Clarksdale, Muscatine, and Sable soils. Virden soils are similar to Sable soils in natural drainage, but they are more clayey in the upper part of the subsoil than those soils. Virden soils are more poorly drained than Muscatine and Clarksdale soils.

Virden silt loam (0 to 2 percent slopes) [47].—This soil formed in loess under prairie grasses.

Included with this soil in mapping are some areas that have a lighter colored surface layer than this soil. Also included, mainly in sections 11, 12, and 13 of T. 11 N., R. 10 W., are some areas where the concentration of sodium in the subsoil is higher than that in the profile described as representative for the series. These high-sodium areas are known locally as "slick spots."

This soil is well suited to cultivated crops commonly grown in the county. It is subject to periodic wetness. In most areas tile drains and surface ditches are effective in reducing wetness. Providing drainage and maintaining fertility and tilth are the main concerns of management. Management group IIw–1.

Wagner Series

The Wagner series consists of nearly level, poorly drained soils in the valley of the Illinois River, mainly on stream terraces along Apple Creek. These soils formed in water-deposited sediment.

In a representative profile the surface layer is very dark gray silt loam about 8 inches thick. The subsurface layer is gray silt loam about 7 inches thick. The subsoil is about 25 inches thick. It is gray silty clay loam mottled with dark yellowish brown in the upper 3 inches, dark-gray silty clay mottled with dark yellowish brown in the next 11 inches, and gray silty clay mottled with yellowish brown in the lower 11 inches. The underlying material, to a depth of more than 60 inches, is light-gray heavy silty clay loam mottled with yellowish brown and dark brown.

The content of organic matter is low to moderate in these soils. Permeability is slow to very slow, and available water capacity is moderate to high.

Representative profile of Wagner silt loam, in a cultivated field, 132 feet south and 41 feet west of center of NW¼ sec. 33, T. 11 N., R. 13 W.:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam; strong, fine and medium, granular structure; friable; moderately alkaline; abrupt, smooth boundary.

A2—8 to 15 inches, gray (10YR 5/1) silt loam; few, fine, faint, very dark gray (10YR 3/1) mottles and few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, thick, platy structure; friable to firm; medium acid to slightly acid; abrupt, smooth boundary.

B21tg—15 to 18 inches, gray (10YR 5/1) silty clay loam; medium, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; strong, medium, angular blocky structure; firm; uniform coatings of very dark gray (10YR 4/1) on ped exteriors; medium acid to slightly acid; clear, smooth boundary.

B22tg—18 to 29 inches, dark-gray (10YR 4/1) silty clay; many, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; firm; medium acid to slightly acid; gradual, smooth boundary.

B3tg—29 to 40 inches, gray (10YR 5/1) silty clay; many, fine, distinct, yellowish-brown (10YR 5/4) mottles; weak, coarse, angular blocky structure; firm; medium acid to slightly acid; gradual, smooth boundary.

C1—40 to 49 inches, light-gray (10YR 6/1) heavy silty clay loam; many, fine, prominent, yellowish-brown (10YR 5/4) mottles; massive; firm; few, black (10YR 2/1), cylindrical areas of root channels about one-fourth inch in diameter; slightly acid to neutral; abrupt, smooth boundary.

C2—49 to 78 inches, light-gray (5Y 6/1) heavy silty clay loam; common, medium, prominent, dark-brown (7.5YR 4/4) mottles; massive; firm; few lime concretions; moderately alkaline; abrupt, smooth boundary.

The Ap horizon ranges from black to very dark grayish brown. Combined thickness of the Ap and A2 horizons ranges from about 9 to 18 inches. The B horizon ranges from silty clay loam to silty clay and from slightly acid to strongly acid. Depth to C horizon ranges from about 36 to 60 inches.

Wagner soils are associated with Ambraw, Beaucoup, Darwin, and Titus soils, and they are similar to those soils in natural drainage. Wagner soils are less sandy throughout the profile than Ambraw soils, less clayey in the surface layer than Beaucoup and Titus soils, and less clayey throughout the profile than Darwin soils.

Wagner silt loam (0 to 2 percent slopes) [26].—This soil is in the valley of the Illinois River, mainly on stream terraces along Apple Creek.

Included with this soil in mapping are some areas that have a thicker dark-colored surface layer than this soil.

If this soil is drained, it is suited to most crops commonly grown in the county. Susceptibility to occasional flooding and ponding in some low areas, a high water table, very slow to slow permeability, and low fertility, and poor tilth are the main limitations to use and management of this soil. Management group IIIw–1.

Wakeland Series

The Wakeland series consists of nearly level, somewhat poorly drained soils. Most of these soils are in the valleys of creeks throughout the county, but a few are in the valleys of rivers. These soils formed in water-deposited sediment.

In a representative profile the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil is about 16 inches thick. It is dark grayish-brown silt loam mottled with yellowish brown. The underlying material, to a depth of 55 inches, is mainly grayish-brown silt loam mottled with yellowish brown.

The content of organic matter is low in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Wakeland silt loam, in a cultivated field, about 3 miles northwest of Carrollton, 430 feet north and 180 feet west of SE corner of NE¼ NE¼ sec. 7, T. 10 N., R. 12 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, faint, very dark grayish-brown (10YR 3/2) mottles; weak, fine, granular structure; friable; many roots; mildly alkaline; abrupt, smooth boundary.

B—8 to 24 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, granular structure; friable; many roots; mildly alkaline; gradual, smooth boundary.

C1—24 to 31 inches, dark grayish-brown (10YR 4/2) silt loam; few, medium, distinct, light brownish-gray (10YR 6/2) mottles and few, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, very fine, granular structure; friable; few wormcasts; mildly alkaline; gradual, smooth boundary.

C2—31 to 41 inches, grayish-brown (10YR 5/2) silt loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; few, fine, faint, light-gray (10YR 7/2) and few, fine, distinct, very dark grayish-brown (10YR 3/2) coatings on ped surfaces; mildly alkaline; gradual, smooth boundary.

C3—41 to 55 inches, brown (10YR 5/3) silt loam and some fine sand; few, fine, distinct, yellowish-brown (10YR 5/6) and few, fine, faint, light brownish-gray (10YR 6/2) mottles; massive; friable; many light-gray (10YR 7/2) silt coatings; few soft iron and manganese concretions; neutral.

The Ap horizon ranges from dark grayish brown to brown. Depth to the C horizon ranges from about 24 to 40 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile.

Wakeland soils are associated with Beaucoup, Haymond, Lawson, and soils on bottom lands. Wakeland soils are better drained and contain less clay throughout than Beaucoup soils. They are similar to Lawson soils in natural drainage; but they have a thinner, lighter colored surface layer that contains less organic matter than that of Lawson soils. Wakeland soils are more poorly drained than Haymond soils.

Wakeland silt loam (0 to 2 percent slopes) (333).—This soil is mainly on bottom lands in small areas that finger into the uplands (fig. 13).

Included with this soil in mapping are some areas that are more sandy than this soil.

Most of this Wakeland soil is subject to periodic or seasonal flooding. This soil is well suited to most crops grown in the county if it is protected from flooding, is drained, and is managed so as to maintain tilth and fertility. Management group IIw–2.

Worthen Series

The Worthen series consists of nearly level to strongly sloping, well drained and moderately well drained soils. These soils mainly occupy positions on foot slopes along the bluff in the valley of the Illinois River. They formed mainly in water-deposited sediment under prairie grasses.

In a representative profile the surface layer is silt loam about 33 inches thick. It is very dark grayish-brown silt loam in the upper 7 inches, very dark brown silt loam in the next 11 inches, and dark grayish-brown silt loam in the lower 15 inches. The subsoil, about 21 inches thick, is dark yellowish-brown silt loam mottled with dark brown. The underlying material, to a depth of more than 60 inches, is dark-brown heavy silt loam mottled with pale brown.

The content of organic matter is high in these soils. Permeability is moderate, and available water capacity is very high.

Representative profile of Worthen silt loam, in a pasture, about 3 miles north of Hillview, 474 feet north from center of north abutment of highway bridge and 378 feet east of center of road in SE¼SE¼ sec. 15, T. 12 N., R. 13 W.:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine and medium, granular structure; friable; mildly alkaline; abrupt, smooth boundary.

A1—7 to 18 inches, very dark brown (10YR 2/2) silt loam; moderate, medium, subangular blocky structure; friable; neutral; diffuse, smooth boundary.

A3—18 to 33 inches, dark grayish-brown (10YR 3/2) silt loam; many, fine, faint, very dark brown (10YR 2/2) areas in the upper part; moderate, medium, subangular blocky structure; friable; many coarse pores; somewhat darker color on ped exteriors than on ped interiors; neutral; diffuse, smooth boundary.

B—33 to 54 inches, dark yellowish-brown (10YR 4/4) silt loam; many, fine, faint mottles of dark brown (10YR 4/3); moderate, coarse, subangular blocky structure; friable; many large pores; nearly continuous dark-brown (10YR 4/3) clay films; neutral; diffuse, smooth boundary.

C—54 to 70 inches, dark-brown (7.5YR 4/4) heavy silt loam; few, medium, distinct, pale-brown (10YR 6/3) mottles; massive; friable; thin, patchy, dark-brown (10YR 4/3) clay films; neutral; diffuse, smooth boundary.

The A horizon ranges from black to dark brown and dark grayish brown. It is about 24 to 35 inches thick. Depth to C horizon ranges from about 30 to 60 inches. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

Worthen soils are near Littleton soils on the landscape, but they have better natural drainage than those soils. Worthen soils are similar to Huntsville soils in natural drainage and texture, but they have a B horizon that is missing in the Huntsville soils.

Worthen silt loam, 1 to 4 percent slopes (37B).—This soil has the profile described as representative for the series.

Included with this soil in mapping are some areas that are more sandy than this soil. Also included are some areas that have a thin, light-colored, silty deposition on the surface.

This soil is well suited to crops commonly grown in the county. Runoff from adjacent uplands, the hazard of erosion, and low fertility and poor tilth are the main

Figure 13.—Typical area of Wakeland silt loam. Hickory soils are on the sides of the valley.

limitations to use and management of this soil. Management group IIe–1.

Worthen silt loam, 4 to 12 percent slopes (37C).—This soil has a profile similar to that described as representative for the series.

Included with this soil in mapping are some areas that have slope of more than 12 percent. Also included are areas that have a thin, light-colored silty deposition on the surface and small areas that have some chert and limestone fragments.

This soil is suited to most crops grown in the county. Many areas of this soil are small or irregular in shape and are used for pasture. The hazard of erosion, steepness, and maintenance of fertility and tilth are the main limitations to use and management of this soil. Management group IIIe–1.

Use and Management of the Soils

This section contains information about the use of soils in Greene County for crops and pasture, woodland, recreation, and engineering. It explains the system of capability classification used by the Soil Conservation Service and discusses use and management of groups of similar soils. It also contains a table showing predicted yields of principal crops grown in the county under a high level of management.

Use and Management for Crops and Pasture

About 55 percent of the acreage of Greene County is cultivated. Corn and soybeans are the principal crops, but wheat, oats, and grass-legume hay also are important crops.

The main needs in managing cultivated soils in the county are controlling erosion, overcoming wetness, protecting from flooding, conserving moisture, and maintaining tilth and fertility.

Measures that help to control erosion are terracing, contour farming, keeping tillage to a minimum, planting cover crops, grassing the waterways, and using crop residue. Generally, a combination of several measures is used.

Measures that help to overcome wetness include the use of tile drains, shallow surface ditches, inlets to tile drains, drainage ditches, and diversions. Levees can be used for protection from flooding.

Conserving moisture generally means reducing evaporation, limiting runoff, increasing infiltration, and controlling weeds. Measures that help to conserve moisture are keeping tillage to a minimum, using crop residue, contour farming, stripcropping, and planting field windbreaks.

Among the measures that help to maintain tilth and fertility are the application of chemical fertilizer, green manure, and barnyard manure, and the inclusion in the cropping system of cover crops, grasses, and legumes. Crops respond well to fertilizers on all soils used as cropland. The application of lime is needed periodically, especially on most soils on uplands and terraces. Controlling erosion also helps to conserve fertility and to maintain tilth.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so 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 forest trees or for engineering.

In the capability system, the kinds of soils are grouped at three levels: the capability class, subclass, and unit (management group in this soil survey). These groupings 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 habitat. (No class V soils are in Greene County.)

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

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 habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, or water supply, or to esthetic purposes. (No class VIII soils are in Greene County.)

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, but not in Greene 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 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 habitat, or recreation.

Capability Units (management groups in this county) 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 management group is a convenient grouping for making many statements about management of soils. Management groups are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–2 or IIIw–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the management group within each subclass.

In the following pages the management groups in Greene County are described, and suggestions for use and management for all the soils of each group are given. Soils used for cultivated crops generally need lime and fertilizers. The amounts to apply on a given soil should be determined by soil tests. The names of soil series represented are mentioned in the description of each management group, but this does not mean that all soils of a given series appear in the group. To find the names of all the soils in any given management group, refer to the "Guide to Mapping Units" at the back of this survey.

MANAGEMENT GROUP I–1

This group consists of nearly level, moderately well drained and well drained soils in the Haymond, Huntsville, and Proctor series. The Haymond and Huntsville soils are on bottom lands, and the Proctor soils are on terraces above the bottom lands. Haymond and Hunts-

ville soils are silt loam throughout, but the Proctor soils have a surface layer of silt loam and a subsoil of silty clay loam.

Permeability is moderate in the soils in this group. Available water capacity is high to very high. The content of organic matter is high, except in the Haymond soils, which are low in content of organic matter.

The soils in this group are well suited to crops commonly grown in the county. Corn and soybeans are the main crops, but wheat, grasses, and legumes are also grown.

These soils have no major limitations to use, but fertility and tilth need to be maintained. The Haymond and Huntsville soils are subject to occasional flooding, but it generally is of short duration and causes little or no damage to crops. The Proctor soils are somewhat higher in elevation and are seldom flooded.

MANAGEMENT GROUP I–2

This group consists of nearly level, somewhat poorly drained soils in the Clarksdale and Muscatine series. These soils are on uplands. They have a surface layer of silt loam and a subsoil of silty clay loam.

Permeability is moderate to moderately slow in the soils in this group. Available water capacity is very high. The content of organic matter is moderate in the surface layer of the Clarksdale soils and high in the Muscatine soils.

The soils in this group are well suited to crops commonly grown in the county. Corn, soybeans, and wheat are the main crops. Row crops can be grown continuously under a high level of management.

These soils have no major limitations to use, but fertility and tilth need to be maintained. Wetness is a slight limitation in some areas. Tile drains and shallow surface ditches are commonly used to reduce wetness.

MANAGEMENT GROUP I–3

This group consists of nearly level, somewhat poorly drained soils in the Beardstown, La Hogue, Lawson, Littleton, Radford, and Tice series. The Lawson, Radford, and Tice soils are on bottom lands. The Beardstown, La Hogue, and Littleton soils are in higher areas above the bottom lands. These soils have a surface layer of loam, silt loam, or silty clay loam and a subsoil of silt loam, silty clay loam, clay loam, or sandy clay loam.

Permeability is moderate in all the soils of this group, except for Beardstown soils, in which permeability is moderate to moderately slow. Available water capacity is moderate to very high. The content of organic matter is moderate to high in the surface layer.

The soils in this group are well suited to crops commonly grown in the county. Corn and soybeans are the main crops, but wheat, grasses, and legumes are also grown.

These soils have no major limitations to use, but fertility and tilth need to be maintained. The Lawson, Radford, and Tice soils are subject to seasonal flooding if they are not protected by levees. Wetness is a slight limitation in some areas of all the soils in this group. Randomly placed tile drains and shallow surface ditches are commonly used to reduce wetness.

MANAGEMENT GROUP IIe–1

This group consists of gently sloping to moderately sloping, moderately well drained and well drained soils in the Camden, Clinton, Downs, Fayette, Tama, and Worthen series. These soils are on uplands and stream terraces. All these soils have a surface layer of silt loam and a subsoil of silty clay loam, except for Worthen soils, which are silt loam throughout.

Permeability is moderate to moderately slow in the soils in this group. Available water capacity is high to very high. The content of organic matter in the surface layer is low in the Camden, Clinton, and Fayette soils, moderate in the Downs soils, and high in the Tama and Worthen soils. Some areas of the Clinton and Fayette soils are eroded.

The soils in this group are suited to crops commonly grown in the county. Corn and soybeans are the main crops, but wheat, grasses, and legumes are also grown.

Water erosion is a slight hazard in gently sloping areas and a moderate hazard on more sloping areas. Tilth is more difficult to maintain in eroded areas, especially where tillage extends into the subsoil of silty clay loam.

MANAGEMENT GROUP IIe–2

This group consists of gently sloping, somewhat poorly drained soils in the Clarksdale, Keomah, La Hogue, and Muscatine series. These soils are on uplands. All of these soils have a surface layer of silt loam and a subsoil of silty clay loam, except for the La Hogue soils, which have a surface layer of loam and a subsoil of sandy clay loam.

Permeability is moderate to moderately slow in the soils of this group. Available water capacity is moderate to very high. The content of organic matter is low in the surface layer of the Keomah soils, moderate in the Clarksdale and La Hogue soils, and high in the Muscatine soils.

The soils in this group are well suited to crops commonly grown in the county. Corn and soybeans are the main crops; but wheat, grasses, and legumes also are grown.

If these soils are intensively cultivated, water erosion is a hazard. Tilth and fertility need to be maintained. In some areas along waterways and in terrace channels, wetness is a limitation during and shortly after extended periods of rainfall.

MANAGEMENT GROUP IIw–1

This group consists of nearly level, poorly drained soils in the Ambraw, Beaucoup, Denny, McFain, Petrolia, Sable, Titus, and Virden series. The Denny, Sable, and Virden soils are on uplands; and the other soils are on bottom lands. All of these soils have a surface layer of silt loam, clay loam, or silty clay loam and a subsoil of clay loam or silty clay loam, except for McFain soils, which have a surface layer of silty clay and a subsoil of fine sandy loam.

Permeability is moderate to slow in the soils in this group. Available water capacity is high to very high. The content of organic matter is low in the surface layer of the Petrolia soils, moderate in the Beaucoup and Denny soils, and high in the other soils in this group.

If the soils in this group are drained, they are well suited to most crops grown in the county. Corn is the

main crop; but soybeans, wheat, and clover are also grown extensively. Many areas of soils on the flood plain of the river are protected from flooding by a levee system.

Wetness is the main limitation to use of these soils. Flooding is an annual hazard on bottom lands that are not protected by levees. Ponding and slow surface runoff are problems in some areas on uplands. Spring plowing is somewhat difficult on the soils that have a surface layer of silty clay loam and silty clay. Fall plowing is a common practice on these soils, but there is a hazard of soil blowing when the surface material begins to dry out in spring.

MANAGEMENT GROUP IIw–2

This group consists of nearly level, somewhat poorly drained soils in the Dupo and Wakeland series. Most areas of the Wakeland soils are in creek valleys, and most areas of the Dupo soils are near the bluff in the river valley. These soils have a surface layer of silt loam and a subsoil of silt loam or silty clay loam.

Permeability is moderate to slow in the soils in this group. Available water capacity is high to very high. The content of organic matter is low.

If the soils in this group are adequately drained and protected from flooding, they are well suited to most crops grown in the county. Corn and soybeans are the main crops. Some areas are in pasture or woodland.

Wetness is the main limitation to use of these soils. The Wakeland soils are subject to seasonal flooding, and some crop damage can be expected during periods of heavy rainfall. The Dupo soils are subject to only occasional flooding. Both soils have a seasonally high water table, and some areas receive runoff from uplands. Tilth and fertility need to be maintained.

MANAGEMENT GROUP IIw–3

This group consists of nearly level, somewhat poorly drained soils in the Keomah and Starks series. The Keomah soils are on uplands, and the Starks soils are on terraces. These soils have a surface layer of silt loam and a subsoil of silty clay loam.

Permeability is moderate to moderately slow in the soils of this group. Available water capacity is high to very high. The content of organic matter is low. These soils have a seasonal high water table, and runoff is slow.

The soils in this group are suited to most crops grown in the county. Corn, soybeans, wheat, and clover are the main crops. Some areas are used for woodland and pasture.

Wetness is the main limitation to use of these soils. In some areas the Starks soils receive runoff from adjacent uplands. Diversions are commonly used to intercept this runoff. Shallow surface ditches and tile drains are an effective means of reducing wetness.

MANAGEMENT GROUP IIs–1

Onarga sandy loam is the only soil in this group. It is well drained and moderately well drained and is on terraces in the valley of the Illinois River. The subsoil is dominantly sandy loam.

Permeability is moderate to moderately rapid in this soil, and available water capacity is moderate. The content of organic matter is moderate in the surface layer.

This soil is suited to most crops commonly grown in the county. Wheat and soybeans are the main crops, but some clover is grown. Where irrigation systems are in operation, corn is also grown.

MANAGEMENT GROUP IIIe–1

This group consists of moderately sloping to strongly sloping, moderately well drained and well drained soils in the Camden, Clinton, Downs, Fayette, Hickory, and Worthen series. These soils are on uplands and terraces. They have a surface layer of silt loam or loam and a subsoil of silt, silty clay loam, or loam. In some areas of the eroded Camden, Clinton, and Downs soils, the plow layer consists of subsoil material of silty clay loam.

Permeability is moderate to moderately slow in the soils in this group. Available water capacity is high to very high. The content of organic matter is low in the surface layer of the Camden, Clinton, Fayette, and Hickory soils, moderate in the Downs soils, and high in the Worthen soils.

The soils in this group are suited to crops commonly grown in the county, but they are not well suited to continuous row croping. Corn, soybeans, wheat, grasses, and legumes are grown in various cropping sequences. Most of the strongly sloping slightly eroded soils are in woodland or pasture.

If these soils are cultivated, water erosion is the main hazard. It is more severe on the strongly sloping soils than on the moderately sloping soils. Tilth is poorer in the eroded soils and is more difficult to maintain, especially where tillage extends into the subsoil of silty clay loam or clay loam.

MANAGEMENT GROUP IIIw–1

This group consists of nearly level, somewhat poorly drained McGary soils and of poorly drained or very poorly drained Rushville, Sexton, and Wagner soils. The Rushville soils are on uplands; and the McGary, Sexton, and Wagner soils are on stream terraces. All these soils have a surface layer of silt loam and a subsoil of silty clay loam, silty clay, or clay.

Permeability is slow to very slow in the soils in this group. Available water capacity is moderate to high. The content of organic matter is low in the surface layer of the McGary, Rushville, and Sexton soils and low to moderate in the Wagner soils. Runoff is slow on all these soils.

If the soils in this group are drained, they are suited to most crops grown in the county. Corn and soybeans are the main crops. Some areas of the soils in this group are used for pasture, and some areas of McGary soils are in woodland.

Wetness is the major limitation to use of these soils. Some low areas of the Wagner soils flood occasionally. Runoff water stands in depressions in the Wagner, Rushville, and Sexton soils. The water table generally is near the surface in spring. Use of tile drains is not an effective means of reducing wetness in these soils, because of the slow to very slow permeability. Surface drainage is more effective.

MANAGEMENT GROUP IIIw–2

Darwin silty clay is the only soil in this group. It is nearly level and poorly drained to very poorly drained

and is on bottom lands in the valley of the Illinois River. The surface layer and subsoil are silty clay.

Permeability is very slow in this soil, and available water capacity is moderate. The content of organic matter in the surface layer is high.

This soil is not well suited to intensive cultivation. Wheat and clover are the main crops, but corn and soybeans are grown to a limited extent. Areas that do not have surface drainage and flood control are seldom used for cropland. Some of these areas are used for pasture, and some are in woodland.

Poor natural drainage, flooding, high clay content, and very slow permeability make this soil difficult to manage. It is difficult to work because of the high clay content. It is very sticky when wet and very hard when dry. Fall plowing is commonly used because it permits freezing and thawing of the soil through the winter to break down large clods. Flooding is an annual hazard in areas that are not protected by levees. A seasonal water table is near the surface. Surface ditches are an effective means of draining this soil; but tile drains are not effective, because of the very slow permeability.

MANAGEMENT GROUP IVe–1

This group consists of moderately steep, moderately well drained and well drained soils in the Bold, Fayette, Hickory, and Sylvan series. These soils are on uplands. They have a surface layer of silt loam or loam and a subsoil of silt loam, silty clay loam, or clay loam. Some areas of the eroded soils have a plow layer that consists mainly of material originally in the subsoil.

Permeability is moderate in the soils in this group. Available water capacity is high to very high. The content of organic matter is low.

The soils in this group are poorly suited to cultivated crops because of slope and the hazard of erosion. If erosion is controlled and fertility and tilth are maintained, most crops common to the county can be grown. Most of the soils that are only slightly eroded are in woodland or pasture.

Water erosion is a severe hazard on these soils, and slope is a limitation if these soils are cultivated. Tilth is difficult to maintain, especially in eroded areas where tillage extends into the subsoil of silty clay loam or clay loam. The eroded areas dry faster than the slightly eroded areas, and occasionally moisture is insufficient for good seed germination (fig. 14).

MANAGEMENT GROUP IVs–1

Bloomfield fine sand, 3 to 7 percent slopes, is the only soil in this group. It is well drained to somewhat excessively drained and is on uplands on the bluff of the Illinois River and on terraces in the valley of the river.

Permeability is moderately rapid to rapid in this soil, and available water capacity is low. The content of organic matter is low.

Unless this soil is irrigated, it is poorly suited to cultivated crops commonly grown in the county. If adequately fertilized, it is suited to growing melons and to less intensive use. Most areas of this soil are in pasture or native cover.

The main limitations to use of this soil are the low available water capacity and low natural fertility, but soil blowing is a hazard in places. Because this soil is porous, it does not hold large amounts of plant nutrients. Fertilizer needs to be applied frequently in small amounts to reduce losses by leaching.

MANAGEMENT GROUP VIe–1

This group consists of steep, moderately well drained and well drained soils in the Bold, Fayette, Hennepin, Hickory, and Sylvan series. These soils are on uplands. They have a surface layer of silt loam or loam and a subsoil of silt loam, loam, silty clay loam, or clay loam.

Permeability is moderate in the soils in this group. Available water capacity is moderate to very high. The content of organic matter is low. Some of these soils are eroded.

The soils in this group are not suited to cultivated crops. Most of the soils are used for woodland, but some are used for pasture. Pasture is difficult to maintain and the operation of machinery is dangerous because these soils are steep.

The main limitations to use and management of these soils are steep slopes and the severe hazard of water erosion. Runoff is rapid, especially on areas of eroded soils that have poor plant cover.

MANAGEMENT GROUP VIs–1

Bloomfield fine sand, 7 to 18 percent slopes, is the only soil in this group. It is well drained to somewhat excessively drained and is mainly on uplands on the bluff adjacent to the valley of the Illinois River.

Permeability is moderately rapid to rapid in this soil, and available water capacity is low. The content of organic matter is low.

This soil is very poorly suited to cultivated crops. If adequately fertilized, the soil is suited to melons, drought-resistant grasses, and deep-rooted legumes. Most of this soil is in pasture or native cover.

The main limitations to use of this soil are the low available water capacity, low natural fertility, and strong slopes. Soil blowing is a severe hazard on bare areas in spring. Because the soil is porous, it does not hold large amounts of plant nutrients. Fertilizer needs to be applied frequently in small amounts to reduce losses by leaching.

MANAGEMENT GROUP VIIe–1

This group consists of very steep, moderately well drained to somewhat excessively drained soils in the Bold, Fayette, Hamburg, Hennepin, Hickory, and Sylvan series. These soils are on uplands. They have a surface layer of silt, silt loam, or loam and a subsoil of silt, silt loam, loam, silty clay loam, or clay loam.

Permeability is moderate to moderately rapid in the soils in this group. Available water capacity is moderate to very high. The content of organic matter is low.

The soils in this group are not suited to cultivated crops and are poorly suited to pasture. Most of the soils are in woodland, but the Hamburg soils are mainly in grasses. Generally, the soils are too steep to permit use of machinery for liming, fertilizing, seeding, or mowing. Excessive grazing on areas used for pasture destroys the protective cover and generally results in excessive erosion.

Figure 14.—**Poor stand of corn on Fayette silt loam, 12 to 18 percent slopes, eroded. Moisture in this soil is insufficient for good seed germination.**

The main limitations to use and management of these soils are very steep slopes and the severe hazard of water erosion. Runoff is rapid to very rapid during periods of heavy rainfall; and, as a result, the soils seldom have a reserve supply of moisture.

MANAGEMENT GROUP VIIs–1

Bloomfield fine sand, 18 to 45 percent slopes, is the only soil in this group. It is somewhat excessively drained and is mainly on uplands on the bluff adjacent to the valley of the Illinois River.

Permeability is moderately rapid to rapid in this soil, and available water capacity is low. The content of organic matter is low.

This soil is not suited to cultivated crops and is very poorly suited to pasture. Most areas are in woodland.

The main limitations to use of this soil are the low available water capacity, steep slopes, and low fertility. Soil blowing is a severe hazard on bare areas. This soil needs a permanent plant cover.

MANAGEMENT GROUP VIIs–2

This group consists of Limestone rock land and Cherty land, Riverwash sand and gravel, and Shale rock land. The areas of Riverwash are nearly level, but the areas of rock land are moderately steep to very steep. There is little or no soil development, and the rocky or gravelly nature of these land types makes them droughty.

The land types in this group generally are not suited to farming. Most steep to very steep areas of rock land are in low-quality woodland or have no plant cover. Some less steep areas, where some soil is mixed with the rock, support trees and some pasture. Some areas of Riverwash sand and gravel support a growth of willows, but most areas are bare. Plant cover needs to be maintained.

Predicted Yields

Table 5 shows predicted yields of the principal crops grown in Greene County under a high level of management. These predictions are based on yields for the period 1954–63, on soil tests, and on the experience and records of farmers, agronomists, conservationists, and farm advisers (*15*). The predictions are adjusted to reflect the trend toward higher yields during the period 1963–68. Average yields are expected to increase. A few farmers obtain yields as high as 200 bushels of corn an acre in some years, but such yields are not common.

Management was determined on the basis of farming techniques, crop varieties, and fertilizers commonly used in 1968. Differences in weather from year to year can cause annual yields to range 20 percent above or below those shown in the table. Yields for hay and pasture are predicted for varieties of grasses and legumes adapted to the soil.

Under a high level of management, adequate drainage, flood control, and erosion control are provided. The proper number of plants per acre is grown, and high-quality seed is used. Tillage is kept to a minimum and is done when soil moisture is favorable. Weeds, plant diseases, and harmful insects are controlled. Favorable soil reaction and near optimum levels of nitrogen, phosphorus, and potassium are maintained. Efficient use is made of available crop residue, barnyard manure, and green-manure crops, and crops are harvested with the smallest possible loss. The combination of practices used is efficient, and all operations are timely.

TABLE 5.—*Predicted average acre yields of principal crops*

[Yields are those to be expected under a high level of management. Absence of a yield figure indicates that the soil is not well suited to the crop or that the crop is not commonly grown. Limestone rock land and Cherty land, Riverwash sand and gravel, and Shale rock land are not listed]

Soil	Corn	Soybeans	Wheat	Grass-legume hay [1]	Rotation pasture
	Bu.	*Bu.*	*Bu.*	*Tons*	*Animal-unit-days* [2]
Ambraw clay loam	115	40	50	4. 8	240
Beardstown loam	105	38	45	4. 5	225
Beaucoup silty clay loam	115	40	50	4. 8	240
Bloomfield fine sand, 3 to 7 percent slopes	65	22	32	2. 5	125
Bloomfield fine sand, 7 to 18 percent slopes			25	2. 0	100
Bloomfield fine sand, 18 to 45 percent slopes					
Camden silt loam, 1 to 6 percent slopes	110	38	48	5. 0	250
Camden silt loam, 6 to 10 percent slopes, eroded	95	32	40	4. 2	210
Clarksdale silt loam, 0 to 2 percent slopes	120	42	52	5. 0	250
Clarksdale silt loam, 2 to 4 percent slopes	120	42	52	5. 0	250
Clinton silt loam, 2 to 4 percent slopes	110	38	48	5. 0	250
Clinton silt loam, 4 to 7 percent slopes	105	35	45	4. 8	240
Clinton silt loam, 4 to 7 percent slopes, eroded	100	35	42	4. 5	225
Clinton silt loam, 7 to 12 percent slopes	100	35	42	4. 5	225
Clinton silt loam, 7 to 12 percent slopes, eroded	95	32	40	4. 2	210
Darwin silty clay	90	32	38	3. 0	150
Denny silt loam	105	38	40	3. 8	190
Downs silt loam, 2 to 4 percent slopes	125	45	55	5. 2	260
Downs silt loam, 4 to 7 percent slopes	120	42	52	5. 0	250
Downs silt loam, 4 to 10 percent slopes, eroded	115	40	50	4. 8	240
Dupo silt loam	115	40	50	4. 8	240
Fayette silt loam, 2 to 4 percent slopes	120	42	52	5. 2	260
Fayette silt loam, 4 to 7 percent slopes	115	40	50	5. 0	250
Fayette silt loam, 4 to 7 percent slopes, eroded	110	38	48	4. 8	240
Fayette silt loam, 7 to 12 percent slopes	110	38	48	4. 8	240
Fayette silt loam, 7 to 12 percent slopes, eroded	100	35	45	4. 5	225
Fayette silt loam, 12 to 18 percent slopes	95	30	40	4. 2	210
Fayette silt loam, 12 to 18 percent slopes, eroded	90	28	40	4. 2	210
Fayette silt loam, 18 to 30 percent slopes			35	4. 0	200
Fayette silt loam, 18 to 30 percent slopes, eroded			35	4. 0	200
Fayette silt loam, 30 to 60 percent slopes					
Hamburg silt, 20 to 60 percent slopes					
Haymond silt loam	115	40	50	4. 8	240
Hickory loam, 7 to 12 percent slopes, eroded	85	30	38	3. 8	190
Hickory loam, 12 to 18 percent slopes	85	30	35	3. 8	185
Hickory loam, 12 to 18 percent slopes, eroded	80	25	30	3. 5	175
Hickory and Hennepin loams, 18 to 30 percent slopes				3. 5	175
Hickory and Hennepin loams, 18 to 30 percent slopes, eroded				3. 0	150
Hickory and Hennepin loams, 30 to 60 percent slopes				2. 5	140
Huntsville silt loam	130	45	55	5. 5	275
Keomah silt loam, 0 to 2 percent slopes	110	38	48	5. 0	250
Keomah silt loam, 2 to 4 percent slopes	110	38	48	5. 0	250
La Hogue loam, 0 to 2 percent slopes	110	38	48	4. 8	240
La Hogue loam, 2 to 4 percent slopes	110	38	48	4. 8	240

See footnotes at end of table.

TABLE 5.—*Predicted average acre yields of principal crops*—Continued

Soil	Corn	Soybeans	Wheat	Grass-legume hay [1]	Rotation pasture
	Bu.	*Bu.*	*Bu.*	*Tons*	*Animal-unit-days* [2]
Lawson silt loam	130	45	55	5. 5	275
Littleton silt loam	135	48	55	5. 5	275
McFain silty clay	110	38	45	4. 2	210
McGary silt loam	80	28	38	3. 2	160
Muscatine silt loam, 0 to 2 percent slopes	140	48	58	5. 8	290
Muscatine silt loam, 2 to 4 percent slopes	140	48	58	5. 8	290
Onarga sandy loam	90	32	42	3. 8	190
Petrolia silty clay loam	110	38	45	4. 2	210
Proctor silt loam	125	45	55	5. 2	260
Radford silt loam	120	42	50	5. 2	260
Rushville silt loam	100	35	42	3. 8	190
Sable silty clay loam	130	45	55	5. 2	260
Sexton silt loam	100	35	45	4. 0	200
Starks silt loam	115	40	50	5. 0	250
Sylvan-Bold silt loams, 10 to 18 percent slopes, eroded	75	25	30	3. 2	160
Sylvan-Bold silt loams, 18 to 30 percent slopes				3. 0	150
Sylvan-Bold silt loams, 18 to 30 percent slopes, eroded				3. 0	150
Sylvan-Bold silt loams, 30 to 50 percent slopes					
Tama silt loam, 2 to 4 percent slopes	135	48	55	5. 5	275
Tama silt loam, 4 to 7 percent slopes	130	45	55	5. 2	260
Tice silty clay loam	130	45	55	5. 0	250
Titus silty clay loam	100	35	40	3. 8	190
Virden silt loam	125	45	55	5. 0	250
Wagner silt loam	90	32	42	3. 8	190
Wakeland silt loam	115	40	5	4. 8	240
Worthen silt loam, 1 to 4 percent slopes	130	45	55	5. 5	275
Worthen silt loam, 4 to 12 percent slopes	120	40	50	5. 0	255

[1] Hay and pasture yields are estimated for mixed stands of grasses and legumes that are adapted to the soil.

[2] Animal-unit-days is a term used to express the carrying capacity of pasture. It is the number of days 1 acre can carry one animal unit during a single grazing season without injury to the sod. One animal unit is defined as one cow, two yearling calves, one horse, five sheep, or four brood sows. For example, 20 sheep can graze about 25 days in a pasture that has a capacity of 100 animal-unit-days.

Woodland [3]

This section tells some things of the past and present woodland in Greene County, names the main trees, and tells whether they grow on bottom lands or uplands. Most of the information is in table 6, which places the soils in suitability groups, describes the groups, and lists potential productivity, management limitations, and species to favor for the groups.

When pioneer settlement began, trees covered about 75 percent of Greene County. Since then most of the areas have been cleared. According to the Illinois Soil and Water Conservation Needs Inventory published in 1970, about 55,962 acres of Greene County was wooded in 1967. This acreage makes up about 16 percent of the land area of the county.

Because most trees were cleared from soils suitable for crops, the remaining trees are mainly on soils that are unsuitable for cultivation. These soils are either steep, wet, or inaccessible. The largest continuous forests are on Petrolia soils in the valley of the Illinois River, on Beaucoup and Wakeland soils in the valley of Apple Creek, and on Bold, Fayette, Hennepin, Hickory, and Sylvan soils that occupy steep slopes bordering the valleys of creeks and the valley of the Illinois River (fig. 15).

[3] By WILLIAM CLARK, woodland conservationist, Soil Conservation Service.

The main species that grow on the bottom lands are cottonwood, sycamore, pin oak, and silver maple. The main species on the uplands are white oak, red oak, black oak, and hickory.

In table 6 the soils of Greene County are placed in 15 woodland suitability groups (*9*). Each group consists of soils that are capable of producing similar kinds of wood crops, that need similar management to produce these crops when the vegetation is similar, and that have about the same potential productivity.

The potential productivity of a soil for a given species is commonly expressed as site index. It is the height, in feet, that the dominant trees of a given species, growing on a specified soil, will reach at a specified age. The site index for cottonwood is based on height at 30 years of age (*3*), and for other species on height at 50 years of age.

The estimated average annual growth per acre is given in board feet measured by the Doyle Rule. The estimates are based on data from well-stocked, well-managed stands of upland oaks, pin oak, yellow-poplar, and cottonwood (*11*) (*12*). Red oak and white oak were used to estimate the rate of growth for all upland oaks.

Five limitations that affect the growth and management of trees are rated in table 6. The ratings are *slight*, *moderate*, or *severe* for the soils in each group.

Erosion hazard refers to the risk of erosion in properly managed stands. The length and steepness of slopes and

Figure 15.—Cutover woodland on Sylvan-Bold silt loams, 18 to 30 percent slopes.

the soil texture and permeability are among the factors considered. *Slight* means that erosion is not a major problem. *Moderate* indicates that management is needed to prevent erosion during harvesting operations and in cleared areas. *Severe* indicates that intensive management is required to control erosion.

Equipment limitation refers to soil characteristics and topographic features that restrict the use of equipment in planting, tending, or harvesting trees. *Slight* means that there is little or no restriction on the type of equipment or time of year that it can be used. *Moderate* means that use of equipment is restricted because the soils are steep or because the soils are wet for 3 months or less each year. *Severe* indicates that the very steep soils need special harvesting methods, or that use of equipment is restricted because the soils are wet for more than 3 months each year.

Seedling mortality refers to the expected loss of natural or planted tree seedlings as influenced by kinds of soil or topographic features. Losses caused by plant competition are excluded. It is assumed that the natural supply of seed is adequate, that the stock is good, that seedlings are properly planted and cared for, and that climatic conditions are normal. *Slight* means that losses normally are not more than 25 percent of the planted or natural stock; *moderate* indicates that losses are between 25 and 50 percent; and *severe* indicates that more than half of the planted or natural stock is likely to die.

Plant competition refers to the rate at which unwanted trees, shrubs, and weeds are likely to invade a given site where openings are made in the canopy. *Slight* means that competition is not a major problem. *Moderate* means that plant competition will delay natural or artificial regeneration, but it will not prevent the establishment of desirable species and it can be controlled easily. *Severe* indicates that stands of desired species are not restocked naturally and that planted trees are likely to be choked out unless intensive management is applied to eliminate competing plants.

TABLE 6.—*Suitability of*

[The land type Riverwash sand and gravel (123) was not placed

Woodland suitability groups	Potential productivity			Management limitations	
	Species	Site [1] index	Annual [2] growth per acre	Erosion hazard	Equipment limitations
		Bd. ft.			
Group 1o1: Well drained and moderately well drained soils on terraces and uplands; slopes of 0 to 12 percent; surface layer is silt loam or loam; subsoil is silty clay loam or clay loam; high to very high available water capacity. Camden: 134B, 134D2; Clinton: 18B, 18C, 18C2, 18D, 18D2; Downs: 386B, 386C, 386C2 [4]; Hickory: 8D2; Proctor: 148 [4]; Tama: 36B, 36C [4]; Worthen: 37B, 37C [4].	Upland oaks [3] Yellow-poplar	85–95 95–105	350–450 550–650	Slight	Slight
Group 1o4: Well drained and moderately well drained, nearly level soils on bottom lands; surface layer and subsoil are silt loam; very high available water capacity. Haymond: 331; Huntsville: 77.	Cottonwood Yellow-poplar	>105 95–105	550–650 550–650	Slight	Slight
Group 1r2: Well drained and moderately well drained soils on uplands; slopes of 12 to 30 percent; surface layer is loam; subsoil is loam or clay loam; moderate to high available water capacity. Hickory: 8E, 8E2; Hickory and Hennepin: 958F, 958F2.	Upland oaks [3] Yellow-poplar	85–95 95–105	350–450 550–650	Moderate	Moderate
Group 1r3: Well drained and moderately well drained soils on uplands; slopes of 30 to 60 percent; surface layer is loam; subsoil is loam or clay loam; moderate to high available water capacity. Hickory and Hennepin: 958G.	Upland oaks [3] Yellow-poplar	85–95 95–105	350–450 350–650	Severe	Severe
Group 2o1: Somewhat poorly drained to well-drained soils on terraces and uplands; slopes of 0 to 12 percent; surface layer is silt loam, loam, or sandy loam; subsoil is silty clay loam, clay loam, sandy clay loam, or sandy loam; moderate to very high available water capacity. Beardstown: 188; Clarksdale: 257A, 257B, Fayette: 280B, 280C, 280C2, 280D, 280D2; Keomah: 17A, 17B; La Hogue: 102A, 102B; Littleton: 81 [4]; Muscatine: 41A, 41B [4]; Onarga: 150; Starks: 132.	Upland oaks [3] Yellow-poplar	75–85 85–95	250–350 450–550	Slight	Slight
Group 2o4: Somewhat poorly drained, nearly level soils on bottom lands; surface layer and subsoil are silt loam or silty clay loam; high to very high available water capacity. Dupo: 180; Lawson: 451; Radford: 74; Tice: 284; Wakeland: 333.	Cottonwood Yellow-poplar Pin oak	95–105 85–95 85–95	450–550 450–550 350–450	Slight	Slight
Group 2r2: Well-drained soils on uplands; slopes of 12 to 30 percent; surface layer is silt loam; subsoil is silt loam or silty clay loam; high to very high available water capacity. Fayette: 280E, 280E2, 280F, 280F2; Sylvan-Bold: 962E2, 962F, 962F2.	Upland oaks [3] Yellow-poplar	75–85 85–95	250–350 450–550	Moderate	Moderate

See footnotes at end of table.

soils for woodland

in a woodland group. The symbol > means greater than]

Management limitations—Continued				Species suitability		
				For planting		
Seedling mortality	Plant competition	Windthrow hazard	To favor in existing stands	On north- and east-facing sites	On south- and west-facing sites	In windbreaks
Slight	Moderate	Slight	White oak, red oak, yellow-poplar, black walnut, green ash, sweetgum.	Black walnut, cottonwood, sycamore, yellow poplar, white oak, red oak, green ash, white pine, red pine, Scotch pine, sugar maple.	Red pine, Scotch pine, black locust, redcedar.	Norway spruce, white pine, red pine, white spruce, Douglas-fir.
Slight	Moderate	Slight	Cottonwood, sycamore, yellow-poplar, cherrybark oak, sweetgum, green ash, southern red oak, black walnut.	Black walnut, sycamore, cottonwood, red maple, sugar maple, green ash, hackberry.	Black walnut, sycamore, cottonwood, red maple, sugar maple, green ash, hackberry.	White pine, red pine, Norway spruce, white spruce, Douglas-fir.
Slight	Moderate	Slight	White oak, red oak, yellow-poplar, green ash, black walnut.	Black walnut, cottonwood, sycamore, yellow-poplar, white oak, red oak, green ash, white pine, red pine, Scotch pine, sugar maple.	Red pine, Scotch pine, black locust, redcedar.	Norway spruce, white pine, red pine, white spruce, Douglas-fir.
Slight	Moderate	Slight	White oak, red oak, yellow-poplar, black walnut.	Black walnut, cottonwood, sycamore, yellow-poplar, white oak, red oak, green ash, white pine, red pine, Scotch pine, sugar maple.	Red pine, Scotch pine, black locust, redcedar.	Not needed.
Slight	Slight to severe.	Slight	White oak, red oak, yellow-poplar, black walnut.	Black walnut, cottonwood, sycamore, yellow-poplar, white oak, red oak, green ash, white pine, red pine, Scotch pine, sugar maple.	Red pine, Scotch pine, black locust, redcedar.	Norway spruce, white pine, red pine, white spruce, Douglas-fir.
Slight	Severe	Slight	Cottonwood, sycamore, yellow-poplar, sweetgum, pin oak, green ash.	Cottonwood, pin oak, sycamore, red maple, swamp white oak, green ash.	Cottonwood, pin oak, sycamore, red maple, swamp white oak, green ash.	Not needed.
Slight	Moderate	Slight	White oak, red oak, black walnut, yellow-poplar.	Black walnut, cottonwood, sycamore, yellow-poplar, white oak, red oak, green ash, white pine, red pine, Scotch pine, sugar maple.	Red pine, Scotch pine, black locust, redcedar.	Norway spruce, white pine, red pine, white spruce, Douglas-fir.

TABLE 6.—*Suitability of*

Woodland suitability groups	Potential productivity			Management limitations	
	Species	Site [1] index	Annual [2] growth per acre	Erosion hazard	Equipment limitations
		Bd. ft.			
Group 2r3: Well-drained and somewhat excessively drained soils on uplands; slopes of 20 to 60 percent; surface layer is silt or silt loam; subsoil is silt, silt loam, or silty clay loam; moderate to very high available water capacity. Fayette: 280G; Hamburg: 30G; Sylvan-Bold: 962G.	Upland oaks [3] Yellow-poplar	75–85 85–95	250–350 450–550	Severe	Severe
Group 2w5: Poorly drained, nearly level soils on bottom lands; surface layer and subsoil are clay loam or silty clay loam; high to very high available water capacity. Ambraw: 302; Beaucoup: 70; Petrolia: 288; Titus: 404.	Pin oak Cottonwood	85–95 95–105	350–450 450–550	Slight	Moderate
Group 2w6: Poorly drained and very poorly drained, nearly level soils on bottom lands; surface layer is silt loam or silty clay; subsoil is silty clay or fine sandy loam; moderate to high available water capacity. Darwin: 71; Wagner: 26; McFain: 248 [4].	Pin oak	85–95	350–450	Slight	Moderate
Group 3o1: Somewhat poorly drained, nearly level soils on terraces; surface layer is silt loam; subsoil is silty clay; moderate available water capacity. McGary: 173.	Upland oaks [3]	65–75	150–250	Slight	Slight
Group 3s2: Well-drained or somewhat excessively drained soils on terraces and uplands; slopes of 3 to 18 percent; surface layer is fine sand; subsoil is loamy sand to sandy loam; low available water capacity. Bloomfield: 53C, 53D.	Upland oaks [3]	65–75	150–250	Slight	Moderate
Group 3s3: Well-drained or somewhat excessively drained soils on terraces and uplands; slopes of 18 to 45 percent; surface layer is fine sand; subsoil is loamy sand to sandy loam; low available water capacity. Bloomfield: 53F.	Upland oaks [3]	65–75	150–250	Moderate	Severe
Group 3w2: Poorly drained and very poorly drained, nearly level soils on terraces and uplands; surface layer is silt loam or silty clay loam; subsoil is silty clay loam; high to very high available water capacity. Denny: 45 [4]; Rushville: 16; Sable: 68 [4]; Sexton: 208; Virden: 47 [4].	Pin oak	75–85	200–300	Slight	Moderate
Group 5d3: Miscellaneous land types on uplands; slopes of 15 to 70 percent; low available water capacity. Limestone rock land and Cherty land: 94G; Shale rock land: 95F.	Upland oaks [3]	45–55	50–100	Severe	Moderate to severe.

[1] The method for establishing site index is described in the narrative accompanying this table.
[2] Doyle Rule.

soils for woodland—Continued

Management limitations—Continued				Species suitability		
				For planting		
Seedling mortality	Plant competition	Windthrow hazard	To favor in existing stands	On north- and east-facing sites	On south- and west-facing sites	In windbreaks
Moderate	Moderate	Slight	White oak, red oak, black walnut, yellow-poplar.	Black walnut, cottonwood, sycamore, yellow-poplar, white oak, red oak, green ash, white pine, red pine, Scotch pine, sugar maple.	Red pine, Scotch pine, black locust, redcedar.	Not needed.
Moderate	Severe	Slight	Pin oak, cottonwood, sweetgum, sycamore, cherrybark oak.	Cottonwood, sycamore, red maple, green ash, swamp white oak, pin oak, sweetgum.	Cottonwood, sycamore, red maple, green ash, swamp white oak, pin oak, sweetgum.	Not needed.
Severe	Severe	Slight	Pin oak, swamp white oak, cottonwood, green ash, soft maple, sycamore.	Cottonwood, sycamore, red maple, green ash, swamp white oak, pin oak, sweetgum.	Cottonwood, sycamore, red maple, green ash, swamp white oak, pin oak, sweetgum.	Not needed.
Slight	Slight	Slight	White oak, red oak. green ash, bur oak.	White pine, red pine, Scotch pine, redcedar.	White pine, red pine, Scotch pine, redcedar.	White pine, red pine, Norway spruce, Douglas-fir, arborvitae.
Moderate	Slight	Slight	Black oak, white oak, scarlet oak.	White pine, red pine, Scotch pine, redcedar.	Red pine, black locust, Scotch pine, redcedar, osage orange.	White pine, red pine, Norway spruce, Douglas-fir, arborvitae.
Severe	Slight	Slight	Black oak, white oak, scarlet oak.	White pine, red pine, Scotch pine, redcedar.	Red pine, black locust, Scotch pine, redcedar, osage orange.	White pine, red pine, Norway spruce, Douglas-fir, arborvitae.
Moderate	Severe	Slight	White oak, pin oak, green ash.	Pin oak, green ash, red maple.	Pin oak, green ash, red maple.	Arborvitae.
Severe	Slight	Slight	Red oak, white oak, redcedar.	Redcedar, white pine, red pine, jack pine.	Maintain any existing vegetation to protect against erosion.	White pine, red pine, redcedar.

[3] Upland oaks include white oak, red oak, black oak, and bur oak.
[4] No natural woodlands are on these soils, but they are adapted to species listed as suitable for planting.

Windthrow hazard is an evaluation of soil characteristics that control the development of tree roots and the capacity of the soils to hold trees firmly during periods of soil wetness and high winds. All soils are rated *slight*, which indicates no special problems are recognized.

Table 6 lists the tree species to favor in natural stands for each woodland suitability group. The ratings are based on the suitability of the species for the site and the market value of the trees. Species are not listed in order of preference. Species suitable for planting are given for each group. On those soils where aspect is a factor, adapted species are listed for north-east and south-west exposures. For soils where windbreaks are beneficial, tree species suitable for this use also are listed.

Wildlife [4]

Food, cover, and water are plentiful in Greene County; but they are not in combinations suitable for wildlife habitat in all phases (*17*). The three major kinds of wildlife in the county are openland, woodland, and wetland. The soils have a great potential for the development of habitat for all three kinds of wildlife.

In table 7, the soils are placed in eight wildlife groups and rated according to their suitability for elements of wildlife habitat and for kinds of wildlife. The ratings are well suited, suited, poorly suited, and unsuited. A rating of *well suited* means that habitats are easily established, improved, or maintained. A rating of *suited* indicates that the soils have slight to moderate limitations for establishing and maintaining habitats. A *poorly suited* rating means that the soils have severe limitations for establishing and maintaining habitats. Habitat management can be difficult and expensive. An *unsuited* rating means that establishing and maintaining wildlife habitats on these soils is generally not practical.

The eight elements of wildlife habitat and the three kinds of wildlife shown in table 7 are defined in the following paragraphs.

Grain and seed crops are domestic grains or seed-producing annual plants that include such crops as corn, sorghum, wheat, oats, soybeans, buckwheat, cowpeas, and sunflower.

Grasses and legumes are domestic perennial grasses and legumes that include such plants as fescue, timothy, redtop, orchardgrass, reed canarygrass, bromegrass, clovers, trefoil, alfalfa, and sericea or Korean lespedeza.

Wild herbaceous plants are native or introduced perennial grasses and forbs, or weeds, that provide food and cover principally for wildlife on uplands. These plants include bluestem, indiangrass, wheatgrasses, wildryes, oatgrasses, pokeweed, strawberries, lespedezas, beggarweed, wild beans, nightshade, and goldenrod.

Hardwood plants are nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs (browse), or foilage used extensively as food by

[4] By REX HAMILTON, biologist, Soil Conservation Service.

TABLE 7.—*Suitability of*

[Limestone rock land and Cherty land, Shale rock land, and Riverwash sand and gravel

Wildlife groups	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood plants
Group 1. Well drained and moderately well drained, nearly level to strongly sloping soils on uplands and terraces. Camden: 134B; 134D2; Clinton: 18B, 18C, 18C2, 18D, 18D2; Downs: 386B, 386C, 386C2; Fayette: 280B, 280C, 280C2, 280D, 280D2; Haymond: 331; Hickory: 8D2; Huntsville: 77; Onarga: 150; Proctor: 148; Tama: 36B, 36C; Worthen: 37B, 37C.	Well suited if slopes are 0 to 7 percent. Suited if slopes are 7 to 12 percent.	Well suited	Well suited	Well suited
Group 2. Well drained and moderately well drained, moderately steep soils on uplands. Fayette: 280E, 280E2; Hickory: 8E, 8E2; Sylvan-Bold: 962E2.	Poorly suited: slope severely limits use.	Suited: slope moderately limits use.	Well suited	Well suited
Group 3. Well drained and moderately well drained, steep and very steep soils on uplands. Fayette: 280F, 280F2, 280G; Hamburg: 30G; Hickory and Hennepin: 958F, 958F2, 958G; Sylvan-Bold: 962F, 962F2, 962G.	Unsuited: slope very severely limits use.	Suited if slopes are 18 to 30 percent. Unsuited if slopes exceed 30 percent.	Well suited	Well suited

wildlife. These plants are commonly established by natural processes but also are planted. They include oak, beech, cherry, hawthorns, dogwood, viburnum, holly, maple, birch, poplar, grapes, honeysuckle, blueberry, briers, greenbriers, and roses.

Coniferous plants are cone-bearing trees and shrubs that are primarily used as cover by wildlife. Food in the form of browse, seeds, or fruitlike cones is used to some extent by wildlife. These plants include pine, spruce, white cedar, redcedar, hemlock, balsam fir, juniper, and yew. They are established naturally or by planting.

Wetland plants are annual and perennial wild herbaceous plants, excluding submerged or floating aquatic plants that grow on moist or wet sites. These plants are used mainly for food and cover by wetland wildlife. They include smartweeds, wild millets, rushes, sedges, reeds, wildrice, rice cutgrass, mannagrass, bluejoint, cord grasses, cattails, pondweeds, wild celery, and spatterdocks.

Shallow-water developments are impoundments or excavations that generally are not more than 5 feet deep. They include low dikes and levees, shallow dugouts, level ditches, and devices for controlling the water level on marshy streams or channels.

Excavated ponds are dugout areas or combinations of dugout areas and low dikes that have water of suitable quality and depth and in adequate amounts for fish or wildlife. An excavated pond has a surface area of at least one-tenth of an acre, is 6 feet deep in at least one-quarter of the area, and has a dependable high water table or other source of unpolluted water. Soils are not rated for impounded farm ponds in table 7, but this kind of pond attracts migatory waterfowl and can be used for freshwater fish. Features affecting the use of soils for impounded farm ponds are given in table 10.

Openland wildlife includes quail, mourning dove, meadowlark, cottontail rabbit, red fox, and other birds and mammals that frequent wooded areas consisting of hardwood and coniferous trees and shrubs. Elements of wildlife habitat that are used to rate the soils for this kind of wildlife are grasses and legumes, wild herbaceous plants, hardwood plants, and coniferous plants.

Woodland wildlife includes squirrel, white-tailed deer, raccoon, woodchuck, woodpecker, nuthatches, and other birds and mammals that frequent wooded areas consisting of hardwood and coniferous trees and shrubs. Elements of wildlife habitat that are used to rate the soils for this kind of wildlife are grasses and legumes, wild herbaceous plants, hardwood plants, and coniferous plants.

Wetland wildlife includes various kinds of waterfowl, muskrat, kingfisher, red-winged blackbird, and other birds and mammals that normally live in wet areas, such as ponds, marshes, and swamps. Elements of wildlife habitat that are used to rate the soils for this kind of wildlife are grain and seed crops, wetland food and cover plants, shallow-water developments, and excavated ponds.

soils for wildlife

are not listed, because they generally are not suited to wildlife habitat]

Elements of wildlife habitat—Continued				Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water developments	Excavated ponds	Openland wildlife	Woodland wildlife	Wetland wildlife
Poorly suited: rapid growth closes canopy early.	Unsuited: no suitable plant species for food and cover.	Unsuited: water table too deep.	Unsuited: water table too deep.	Well suited	Well suited	Unsuited: no suitable wetland plants for food and cover; water supply limited.
Poorly suited: rapid growth closes canopy early.	Unsuited: no suitable plant species for food and cover.	Unsuited: too sloping and water table too deep.	Unsuited: too sloping and water table too deep.	Suited: production of grain and seed crops severely limited.	Suited: production of grasses and legumes moderately limited.	Unsuited: no suitable wetland plants for food and cover; water supply limited.
Poorly suited: rapid growth closes canopy early.	Unsuited: no suitable plant species for food and cover.	Unsuited: too sloping and water table too deep.	Unsuited: too sloping and water table too deep.	Poorly suited: unsuited for production of grain and seed crops.	Suited: production of grasses and legumes moderately limited.	Unsuited: no suitable wetland plants for food and cover; water supply limited.

TABLE 7.—*Suitability of*

Wildlife groups	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood plants
Group 4. Somewhat poorly drained, nearly level soils on uplands and terraces. Beardstown: 188; Clarksdale: 257A; Keomah: 17A; La Hogue: 102A; Littleton: 81; McGary: 173; Muscatine: 41A; Starks: 132.	Well suited in drained areas. Suited in undrained areas; wetness is a hazard.	Well suited in drained areas. Suited in undrained areas; wetness is a hazard.	Well suited	Well suited
Group 5. Somewhat poorly drained, gently sloping soils on uplands and terraces. Clarksdale: 257B; Keomah: 17B; La Hogue: 102B; Muscatine: 41B.	Well suited	Well suited	Well suited	Well suited
Group 6. Somewhat poorly drained, nearly level soils on bottom lands. Dupo: 180; Lawson: 451; Radford: 74; Tice: 284; Wakeland: 333.	Suited: wetness and flooding are hazards. Well suited in drained areas.	Suited: wetness and flooding are hazards. Well suited in drained areas.	Well suited	Well suited
Group 7. Poorly drained to very poorly drained, nearly level soils on uplands, terraces, and bottom lands. Ambraw: 302; Beaucoup: 70; Darwin: 71; Denny: 45; McFain: 248; Petrolia: 288; Rushville: 16; Sable: 68; Sexton: 208; Titus: 404; Virden: 47; Wagner: 26.	Well suited in drained areas. Poorly suited in undrained areas; wetness is a hazard; flooding or ponding limits growth.	Well suited in drained areas. Suited in undrained areas; wetness is a hazard; flooding or ponding limits growth. Poorly suited in 71.	Well suited in drained areas. Suited in undrained areas; wetness is a hazard; flooding or ponding limits growth. Poorly suited in 71.	Well suited
Group 8. Well-drained to somewhat excessively drained, moderately sloping to steep soils on uplands and terraces. Bloomfield: 53C, 53D, 53F.	Poorly suited in 53C and 53D. Unsuited in 53F. Slope and low available water capacity limit use.	Poorly suited: low available water capacity limits use.	Poorly suited: low available water capacity limits use.	Poorly suited: low available water capacity limits use.

soils for wildlife—Continued

Elements of wildlife habitat—Continued				Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water developments	Excavated ponds	Openland wildlife	Woodland wildlife	Wetland wildlife
Poorly suited: rapid growth closes canopy early.	Suited: limited number of suitable plant species for food and cover.	Suited: water table not high enough to maintain water level all year.	Suited: water table not high enough to maintain water level all year.	Well suited	Well suited	Suited: water supply and number of suitable wetland plants for food and cover moderately limited.
Poorly suited: rapid growth closes canopy early.	Poorly suited: limited number of suitable plant species for food and cover.	Poorly suited: slope and inadequate water table limit use.	Poorly suited: slope and inadequate water table limit use.	Well suited	Well suited	Poorly suited: water supply and number of suitable wetland plants for food and cover severely limited.
Poorly suited: rapid growth closes canopy early.	Suited: limited number of suitable plant species for food and cover.	Suited: water table not high enough to maintain water level all year.	Poorly suited: flooding affects control of water level; water table fluctuates.	Well suited: production of grain and seed crops moderately limited in undrained areas.	Well suited in drained areas. Suited in undrained areas; growth of grasses and legumes moderately limited.	Suited: water supply and number of suitable wetland plants for food and cover moderately limited. Poorly suited in drained areas.
Unsuited: wetness severely limits choice of plant species suitable for woodland wildlife.	Poorly suited in drained areas; limited number of suitable plant species for food and cover. Well suited in undrained areas.	Suited in drained areas; limited water supply. Well suited in undrained areas except in 71, in which flooding affects control of water level.	Suited in drained areas; limited water supply. Well suited in undrained areas except in 71, in which flooding affects control of water level.	Well suited in drained areas. Suited in undrained areas; production of grain and seed crops severely limited. Poorly suited in 71.	Well suited in drained areas except in 71. Suited in undrained areas; growth of plants for food and cover limited.	Poorly suited in drained areas; number of suitable wetland plants for food and cover severely limited. Well suited in undrained areas.
Well suited	Unsuited: low available water capacity limits use; no suitable plant species for food and cover.	Unsuited: too sloping and water table too deep.	Unsuited: too sloping and water table too deep.	Poorly suited in 53C and 53D. Unsuited in 53F. Low available water capacity severely limits growth of food and cover plants.	Poorly suited: low available water capacity severely limits growth of food and cover plants.	Unsuited: no suitable wetland plants for food and cover; water supply limited.

Recreational Uses of the Soils

In table 8, the soils of Greene County are placed in seven recreation groups, and are rated according to their limitations for recreational uses. The ratings for the soils in each group are based on soil characteristics that affect use, such as natural drainage, seasonal high water table, hazard of flooding, permeability, slope, texture of the surface layer, and stoniness or rockiness.

The ratings are slight, moderate, or severe. A rating of *slight* means that the soil has few or no limitations for the use specified or that the limitations can be easily overcome. A rating of *moderate* indicates that the limitations can be overcome by careful planning and maintenance. A rating of *severe* indicates that the soil is poorly suited to the use specified, or that the limitations can be overcome only by intensive engineering practices that require a large investment. The soil properties that determine moderate and severe limitations are given with the ratings in table 8. The recreational uses given in the table are discussed in the following paragraphs.

Cottages and utility buildings include cottages, washrooms and bathrooms, picnic shelters, and service buildings that are used seasonally or all year. The ratings are based mainly on soil features that contribute to the adequate support of these buildings. Information on soil limitations for septic tank filter fields is given in table 10.

Campsites are areas suitable for tents and trailers and for living outdoors for a period of 1 week or more. Little site preparation is required. The soils are rated according to their limitations for unsurfaced parking areas for cars and camp trailers and for heavy traffic by people, horses, and small vehicles, such as bicycles.

Picnic areas require soils that can support intensive foot traffic. Features that affect the desirability of a site, such as trees or ponds, are not considered in the ratings.

Playgrounds are areas developed for intensive play and for organized games, such as baseball, football, and tennis. They are subject to intensive foot traffic.

Paths and trails require soils that support intensive traffic by people on foot or on horseback. Little preparation is needed. Paths and trails on sloping soils should be contoured to control erosion.

Golf fairways require soils that can support intensive traffic by people on foot or driving golf carts. Turf and various kinds of trees and shrubs should grow well on these soils. Greens, traps, and hazards are not considered in the rating; they generally are made from transported soil material.

Engineering Uses of the Soils

This section names properties of soils that are likely to affect engineering work, tells how the section can be used in planning and carrying out this work, and descrbes two commonly used engineering soil classifications. It contains tables that list engineering properties and interpretations of soils and engineering soil test data.

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion-control structures, drainage systems, and sewage disposal systems. Among the properties most important to engineers are permeability, shear strength, compaction characteristics, grain size, plasticity, and pH value. Also important is the depth to the water table and to bedrock. Soil development related to topographic position may be significant.

Information in this section can be used to—

1. Make studies that will aid in planning and developing agricultural, industrial, business, residential, and recreational sites.
2. Make preliminary evaluations of the soils that will aid in selecting locations for flood-control structures, agricultural drainage systems, farm ponds, irrigation systems, terraces, diversions, and waterways.
3. Make preliminary evaluations of soils and sites that will aid in selecting locations for highways and airports and in planning detailed investigations at the selected locations.
4. Locate probable sources of road and highway construction materials.
5. Correlate performance of engineering structures with soil mapping units to obtain information that will be useful in designing and maintaining such structures.
6. Determine the suitability of soil units for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps, reports, and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Make preliminary estimates for other construction purposes pertinent to the particular area.

With the use of the soil map for identification, the engineering interpretations reported can be useful for many purposes. It should be emphasized that they do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or excavations deeper than the depths of the layers reported. Even in these situations, however, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Much of the information in this section is in tables 9, 10, and 11. Some of the terms used have a special meaning to the soil scientist and a different special meaning to engineers. The Glossary defines many such terms as they are used in soil science. The section "Descriptions of the Soils" gives a detailed technical profile representative of each series and a description of each individual soil.

Engineering classification systems

Engineers commonly classify soils according to the Unified Soil Classification System (*16*) and the system adopted by the American Association of State Highway Officials (AASHO) (*1*).

The Unified system of soil classification is based on the identification of soils according to particle size and dis-

tribution, plasticity, liquid limit, and content of organic matter. In this system, GW and GP are gravels that are well graded or poorly graded; SW and SP are sands that are well graded or poorly graded; SM and SC are sands with nonplastic or plastic fines; GM and GC are gravelly soils with nonplastic or plastic fines; ML and CL are nonplastic or plastic fine-grained material with a low liquid limit; and MH and CH are primarily nonplastic or plastic fine-grained material with a high liquid limit.

The AASHO system is used to classify soils according to those properties that affect use in highway construction. Soils of about the same general load-carrying capacity and service are placed into seven basic groups, A–1 to A–7. Generally, the best soils for road subgrade are classified A–1, the next best A–2, and the poorest soils are A–7.

Agricultural scientists classify soils by texture according to the system of the United States Department of Agriculture (*13*). Soil material that is smaller than 2.0 millimeters in diameter is classified in three size particles as clay, silt, or sand. The percentages of the three size fractions determine the texture. Some terms used in soil science, such as soil, clay, silt, and sand, differ in meaning from the same terms used in engineering. The definitions of terms as used in soil science are given in the Glossary.

Estimated engineering properties

Table 9 gives the estimated soil properties most likely to affect engineering practices. The information in this table is based on the test data in table 11 and on other available data.

Depth to bedrock is not estimated in table 9, because most soils in the survey area are so deep that bedrock generally does not affect their use. In Limestone rock land and Cherty land, however, bedrock is at a depth of 0 to 4 feet; and in Shale rock land, shale is at a depth of 0 to 2 feet.

Depth to seasonal high water table is the minimum depth at which the soil is periodically saturated or contains free water, unless drainage systems have been installed. It can be a perched water table or the upper limit of the true water table. Where it is very near the surface, the water table commonly interferes with the timely and efficient use and management of the soil. It generally rises late in winter and early in spring.

Permeability is the quality of a soil horizon that enables water or air to move through it. The estimates in table 9 are the inches per hour that water will move through undisturbed soil. They are based on the structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from use of the soil are not considered. In this survey the permeability classes in inches per hour are very slow, less than 0.06; slow, 0.06 to 0.20; moderately slow, 0.20 to 0.63; moderate, 0.63 to 2.0; moderately rapid, 2.0 to 6.30; and rapid, 6.30 to 20.0.

Available water capacity is that amount of water in the soil available for use by most plants. It essentially is the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed in inches of water per inch of soil.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH value indicates the corrosiveness of the soil solution and the protection needed for structures, such as pipelines, when placed in the soil. Reaction is also used to estimate the suitability of certain plants for use along highways and other areas where the soil has been disturbed. The pH value and related terms used to describe soil reaction are defined in the glossary.

Shrink-swell potential indicates the volume change to be expected of a soil when the moisture content changes. The shrink-swell potential generally is high in very clayey soils and low in very sandy soils. Generally, a high shrink-swell potential indicates that the soil material is hazardous to use for engineering structures.

Some soils tend to cause corrosion of concrete conduits buried in them. The ratings in table 9 are estimates of expected corrosivity. Extensive installations that cross soil boundaries or horizons are more likely to be damaged by corrosion than installations placed entirely in one kind of soil. Because conduits normally are not placed in the surface layer, ratings are not given for that layer.

Engineering interpretations

In table 10, the soils in the survey area are given ratings that indicate slight, moderate, or severe limitations to use as septic tank absorption fields, sewage lagoons, shallow excavations, and sites for buildings and local roads and streets. Also, the soils are given ratings that indicate good, fair, or poor suitability as a source of road fill, sand, and topsoil. Soil features are listed that affect the location of pond reservoir areas; construction of embankments, dikes, and levees; drainage of cropland and pasture; irrigation; and construction of terraces, diversions, and grassed waterways. The ratings and other interpretations in this table are based on estimated engineering properties of the soils given in table 9; on available test data, including those given in table 11; and on field experience.

Septic tank absorption fields and sewage lagoons are affected mainly by permeability, location of water table, susceptibility to flooding, and slope. The principal reasons for assigning moderate or severe limitations are given. Where estimated percolation rates are given, they reflect rates that normally can be expected where tests are conducted on saturated or nearly saturated soil.

Shallow excavations generally are less than 6 feet deep and pertain to those made for such purposes as basements, ditches, graves, underground cables, pipelines, and sewers.

Buildings of three stories or less, with public sewers, are given ratings that are based chiefly on soil characteristics affecting foundations; but soil slope, susceptibility to flooding, seasonal wetness, depth to bedrock, and other conditions are considered.

The limitation ratings given for local roads and streets apply to use of the soils for construction and maintenance of improved roads and streets that have some kind of all-weather surfacing. They are expected to carry automobile traffic all year, but not fast-moving, heavy trucks.

Road fill is soil material used for making an embankment to support the subbase and base course or surface course. The ratings indicate the performance of soil material moved from borrow areas for this purpose.

TABLE 8.—*Limitations of the soils*

Recreation group, soil series, and map symbols	Degree of limitation and soil features affecting use for—	
	Cottages and utility buildings	Campsites
Group 1. Well drained and moderately well drained, nearly level to moderately sloping soils on uplands and terraces. Camden: 134B; Clinton: 18B, 18C, 18C2; Downs: 386B, 386C, 386C2; Fayette: 280B, 280C, 280C2; Onarga: 150; Proctor: 148; Tama: 36B, 36C; Worthen: 37B, 37C.	Slight	Slight
Group 2. Somewhat excessively drained, well drained, and moderately well drained, moderately sloping to strongly sloping soils on uplands and terraces. Bloomfield: 53C, 53D; Camden: 134D2; Clinton: 18D, 18D2; Fayette: 280D, 280D2; Hickory: 8D2.	Moderate: slope	Moderate: slope; difficult to maintain vegetation on the Bloomfield soils.
Group 3. Somewhat excessively drained, well drained, and moderately well drained, moderately steep to very steep soils on uplands. Bloomfield: 53F; Fayette: 280E, 280E2, 280F, 280F2, 280G; Hamburg: 30G; Hickory: 8E, 8E2; Hickory and Hennepin: 958F, 958F2, 958G; Limestone rock land and Cherty land: 94G; Shale rock land: 95F; Sylvan-Bold: 962E2, 962F, 962F2, 962G.	Severe: slope	Severe: slope
Group 4. Somewhat poorly drained, nearly level and gently sloping soils on uplands and terraces. Beardstown: 188; Clarksdale: 257A, 257B; Keomah: 17A, 17B; La Hogue: 102A, 102B; Littleton: 81; McGary: 173; Muscatine: 41A, 41B; Starks: 132.	Moderate: seasonal high water table; subject to frost heave; moderate to high shrink-swell potential in subsoil.	Moderate: seasonal high water table; the Clarksdale, Keomah, and McGary soils dry more slowly than other soils in this group.
Group 5. Poorly drained, nearly level soils on uplands and terraces. Denny: 45; Rushville: 16; Sable: 68; Sexton: 208; Virden: 47; Wagner: 26.	Severe: seasonal water table near surface; subject to ponding; soils dry slowly; subject to frost heave; moderate to high shrink-swell potential in subsoil.	Severe: seasonal water table near surface; subject to ponding; soils dry slowly; some areas difficult to drain; turf easily damaged when wet.
Group 6. Poorly drained and very poorly drained, nearly level soils on bottom lands. Ambraw: 302; Beaucoup: 70; Darwin: 71; McFain: 248; Petrolia: 288; Titus: 404.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; subject to frost heave.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; some areas difficult to drain.
Group 7. Somewhat poorly drained to well-drained, nearly level soils on bottom lands. Riverwash is an inclusion in this group. Dupo: 180; Haymond: 331; Huntsville: 77; Lawson: 451; Radford: 74; Riverwash sand and gravel: 123; Tice: 284; Wakeland: 333.	Severe: subject to flooding. Very severe on Riverwash sand and gravel because of frequent flooding.	Severe: subject to flooding. Very severe on Riverwash sand and gravel because of frequent flooding and inability to support adequate vegetation.

for recreational uses

Degree of limitation and soil features affecting use for—Continued			
Picnic areas	Playgrounds	Paths and trails	Golf fairways
Slight	Slight if slope is 0 to 2 percent. Moderate if slope is 2 to 7 percent; moderate for grading and leveling.	Slight	Slight.
Moderate: slope; difficult to maintain vegetation on the Bloomfield soils.	Severe: slope	Slight for all soils except the Bloomfield soils. Moderate for the Bloomfield soils, which lack a firm surface and are subject to soil blowing.	Moderate: slope; the Bloomfield soils are droughty, and turf is difficult to maintain.
Severe: slope	Severe: slope	Moderate if slope is 12 to 18 percent. Severe if slope is more than 18 percent.	Severe: slope.
Moderate: seasonal high water table; the Clarksdale, Keomah, and McGary soils dry more slowly than other soils in this group.	Moderate: seasonal high water table; the Clarksdale, Keomah, and McGary soils dry more slowly than other soils in this group.	Moderate: seasonal high water table; the Clarksdale, Keomah, and McGary soils dry more slowly than other soils in this group.	Moderate: seasonal high water table; the Clarksdale, Keomah, and McGary soils dry more slowly than other soils in this group.
Severe: seasonal water table near surface; subject to ponding; soils dry slowly; some areas difficult to drain; turf easily damaged when wet.	Severe: seasonal water table near surface; subject to ponding; soils dry slowly; some areas difficult to drain.	Severe: seasonal water table near surface; subject to ponding; soils dry slowly; some areas difficult to drain.	Severe: seasonal water table near surface; subject to ponding; soils dry slowly; some areas difficult to drain; turf easily damaged when wet.
Severe: subject to flooding; seasonal water table near surface; soils dry slowly; some areas difficult to drain.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; some areas difficult to drain.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; some areas difficult to drain.	Severe: subject to flooding; seasonal water table near surface; soils dry slowly; some areas difficult to drain.
Severe where flooding occurs more than twice during season of use; moderate where flooding is infrequent and of short duration. Very severe on Riverwash sand and gravel because of frequent flooding and inability to support adequate vegetation.	Severe: subject to flooding; moderate where flooding is infrequent and of short duration. Very severe on Riverwash sand and gravel because of frequent flooding and inability to support adequate vegetation.	Moderate: subject to flooding. Very severe on Riverwash sand and gravel because of frequent flooding and inability to support adequate vegetation.	Severe: subject to flooding; moderate where flooding is infrequent and of short duration. Very severe on Riverwash sand and gravel because of frequent flooding and inability to support adequate vegetation.

TABLE 9.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils for referring to other series that appear in the first column of this table. The symbol < means less than; the symbol > means more than. of data indicates that no estimate was made]

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Ambraw: 302	[1] 0–1	0–14	Clay loam	CL	A–6 or A–7
		14–40	Clay loam	CL	A–6 or A–7
		40–60	Stratified loamy sand, sandy loam, and sandy clay loam.	SC or SM	A–2 or A–4
Beardstown: 188	1–2	0–16	Loam to heavy loam	ML or CL	A–4 or A–6
		16–42	Clay loam to sandy clay loam	CL or SC	A–4 or A–6
		42–60	Sandy loam and loamy sand	SM	A–2 or A–4
Beaucoup: 70	[1] 0–1	0–18	Silty clay loam	CL	A–6 or A–7
		18–38	Silty clay loam	CL	A–7
		38–60	Silt loam	CL	A–6
Bloomfield: 53C, 53D, 53F	>10	0–60	Fine sand to light sandy loam	SP–SM	A–3
Bold	>10	0–60	Silt loam	ML	A–4
Mapped only in complex with Sylvan soils.					
Camden: 134B, 134D2	5–10	0–15	Silt loam	ML or CL	A–6 or A–4
		15–44	Silty clay loam and clay loam	CL	A–6
		44–76	Stratified silt loam, sandy loam, and loam	SM, SC, or CL	A–4 or A–6
Clarksdale: 257A, 257B	2–4	0–17	Silt loam	ML or CL	A–4 or A–6
		17–48	Silty clay loam	CL	A–7 or A–6
		48–60	Silt loam	CL or ML	A–4 or A–6
Clinton: 18B, 18C, 18C2, 18D, 18D2.	3–10	0–12	Silt loam	ML or CL	A–4
		12–46	Silty clay loam	CL	A–7 or A–6
		46–70	Silt loam	CL or ML	A–4 or A–6
Darwin: 71	[1] 0–1	0–11	Silty clay	CH	A–7
		11–50	Silty clay	CH	A–7
		50–76	Silty clay loam	CH	A–7 or A–6
Denny: 45	0–2	0–18	Silt loam	ML or CL	A–6 or A–7
		18–54	Silty clay loam	CH or CL	A–6 or A–7
		54–70	Silt loam	CL	A–6
Downs: 386B, 386C, 386C2	4–10	0–11	Silt loam	ML or CL	A–4 or A–6
		11–48	Silty clay loam	CL	A–6 or A–7
		48–62	Silt loam	CL or ML	A–4 or A–6
Dupo: 180	0–3	0–28	Silt loam	ML or CL	A–4 or A–6
		28–60	Silty clay	CH or CL	A–7
Fayette: 280B, 280C, 280C2, 280D, 280D2, 280E, 280E2, 280F, 280F2, 280G.	>10	0–12	Silt loam	ML or CL	A–4
		12–56	Silty clay loam	CL	A–7 or A–6
		56–60	Silt loam	CL	A–4 or A–6
Hamburg: 30G	>10	0–60	Silt	ML	A–4
Haymond: 331	[1] 4–8	0–60	Silt loam and some layers of loam and sandy loam below depth of 30 inches.	ML or CL	A–4 or A–6

See footnotes at end of table.

significant in engineering

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions The depth to bedrock is not listed, because bedrock generally is so far below the surface that it presents no problem in engineering. Absence

Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)					
				Inches per hour	*Inches per inch of soil*	*pH*		
100	95–100	75–85	65–75	0. 2–0. 63	0. 16–0. 20	6. 1–7. 3	Moderate	
100	95–100	75–85	65–75	0. 2–2. 0	0. 15–0. 19	6. 6–7. 8	Moderate	Low.
100	95–100	65–80	15–40	0. 63–2. 0	0. 10–0. 16	5. 5–7. 8	Low	Low.
100	95–100	85–90	50–80	0. 63–2. 0	0. 16–0. 20	5. 6–6. 5	Low	
100	95–100	75–85	40–70	0. 2–2. 0	0. 16–0. 18	5. 1–6. 0	Low	Low.
100	95–100	65–80	15–25	0. 63–6. 3	0. 10–0. 14	5. 1–6. 0	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 19–0. 23	6. 1–7. 3	Moderate	
100	95–100	90–100	90–100	0. 63–2. 0	0. 19–0. 21	6. 6–7. 3	Moderate	Low.
100	85–95	70–90	65–100	0. 63–2. 0	0. 19–0. 21	6. 1–7. 8	Moderate	Low.
100	95–100	50–80	5–10	6. 3–20. 0	0. 04–0. 06	5. 6–7. 3	Low	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 16–0. 18	7. 4–8. 4	Low	Low.
100	100	95–100	85–95	0. 63–2. 0	0. 20–0. 25	6. 1–8. 0	Low	
100	100	90–100	80–90	0. 63–2. 0	0. 16–0. 19	5. 1–7. 3	Moderate	Moderate.
100	95–100	90–100	30–80	0. 63–2. 0	0. 16–0. 19	5. 1–7. 3	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 22–0. 25	5. 6–7. 8	Low	
100	100	100	95–100	0. 2–0. 63	0. 19–0. 21	5. 1–6. 5	Moderate	Moderate.
100	100	100	95–100	0. 2–0. 63	0. 18–0. 23	6. 6–7. 8	Low to moderate.	Low.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 23	5. 1–6. 5	Low	
100	100	100	95–100	0. 2–0. 63	0. 19–0. 21	4. 5–5. 5	Moderate	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 19–0. 23	6. 1–7. 3	Low to moderate.	Low.
100	100	100	95–100	0. 06–0. 2	0. 12–0. 14	6. 1–7. 3	High	
100	100	100	95–100	<0. 06	0. 11–0. 13	6. 1–8. 0	High	Low.
100	100	100	95–100	0. 06–0. 2	0. 18–0. 20	7. 9–8. 4	High	Low.
100	100	100	95–100	0. 2–0. 63	0. 20–0. 25	5. 6–7. 3	Low	
100	100	100	95–100	0. 06–0. 2	0. 19–0. 21	5. 6–6. 6	Moderate to high.	Moderate.
100	100	100	95–100	0. 2–0. 63	0. 18–0. 23	6. 6–7. 3	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 25	6. 1–7. 3	Low	
100	100	100	95–100	0. 63–2. 0	0. 19–0. 21	5. 1–6. 5	Moderate	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 23	6. 6–8. 4	Low	Low.
100	100	100	85–95	0. 63–2. 0	0. 20–0. 25	7. 9–8. 4	Low	Low.
100	100	100	95–100	0. 06–0. 63	0. 15–0. 19	7. 9–8. 4	Moderate	Low.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 23	4. 8–5. 5	Low	
100	100	100	95–100	0. 63–2. 0	0. 19–0. 21	4. 4–4. 9	Moderate	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 20	5. 1–6. 5	Low	Low.
95–100	95–100	95–100	90–100	2. 0–6. 3	0. 13–0. 15	7. 4–8. 4	Low	Low.
95–100	90–100	85–95	70–90	0. 63–2. 0	0. 20–0. 23	6. 1–7. 3	Low	Low.

TABLE 9.—*Estimated soil properties*

Soil series and map symbol	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
*Hennepin: 958F, 958F2, 958G. For Hickory part of these mapping units, see the Hickory series.	4–10	0–12	Loam	CL	A–4 or A–6
		12–60	Loam to sandy loam	CL or SM	A–4 or A–6
Hickory: 8D2, 8E, 8E2	4–10	0–13	Loam	ML or CL	A–4 or A–6
		13–50	Clay loam	CL	A–6 or A–7
		50–60	Loam to sandy loam	CL or SM	A–4 or A–6
Huntsville: 77	[1] 4–10	0–60	Silt loam	CL or ML	A–6 or A–4
Keomah: 17A, 17B	1–4	0–16	Silt loam	ML or CL	A–4 or A–6
		16–50	Silty clay loam	CL or CH	A–7 or A–6
		50–60	Silt loam	CL or ML	A–4 or A–6
La Hogue: 102A, 102B	1–3	0–13	Loam	ML or CL	A–4 or A–6
		13–36	Loam, sandy clay loam, or sandy loam	SC or CL	A–4 or A–6
		36–73	Sand and loamy sand	SM	A–2
Lawson: 451	[1] 1–4	0–60	Silt loam	CL, ML, or OL	A–6 or A–4
Limestone rock land and Cherty land: 94G.[2]					
Littleton: 81	1–4	0–25	Silt loam	ML or CL	A–6 or A–4
		25–42	Heavy silt loam	CL	A–6 or A–4
		42–60	Silt loam	ML or CL	A–6 or A–4
McFain: 248	[1] 0–2	0–18	Silty clay	CH	A–7
		18–40	Fine sandy loam and silty clay	SM, ML, or CL	A–2, A–4, or A–6
		40–60	Silty clay loam	CL	A–6 or A–7
McGary: 173	1–2	0–6	Silt loam	ML or CL	A–4 or A–6
		6–29	Silty clay	CH	A–4 or A–7
		29–50	Silty clay	CH	A–7
Muscatine: 41A, 41B	1–3	0–18	Silt loam	ML, OL, or CL	A–7 or A–6
		18–40	Silty clay loam	CL	A–7
		40–60	Silt loam	CL or ML	A–6 or A–4
Onarga: 150	>10	0–12	Sandy loam	SM	A–2
		12–37	Heavy sandy loam	SC	A–4
		37–60	Sandy loam to loamy sand	SP or SM	A–2 or A–1
Petrolia: 288	[1] 0–2	0–64	Silty clay loam	CL	A–6
Proctor: 148		0–13	Silt loam	CL or ML	A–6 or A–7
		13–37	Silty clay loam	CL	A–6 or A–7
		37–60	Silt loam, loam, sandy loam, and silty clay loam	CL or ML	A–4 or A–6
Radford: 74	[1] 1–4	0–24	Silt loam	CL, ML, or OL	A–4 or A–6
		24–48	Silty clay loam	CH	A–7
Riverwash sand and gravel: 123.	[1] 2–4	0–60	Sand and gravel	SP, SM, GP, or GM	A–1 or A–2

See footnotes at end of table.

significant in engineering—Continued

Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)					
				Inches per hour	*Inches per inch of soil*	*pH*		
95–100	90–100	80–90	50–80	0. 63–2. 0	0. 20–0. 22	6. 6–8. 4	Low	
95–100	90–100	80–90	40–80	0. 63–2. 0	0. 14–0. 18	7. 4–8. 4	Low	Low.
95–100	90–100	80–90	50–80	0. 63–2. 0	0. 20–0. 22	5. 1–6. 5	Low	
95–100	90–100	80–90	55–85	0. 63–2. 0	0. 16–0. 19	5. 1–7. 3	Moderate	Moderate.
95–100	90–100	80–90	40–80	0. 63–2. 0	0. 11–0. 13	7. 4–8. 4	Low	Low.
100	95–100	90–100	85–95	0. 63–2. 0	0. 20–0. 25	6. 1–7. 3	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 25	5. 1–7. 3	Low	
100	100	100	95–100	0. 2–0. 63	0. 18–0. 20	5. 1–6. 0	Moderate to high.	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 20	6. 6–7. 3	Moderate	Low.
100	95–100	90–100	50–80	0. 63–2. 0	0. 19–0. 21	6. 1–7. 3	Low	
100	85–100	70–85	40–85	0. 63–2. 0	0. 16–0. 18	5. 1–6. 0	Moderate	Moderate.
85–100	80–90	50–70	15–30	2. 0–20. 0	0. 08–0. 10	5. 6–6. 0	Low	Low.
100	100	95–100	85–100	0. 63–2. 0	0. 20–0. 25	6. 1–8. 0	Low	Low.
100	100	95–100	95–100	0. 63–2. 0	0. 20–0. 25	5. 6–7. 8	Low	
100	100	95–100	95–100	0. 63–2. 0	0. 18–0. 23	5. 6–7. 8	Moderate	Moderate.
100	100	95–100	95–100	0. 63–2. 0	0. 18–0. 23	5. 6–7. 8	Low	Low.
100	100	100	95–100	0. 06–0. 2	0. 12–0. 14	6. 6–7. 8	High	
90–100	70–90	60–80	25–60	0. 63–2. 0	0. 12–0. 18	7. 4–8. 4	Low	Low.
100	100	100	80–100	0. 63–2. 0	0. 18–0. 20	7. 4–8. 4	Moderate	Low.
100	100	100	95–100	0. 63–2. 0	0. 22–0. 24	6. 1–7. 3	Low	
100	100	100	95–100	<0. 2	0. 11–0. 13	5. 1–6. 5	Moderate to high.	Low.
100	100	100	90–100	<0. 2	0. 10–0. 12	7. 4–8. 4	Moderate to high.	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 25	4. 5–7. 3	Low	
100	100	100	95–100	0. 63–2. 0	0. 19–0. 21	5. 1–6. 0	Moderate	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 23	6. 1–6. 5	Low	Low.
100	95–100	70–85	15–25	0. 63–2. 0	0. 11–0. 15	5. 6–7. 3	Low	
100	95–100	50–70	35–50	0. 63–6. 3	0. 14–0. 18	5. 1–6. 5	Low	Moderate.
100	95–100	15–30	0–15	6. 3–20. 0	0. 05–0. 10	5. 6–6. 0	Low	Low.
100	95–100	90–100	80–100	0. 2–0. 63	0. 18–0. 22	6. 1–7. 8	Moderate	Moderate.
100	95–100	90–100	80–95	0. 63–2. 0	0. 20–0. 25	6. 1–7. 8	Low	
95–100	90–100	80–90	60–90	0. 63–2. 0	0. 18–0. 20	5. 1–7. 3	Moderate	Moderate.
95–100	90–100	70–90	50–80	0. 63–2. 0	0. 18–0. 20	5. 1–6. 5	Low	Low.
100	90–100	85–100	80–100	0. 63–2. 0	0. 20–0. 25	6. 6–7. 8	Low	
100	100	95–100	90–100	0. 63–2. 0	0. 19–0. 21	7. 4–7. 8	Moderate	Low.
40–80	30–70	15–30	0–20	6. 3–20. 0	<0. 05	7. 4–8. 4	Low	Low.

TABLE 9.—*Estimated soil properties*

Soil series and map symbol	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Feet	*Inches*			
Rushville: 16	0–2	0–15	Silt loam	ML	A–4
		15–53	Silty clay loam	CH or CL	A–7
		53–77	Silt loam	ML or CL	A–4 or A–6
Sable: 68	0–3	0–21	Silty clay loam	CL or OH	A–7
		21–45	Silty clay loam	CL	A–7
		45–60	Silt loam	CL	A–6
Sexton: 208	0–2	0–18	Silt loam	ML or CL	A–4 or A–6
		18–60	Silty clay loam	CH or CL	A–7
Shale rock land: 95F.[3]					
Starks: 132	1–3	0–20	Silt loam	CL or ML	A–4 or A–6
		20–60	Silty clay loam	CL	A–6 or A–7
		60–72	Silt loam, loam, silty clay loam, and clay loam	CL	A–4 or A–6
*Sylvan: 962E2, 962F, 962F2, 962G	>10	0–8	Silt loam	ML or CL	A–4
For Bold part of these mapping units, see the Bold series.		8–24	Silty clay loam	CL	A–6 or A–7
		24–60	Silt loam	ML or CL	A–4 or A–6
Tama: 36B, 36C	4–10	0–12	Silt loam	ML or CL	A–7 or A–6
		12–51	Silty clay loam	CL	A–7 or A–6
		51–81	Silt loam	ML or CL	A–4 or A–6
Tice: 284	[1] 1–3	0–20	Silty clay loam	CL or OL	A–6 or A–7
		20–60	Silty clay loam	CL	A–6 or A–7
		60–82	Silt loam	ML or CL	A–4 or A–6
Titus: 404	[1] 0–2	0–39	Silty clay loam	CH or CL	A–7
		39–62	Silty clay loam	CH or CL	A–7
Virden: 47	0–3	0–8	Silt loam	ML or CL	A–6 or A–7
		8–44	Silty clay loam	CL or CH	A–7
		44–70	Silt loam	ML or CL	A–4 or A–6
Wagner: 26	0–2	0–15	Silt loam	ML or CL	A–6
		15–78	Silty clay to heavy silty clay loam	CH	A–7
Wakeland: 333	[1] 1–3	0–55	Silt loam	ML or CL	A–4 or A–6
Worthen: 37B, 37C	4–10	0–70	Silt loam	ML or CL	A–4 or A–6

[1] Subject to flooding unless protected by levees.
[2] No valid estimates can be made, except that depth to bedrock is less than 2 feet.

significant in engineering—Continued

Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosion potential for concrete conduits
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)					
				Inches per hour	*Inches per inch of soil*	*pH*		
100	100	100	95–100	0. 2–0. 63	0. 20–0. 25	4. 5–7. 3	Low	
100	100	100	95–100	<0. 2	0. 15–0. 19	4. 2–7. 3	Moderate to high.	Moderate.
100	100	100	95–100	0. 2–0. 63	0. 18–0. 23	7. 4–8. 0	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 21–0. 23	6. 1–8. 0	Moderate	
100	100	100	95–100	0. 63–2. 0	0. 19–0. 21	6. 6–7. 8	Moderate	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 22	7. 4–7. 8	Low	Low.
100	100	100	95–100	0. 2–0. 63	0. 20–0. 24	6. 6–8. 0	Low	
100	100	100	90–100	0. 06–0. 2	0. 18–0. 20	4. 5–6. 5	Moderate	Moderate.
100	100	95–100	85–95	0. 63–2. 0	0. 20–0. 23	5. 6–8. 0	Low	
100	100	95–100	80–90	0. 2–2. 0	0. 18–0. 20	5. 1–6. 5	Moderate	Moderate.
100	100	95–100	70–90	0. 63–2. 0	0. 14–0. 18	6. 6–7. 8	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 24	5. 6–6. 5	Low	
100	100	100	95–100	0. 63–2. 0	0. 19–0. 21	5. 6–7. 3	Moderate	Low.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 20	7. 4–8. 4	Low	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 25	6. 1–7. 3	Low	
100	100	100	95–100	0. 63–2. 0	0. 19–0. 21	5. 1–6. 5	Moderate	Moderate.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 23	5. 6–6. 0	Low	Low.
100	100	95–100	90–100	0. 63–2. 0	0. 20–0. 23	6. 6–7. 3	Moderate	Low.
100	100	95–100	90–100	0. 63–2. 0	0. 18–0. 20	5. 6–6. 5	Moderate	Low.
100	100	95–100	85–95	0. 63–2. 0	0. 18–0. 20	6. 1–7. 3	Low	Low.
100	100	100	95–100	0. 06–0. 2	0. 17–0. 19	6. 1–7. 3	High	Low.
100	100	90–100	85–100	0. 06–0. 2	0. 17–0. 19	6. 1–7. 3	High	Low.
100	100	100	95–100	0. 63–2. 0	0. 20–0. 25	6. 6–8. 0	Low	
100	100	100	95–100	0. 2–2. 0	0. 19–0. 21	5. 6–7. 3	Moderate to high.	Low.
100	100	100	95–100	0. 63–2. 0	0. 18–0. 23	6. 6–7. 3	Low to moderate.	Low.
100	100	100	95–100	0. 2–0. 63	0. 20–0. 25	6. 1–8. 0	Low	
100	100	100	95–100	<0. 2	0. 11–0. 15	5. 6–8. 0	High	Low.
100	100	95–100	80–100	0. 63–2. 0	0. 20–0. 25	6. 6–7. 8	Low	Low.
100	100	95–100	90–100	0. 63–2. 0	0. 20–0. 25	6. 6–7. 8	Low	Low.

[3] No valid estimates can be made, except that depth to bedrock ranges from 0 to 4 feet.

TABLE 10.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such mapping units may have

Soil series and map symbols	Degree and kind of limitation for—					Suitability as a source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Buildings, three stories or less	Local roads and streets	Road fill
Ambraw: 302	Severe: seasonal high water table; subject to flooding.	Severe: subject to flooding; seepage rate high in underlying material in some places; surface layer poor for embankment material and floor of lagoon.	Severe: poorly drained; seasonal high water table; subject to ponding and flooding.	Severe: poorly drained; subject to flooding; moderate shrink-swell potential.	Severe: poorly drained; seasonal high water table; susceptible to frost heave; moderate shrink-swell potential in subsoil.	Poor: poorly drained; plasticity index of subsoil more than 15; moderate shrink-swell potential.
Beardstown: 188	Severe: temporary seasonal high water table; hazard of ground water contamination through sandy underlying material.	Severe: hazard of excessive leakage through underlying sand; moderate in content of organic matter.	Severe: somewhat poorly drained; seasonal high water table; sandy at depth of 3 to 4 feet.	Moderate: somewhat poorly drained; low shrink-swell potential; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table; susceptible to frost heave.	Fair to poor in subsoil. Fair to good in underlying material; needs some binder for maximum strength in places.
Beaucoup: 70	Severe: seasonal high water table near surface; subject to flooding.	Severe: subject to flooding; seasonal high water table near surface.	Severe: poorly drained; seasonal high water table; subject to flooding.	Severe: poorly drained; subject to flooding; moderate shrink-swell potential; seasonal high water table; frequent ponding; susceptible to frost heave.	Severe: poorly drained; seasonal high water table; subject to flooding; susceptible to frost heave; moderate shrink-swell potential.	Poor: saturated with water in spring; moderate shrink-swell potential; plasticity index more than 2°.
Bloomfield: 53C, 53D, 53F.	Moderate on 53C and 53D, severe on 53F; slope limits use; moderately rapid to rapid permeability; percolating effluent contaminates local water supply in places.	Severe: moderately rapid to rapid permeability.	Severe: sandy; hazard of cave-in; moderately sloping to steep.	Slight on 53C, moderate on 53D, severe on 53F; slope limits use; lawns difficult to establish and maintain on sandy material.	Slight on 53C, moderate on 53D, severe on 53F; slope affects amount of cut and fill needed.	Good on 53C and 53D, fair on 53F; needs soil binder in places; slope hinders excavation on 53F.
Bold	Severe: slope limits use.	Severe: slope limits use.	Severe: slope limits use.	Severe: slope limits use.	Severe: slope affects amount of cut and fill needed; severe hazard of erosion; well drained.	Fair on 962E2, 962F, and 962F2 and poor on 962G: slope hinders excavation; poor compaction.
Camden: 134B, 134D2.	Slight on 134B, moderate on 134D2 (slope limits use); moderate permeability in subsoil.	Moderate on 134B, severe on 134D2; moderate hazard of seepage.	Slight on 134B, moderate on 134D2 (slope limits use).	Moderate: moderate shrink-swell potential in subsoil; low shrink-swell potential below subsoil; slope limits use on 134D2.	Moderate: fair to good stability; moderate shrink-swell potential in subsoil; well drained and moderately well drained.	Fair: fair to good compaction; plasticity index of subsoil generally more than 20.
Clarksdale: 257A, 257B.	Severe: seasonal high water table; moderately slow permeability in subsoil; estimated percolation rate slower than 60 minutes per inch.	Moderate: seasonal high water table; surface layer poor for embankment material and floor of lagoon.	Severe: somewhat poorly drained; seasonal high water table.	Moderate: somewhat poorly drained; moderate to low shrink-swell potential in subsoil; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table; susceptible to frost heave.	Poor in subsoil: moderate to high shrink-swell potential; plasticity index more than 15. Fair to poor in underlying material: low to moderate shrink-swell potential; plasticity index generally less than 15. Seasonal high water table.
Clinton: 18B, 18C, 18C2, 18D, 18D2.	Moderate: moderately slow permeability in subsoil; 2 to 12 percent slopes; estimated percolation rate ranges from 45 to 60 minutes per inch.	Moderate on 18B, 18C, and 18C2, severe on 18D and 18D2; slope limits use; hazard of seepage below depth of about 4 feet.	Slight on 18B, 18C, and 18C2, moderate on 18D and 18D2 (slope limits use).	Moderate: moderate shrink-swell potential in subsoil; low to moderate shrink-swell potential below subsoil.	Moderate: moderate shrink-swell potential in subsoil; slope moderately limits use on 18D and 18D2.	Poor in subsoil: plasticity index more than 30; moderate shrink-swell potential.
Darwin: 71	Severe: very slow permeability; seasonal water table near surface; subject to flooding; estimated percolation rate slower than 60 minutes per inch.	Severe: subject to flooding; seasonal water table near surface.	Severe: poorly drained and very poorly drained; seasonal high water table; subject to flooding.	Severe: poorly drained and very poorly drained; subject to flooding; high shrink-swell potential; seasonal water table near surface.	Severe: poorly drained and very poorly drained; high water table; susceptible to frost heave; high shrink-swell potential.	Poor: poorly drained and very poorly drained; highly plastic; high shrink-swell potential; susceptible to frost heave.
Denny: 45	Severe: slow permeability; seasonal water table near surface; subject to ponding; estimated percolation rate slower than 60 minutes per inch.	Severe: seasonal water table near surface; slow permeability in subsoil, but it can be sealed to prevent seepage.	Severe: poorly drained; seasonal water table near surface; subject to ponding.	Severe: poorly drained; moderate to high shrink-swell potential in subsoil; seasonal water table near surface.	Severe: poorly drained; seasonal high water table; susceptible to frost heave; moderate to high shrink-swell potential in subsoil.	Poor: poorly drained; highly plastic; moderate to high shrink-swell potential in subsoil; susceptible to frost heave.

interpretations

different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the first column of this table]

Suitability as a source of—Continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Grassed waterways
Poor: some thin layers of loamy sand stratified with heavier material below depth of 3 to 4 feet.	Poor: poorly drained; surface layer is fair source, but remaining soil is difficult to reclaim.	Relief suitable for dugout ponds only; seepage hazard in underlying material; seasonal high water table.	Fair to good stability and compaction; good resistance to piping in uppermost 3 to 4 feet.	Drainage needed; tile drains function satisfactorily; subject to flooding.	Poor drainage; high available water capacity; moderate intake rate; moderate to moderately slow permeability.	Not applicable	Not applicable.
Fair: fair to good below depth of 3 to 4 feet; includes layers of clay in places.	Good in surface layer. Fair in subsoil; clay loam to sandy clay loam; low in content of organic matter.	Sandy material below subsoil; rapid seepage; seasonal high water table.	Fair to good stability and compaction; good resistance to piping in uppermost 3 to 4 feet.	Drainage needed; moderately slow to moderate permeability in subsoil.	High available water capacity; moderate intake rate; moderate to moderately slow permeability.	Not applicable	Not applicable.
Not suitable	Fair if remaining soil is not reclaimed; poor if remaining soil is to be reclaimed; poorly drained; seasonal high water table.	Subject to flooding; natural high water table and potential for dugout ponds; seepage hazard in areas that have been tile drained.	Fair to good stability and compaction; good resistance to piping.	Drainage needed; many areas subject to flooding; moderate permeability; tile drains function satisfactorily.	Poor drainage; very high available water capacity; moderate intake rate; moderate permeability.	Not applicable	Not applicable.
Good to fair: poorly graded; bands of finer material below depth of 24 inches.	Poor: fine sand; low in content of organic matter; droughty; subject to soil blowing.	Pervious material; high seepage rate; generally unsuited as reservoir area.	Fair to poor stability, compaction, and resistance to piping.	Natural drainage is adequate.	Low available water capacity; rapid intake rate.	Not needed; deep porous sand; little runoff; difficult to maintain vegetation.	Difficult to establish and maintain vegetation; droughty; low in fertility.
Not suitable	Poor: slope limits use; low content of organic matter; severe hazard of erosion.	Underlain by coarse silt; severe hazard of seepage.	Poor stability and compaction; poor resistance to piping.	Natural drainage is adequate.	High available water capacity; moderate intake rate; slope limits use; severe hazard of erosion.	Too sloping for this use; highly erodible.	Difficult to establish grass because of steepness; low in fertility in exposed subsoil.
Generally not suitable; sandy material below depth of about 4 feet in places.	Good in surface layer: thin if eroded. Fair in subsoil: silty clay loam and clay loam; low in content of organic matter.	Sites generally not favorable for impoundment; underlain by pervious material in places.	Fair to good stability and compaction; good resistance to piping.	Natural drainage is adequate.	High available water capacity; moderate intake rate; slopes of 1 to 10 percent.	Slopes of 1 to 10 percent; somewhat difficult to work exposed subsoil material.	Slopes of 1 to 10 percent; somewhat difficult to work and vegetate exposed subsoil material.
Not suitable	Good in surface layer. Fair in subsoil: silty clay loam; seasonal high water table.	Relief suitable mainly for dugout ponds.	Fair to good stability and compaction and good resistance to piping in subsoil; fair to poor stability and compaction in underlying material.	Generally needs drainage; tile drains function satisfactorily.	Very high available water capacity; moderate intake rate; moderately slow permeability.	Generally not needed; somewhat poor drainage.	Generally not needed; somewhat poor drainage.
Not suitable	Fair: less than 12 inches of silt loam over silty clay loam in subsoil; hazard of erosion.	Moderately slow permeability in subsoil; moderate hazard of seepage in silt loam underlying material.	Fair to good stability and compaction in subsoil; fair to poor stability and compaction in underlying material.	Natural drainage is adequate.	High to very high available water capacity; moderate intake rate; slopes of 2 to 12 percent.	Slopes of 2 to 12 percent; difficult to work and vegetate exposed subsoil material.	Slopes of 2 to 12 percent; difficult to work and vegetate exposed subsoil material.
Not suitable	Poor: poorly drained and very poorly drained; high water table; clayey and plastic.	Suitable for dugout ponds only; high water table.	Poor to fair stability and compaction; high shrink-swell potential; high compressibility.	Drainage needed; very slow permeability; tile drains seldom function satisfactorily; subject to flooding.	Poor and very poor drainage; moderate available water capacity; slow intake rate; very slow permeability; subject to flooding.	Not applicable	Not applicable.
Not suitable	Good if remaining soil is not to be revegetated, poor if remaining soil is to be revegetated; poorly drained.	Suitable for dugout ponds only; seasonal high water table.	Poor to fair stability; medium to high compressibility and moderate to high shrink-swell potential in subsoil.	Drainage needed; slow permeability; tile drains function slowly; ponding in some areas.	Poor drainage; high available water capacity; slow intake rate; slow permeability; subject to ponding.	Not applicable	Not applicable.

TABLE 10.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as a source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Buildings, three stories or less	Local roads and streets	Road fill
Downs: 386B, 386C, 386C2.	Slight: moderate permeability.	Moderate: moderate permeability in subsoil and underlying material; slope limits use.	Slight: slope limits use in places on 386C2.	Moderate: moderate shrink-swell potential in subsoil; low shrink-swell potential below subsoil.	Moderate: moderate shrink-swell potential in subsoil; highly erodible in exposed cuts.	Poor in subsoil: plasticity index more than 15; moderate shrink-swell potential. Fair to poor underlying material: fair to poor compaction and stability.
Dupo: 180	Severe: subject to flooding; seasonal high water table; moderately slow to slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: subject to flooding; seasonal high water table.	Severe: seasonal high water table; subject to flooding.	Severe: subject to flooding; moderate shrink-swell potential; seasonal high water table.	Severe: somewhat poorly drained; susceptible to frost heave; poor stability; seasonal high water table; subject to flooding.	Poor: plasticity index of subsoil more than 20; moderate shrink-swell potential.
Fayette: 280B, 280C, 280C2, 280D, 280D2, 280E, 280E2, 280F, 280F2, 280G.	Slight on 280B, 280C, and 280C2, moderate on 280D and 280D2, and severe on 280E, 280E2, 280F, 280F2, and 280G; slope limits use; moderate permeability.	Moderate on 280B, 280C, and 280C2, severe on 280D, 280D2, 280E2, 280F, 280F2, 280G (slope limits use); hazard of seepage.	Slight on 280B, 280C, and 280C2, moderate on 280D and 280D2, and severe on 280E, 280E2, 280F, 280F2, 280G (slope limits use).	Moderate on 280B, 280C, 280C2, 280D, and 280D2 and severe on 280E, 280E2, 280F, 280F2, 280G; moderate shrink-swell potential in subsoil; low shrink-swell potential below subsoil; slopes of more than 7 percent limit use.	Moderate on 280B, 280C, 280C2, 280D, and 280D2 and severe on 280E, 280E2, 280F, 280F2, 280G; moderate shrink-swell potential in subsoil; severe hazard of erosion on bare slopes.	Poor in subsoil: plasticity index more than 15; moderate shrink-swell potential; fair to poor in underlying material; low shrink-swell potential; plasticity index of 5 to 15.
Hamburg: 30G	Severe: steep	Severe: steep	Severe: steep	Severe: steep	Severe: steep; very erodible; poor stability.	Poor: poor stability and compaction; steep.
Haymond: 331	Severe: moderate permeability; estimated percolation rate faster than 45 minutes per inch, but soil is subject to flooding.	Severe: porous layers below depth of 4 to 5 feet; subject to flooding.	Severe: features are favorable except that the soil is subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; susceptible to frost heave; poor stability when wet.	Poor to fair: fair to poor stability and compaction; low shrink-swell potential.
Hennepin	Severe: too steep for this use.	Severe: steep	Severe: steep; severe hazard of erosion.	Severe: steep; severe hazard of erosion and siltation.	Severe: steep; many cuts and fills needed; severe hazard of erosion.	Poor to fair in subsoil: low shrink-swell potential; fair in substrata.
*Hickory: 8D2, 8E, 8E2, 958F, 958F2, 958G For Hennepin part of 958F, 958F2, and 958G, see the Hennepin series.	Moderate on 8D2, severe on 8E, 8E2, 958F, 958F2, and 958G; slope limits use; moderate permeability.	Severe: slopes of more than 7 percent.	Moderate on 8D2, severe on 8E, 8E2, 958F, 958F2, and 958G; slope limits use.	Moderate on 8D2, severe on 8E, 8E2, 958F, 958F2, and 958G; slope limits use; moderate shrink-swell potential in subsoil; severe hazard of erosion on bare soil.	Moderate on 8D2, severe on 8E, 8E2, 958F, 958F2, and 958G; slopes limit use; many cuts and fills needed; severe hazard of erosion on bare soil.	Poor in subsoil; moderate shrink-swell potential; plasticity index more than 15; fair to poor in underlying material: plasticity index generally less than 15.
Huntsville: 77	Severe: moderate permeability; estimated percolation rate faster than 45 minutes per inch, but soil is subject to flooding.	Severe: subject to flooding; moderate seepage.	Severe: features are favorable except that the soil is subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding; susceptible to frost heave.	Poor to fair: poor to fair stability and compaction; low shrink-swell potential.
Keomah: 17A, 17B	Severe: moderately slow permeability in subsoil; seasonal high water table; estimated percolation rate slower than 60 minutes per inch.	Moderate: seasonal high water table; moderate permeability below depth of about 4 feet.	Severe: somewhat poorly drained; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table; moderate to high shrink-swell potential in subsoil.	Moderate: somewhat poorly drained; susceptible to frost heave; seasonal high water table.	Poor in subsoil; moderate to high shrink-swell potential; plasticity index more than 15. Fair to poor in underlying material; plasticity index generally less than 15; seasonal high water table.
La Hogue: 102A, 102B	Moderate: temporary seasonal high water table; hazard of ground water contamination through sandy underlying material.	Severe: hazard of excessive seepage through underlying sand.	Severe: somewhat poorly drained; seasonal high water table; sand at depth of about 3 feet.	Moderate: somewhat poorly drained; moderate shrink-swell potential in subsoil; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table; susceptible to frost heave.	Fair to poor in subsoil. Good in underlying material; needs binder in places.

interpretations—Continued

Suitability as a source of—Continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Grassed waterways
Not suitable	Fair: less than 12 inches of silt loam over silty clay loam in subsoil; hazard of erosion.	Moderate hazard of seepage in underlying silt loam material.	Fair to good stability and compaction in subsoil; fair to poor stability and compaction in underlying material.	Natural drainage is adequate.	High available water capacity; moderate intake rate; slopes of 2 to 10 percent.	No major construction problems; slopes of 2 to 10 percent.	Soil properties are favorable; slopes of 2 to 10 percent.
Not suitable	Good: about 2 feet of silt loam but low content of organic matter.	Suitable for dugout ponds only; seasonal high water table; subject to flooding.	Poor to fair stability and compaction; clayey material at depth of about 2 feet.	Drainage needed; tile and open ditches used; some areas need protection from flooding.	High available water capacity; moderate intake rate; moderately slow to slow permeability.	Not applicable	Not applicable.
Not suitable	Fair on slopes of less than 18 percent; poor on slopes of more than 18 percent; less than 12 inches of silt loam over silty clay loam in subsoil.	Relief favorable; underlying material of silt loam; moderate hazard of seepage.	Fair to good stability and compaction in subsoil; fair to poor stability and compaction in underlying material.	Natural drainage is adequate.	High to very high available water capacity; moderate intake rate; slopes of 2 to 60 percent.	Slopes of 2 to 60 percent; not applicable on steeper slopes; very strongly acid in exposed subsoil.	Slopes of 2 to 60 percent; not applicable on steeper slopes; very strongly acid in exposed subsoil.
Not suitable	Poor: steep; very erodible.	Relief generally not suitable; permeable material.	Poor stability and compaction; poor resistance to piping.	Natural drainage is adequate.	Not applicable; steep.	Not applicable; steep.	Not applicable; steep.
Not suitable	Good: fertile; content of organic matter less than 2 percent.	Subject to flooding; permeable material; hazard of excessive seepage.	Fair to poor stability and compaction; moderate permeability when compacted.	Natural drainage is adequate but subject to flooding unless protected by levees.	Very high available water capacity; moderate intake rate; some areas subject to flooding.	Terraces not needed; diversions needed in places to intercept runoff from higher ground.	Not applicable.
Not suitable	Poor: steep; severe hazard of erosion.	Steep; moderate permeability; hazard of seepage on some sites.	Fair to good stability and compaction; hazard of piping on some sites; severe hazard of erosion.	Natural drainage is adequate.	Steep; severe hazard of erosion and rapid runoff.	Not applicable; too steep.	Steep; difficult to establish and maintain vegetation.
Not suitable	Fair on 8D2, 8E, and 8E2, poor on 958F, 958F2, and 958G, slope limits use.	Steeper slopes restrict storage potential; moderate permeability; hazard of seepage on some sites.	Fair to good stability and compaction; hazard of piping on some sites; severe hazard of erosion on bare soil.	Natural drainage is adequate.	Slopes of 7 to 60 percent; moderate intake rate on 8D2; severe hazard of erosion and rapid runoff on steeper slopes.	Slopes of 7 to 60 percent and generally short and irregular.	Channels generally have steep gradients; difficult to establish and maintain vegetation.
Not suitable	Good: thick; silt loam; high content of organic matter.	Subject to flooding; permeable material; hazard of excessive seepage.	Fair to poor stability and compaction; moderate permeability when compacted.	Natural drainage is adequate.	Very high available water capacity; moderate intake rate; some areas subject to flooding.	Not applicable	Not applicable.
Not suitable	Good in surface layer; about 16 inches of silt loam. Fair in subsoil; silty clay loam; seasonal high water table.	Relief suitable mainly for dugout ponds.	Fair to good stability and compaction and good resistance to piping in subsoil. Fair to poor stability and compaction in underlying materials.	Generally needs drainage; tile drains function satisfactorily.	High to very high available water capacity; moderate intake rate; moderately slow permeability in subsoil.	Generally not needed; need of drainage in many places.	Generally not needed; need of drainage in many places.
Fair: good source of poorly graded sand below depth of 3 or 4 feet.	Good in surface layer: moderate content of organic matter. Fair to good in subsoil: loam, sandy clay loam, or sandy loam; low content of organic matter.	Relief suitable mainly for dugout ponds; severe leakage likely through underlying sand unless sealed.	Fair to good stability and compaction in subsoil. Sandy in underlying material; rapid permeability when compacted; poor resistance to piping.	Drainage needed in some areas; sand below depth of about 3 feet.	Moderate available water capacity; moderate intake rate; moderate permeability in subsoil; moderately rapid to rapid permeability in sand below subsoil.	Not applicable	Generally not needed.

TABLE 10.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as a source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Buildings, three stories or less	Local roads and streets	Road fill
Lawson: 451	Severe: subject to flooding; seasonal high water table.	Severe: subject to flooding; seasonal high water table; high content of organic matter.	Severe: somewhat poorly drained; subject to flooding; seasonal high water table.	Severe: somewhat poorly drained; subject to flooding; susceptible to frost heave; seasonal high water table.	Severe: somewhat poorly drained; seasonal high water table; subject to flooding; susceptible to frost heave.	Poor: high content of organic matter; poor stability and compaction.
Limestone rock land and Cherty land: 94G.	Severe: steep; less than 2 feet to bedrock.	Severe: steep; less than 2 feet to bedrock.	Severe: steep; less than 2 feet to bedrock.	Severe: steep; less than 2 feet to bedrock.	Severe: steep, rough topography; less than 2 feet to bedrock.	Poor: bedrock near surface; steep.
Littleton: 81	Moderate: seasonal water table at depth of 1 to 4 feet; moderate permeability; estimated percolation rate ranges from 45 to 60 minutes per inch.	Moderate: hazard of moderate seepage; upper 2 feet poor for embankment material and floor of lagoon.	Severe: somewhat poorly drained; seasonal water table at depth of 1 to 4 feet.	Moderate: somewhat poorly drained; seasonal high water table; susceptible to frost heave.	Moderate: somewhat poorly drained; seasonal high water table; susceptible to frost heave; receives runoff from higher ground.	Poor to fair: poor to fair stability and compaction; plasticity index generally less than 15.
McFain: 248	Severe: seasonal water table near surface; subject to flooding.	Severe: high content of organic matter; subject to flooding; seasonal water table near surface.	Severe: poorly drained and very poorly drained; high water table; subject to flooding.	Severe: poorly drained and very poorly drained; subject to flooding; high water table; susceptible to frost heave.	Severe: poorly drained and very poorly drained; seasonal water table near surface; subject to flooding; susceptible to frost heave.	Poor: highly plastic material in upper 2 feet; high water table.
McGary: 173	Severe: seasonal high water table; slow to very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Moderate: seasonal high water table; slow to very slow permeability; high in content of clay; easily sealed.	Severe: somewhat poorly drained; seasonal high water table at depth of 1 to 2 feet; silty clay material.	Severe: somewhat poorly drained; moderate to high shrink-swell potential; seasonal high water table; susceptible to frost heave.	Severe: somewhat poorly drained; plastic, clayey subsoil; seasonal high water table; susceptible to frost heave.	Poor: moderate to high shrink-swell potential; fair to poor stability and compaction; plasticity index more than 20.
Muscatine: 41A, 41B	Moderate: temporary seasonal water table at depth of 1 to 3 feet; moderate permeability; estimated rate of percolation ranges from 45 to 60 minutes per inch.	Moderate: hazard of moderate seepage; surface layer high in content of organic matter and poor for embankment material and floor of lagoon.	Severe: somewhat poorly drained; seasonal water table at depth of 1 to 3 feet.	Moderate: somewhat poorly drained; moderate shrink-swell potential in subsoil; seasonal high water table; susceptible to frost heave.	Moderate: somewhat poorly drained; seasonal high water table; susceptible to frost heave; moderate shrink-swell potential in subsoil.	Poor in subsoil; moderate shrink-swell potential; plasticity index more than 20. Fair to poor in underlying material; fair to poor compaction; plasticity index of 13 to 20.
Onarga: 150	Slight: hazard of ground water contamination through sandy underlying material.	Severe: hazard of excessive seepage through porous underlying material.	Slight to depth of 3 or 4 feet. Severe below depth of 3 or 4 feet; loose loamy sand.	Slight: well drained and moderately well drained; low shrink-swell potential.	Slight: well drained and moderately well drained.	Fair in subsoil: fair to good compaction; plasticity index less than 10. Good in underlying material; needs binder in places.
Petrolia: 288	Severe: subject to flooding; seasonal high water table; moderately slow permeability.	Severe: subject to flooding; seasonal high water table.	Severe: poorly drained; seasonal water table at depth of 0 to 2 feet; subject to flooding.	Severe: poorly drained; subject to flooding; moderate shrink-swell potential; high water table; susceptible to frost heave.	Severe: poorly drained; seasonal high water table; subject to flooding; susceptible to frost heave; moderate shrink-swell potential.	Poor: poorly drained; moderate shrink-swell potential; seasonal high water table; susceptible to frost heave.
Proctor: 148	Slight: moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Moderate: moderate permeability; hazard of seepage into underlying sandy layers in some areas.	Slight: well drained and moderately well drained; nearly level.	Slight: well drained and moderately well drained; moderate shrink-swell potential in subsoil to a depth of about 3 feet.	Slight: well drained and moderately well drained; fair to good stability; moderate shrink-swell potential in subsoil that can cause cracking.	Poor in subsoil: fair to good compaction; plasticity index more than 15. Fair to poor in underlying material: fair to poor compaction; plasticity index generally less than 15.

interpretations—Continued

Suitability as a source of—Continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Grassed waterways
Not suitable	Good: about 3 feet of silt loam high in content of organic matter; seasonal high water table.	Suitable for dugout ponds only; seasonal high water table; subject to flooding.	Poor stability and compaction; poor resistance to piping.	Drainage and protection from flooding needed in most areas; tile drains function satisfactorily.	High available water capacity; moderate intake rate; moderate permeability; subject to flooding.	Not applicable	Not applicable.
Not suitable	Poor: steep; high content of rock and chert fragments.	Sites not suitable; fractured rocks; severe leakage of water.	Not suitable; high content of rock and chert fragments.	Natural drainage is adequate.	Not applicable	Not applicable	Not applicable.
Not suitable	Good: upper 2 feet silt loam high in content of organic matter.	Relief suitable mainly for dugout ponds; moderate seepage in summer.	Poor to fair stability, compaction, and resistance to piping.	Drainage needed; seasonal high water table; moderate permeability; tile drains function satisfactorily.	Very high available water capacity; moderate intake rate; moderate permeability; poor drainage.	Terraces not needed; diversions needed in places to intercept runoff from higher ground; seasonal wetness hinders construction in places.	Seldom needed; seasonal wetness hinders construction in places.
Not suitable	Poor: clayey and plastic material in upper 1 foot; shells in lower part; poorly drained.	Relief suitable for dugout ponds only.	Fair stability; high shrink-swell potential and compaction.	Drainage and protection from flooding needed; sandy layers at depth of about 2 feet; tile drains function satisfactorily.	Poor and very poor drainage; high available water capacity; slow intake rate; subject to flooding.	Not applicable	Not applicable.
Not suitable	Poor: silt loam surface layer generally less than 8 inches thick; low content of organic matter; clayey subsoil.	Relief suitable mainly for dugout ponds; high water table; slow seepage.	Fair to poor stability and compaction; good resistance to piping; moderate to high shrink-swell potential.	Surface drainage needed; slow to very slow permeability; seasonal high water table; tile drains do not function well.	Moderate available water capacity; slow intake rate; slow to very slow permeability, somewhat poor drainage.	Not needed	Seldom needed; difficult to establish and maintain vegetation where excavation exposes clayey subsoil.
Not suitable	Good in surface layer; thick; high in content of organic matter. Fair in subsoil: silty clay loam; seasonal high water table.	Relief suitable mainly for dugout ponds; hazard of moderate seepage in summer.	Poor to fair stability and compaction; good resistance to piping; moderate shrink-swell potential in subsoil.	Generally needs drainage; moderate permeability; tile drains function satisfactorily.	Very high available water capacity; moderate intake rate; moderate permeability; somewhat poor drainage.	Seldom needed; wetness hinders construction in places some seasons.	Soil properties favorable; tile generally needed; seasonal wetness hinders construction in places.
Good source of poorly graded sand below depth of 3 to 4 feet.	Fair: sandy loam in surface layer and subsoil; moderate available water capacity.	Relief suitable mainly for dugout ponds; underlying material of sand; subject to severe leakage unless sealed.	Fair stability and fair to good compaction in subsoil. Loamy sand in underlying material; high permeability when compacted; fair to poor resistance to piping.	Natural drainage is adequate.	Moderate available water capacity; rapid intake rate; moderate to moderately rapid permeability.	Not applicable	Seldom used because of nearly level topography; moderate available water capacity for plants.
Not suitable	Poor: poorly drained; silty clay loam in surface layer and subsoil; seasonal high water table.	Relief suitable only for dugout ponds; seasonal high water table; subject to flooding.	Fair to good stability and compaction; high water table hinders excavation in places.	Drainage needed; moderately slow permeability; subject to flooding; seasonal water table near surface; tile drains function slowly.	High to very high available water capacity; moderate to slow intake rate; moderately slow permeability; subject to flooding.	Not applicable	Not applicable.
Poor: local areas have some sand mixed with silt below depth of 3 feet in places.	Good in surface layer: high in content of organic matter; fair in subsoil; silty clay loam; sticky when wet and hard when dry.	Sites generally not favorable for impoundment; hazard of excessive seepage in underlying material.	Fair to good stability and compaction in subsoil; fair to good stability and compaction in underlying material.	Natural drainage is adequate.	High available water capacity; moderate intake rate; moderate permeability; nearly level.	Not needed; nearly level.	Generally not needed; nearly level.

TABLE 10.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as a source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Buildings, three stories or less	Local roads and streets	Road fill
Radford: 74	Severe: subject to flooding; seasonal high water table.	Severe: subject to flooding; seasonal high water table; high content of organic matter in upper 2 feet.	Severe: somewhat poorly drained; seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; subject to flooding; moderate shrink-swell potential below depth of about 2 feet; seasonal high water table.	Severe: somewhat poorly drained; subject to flooding; seasonal high water table; susceptible to frost heave.	Poor: high content of organic matter in upper 2 feet; moderate shrink-swell potential below depth of 2 feet; poor to fair compaction.
Riverwash sand and gravel: 123.	Severe: rapid permeability; subject to flooding.	Severe: sand and gravel; hazard of excessive seepage; subject to flooding.	Severe: sand and gravel; subject to flooding.	Severe: subject to frequent flooding.	Severe: subject to frequent flooding.	Good: poorly graded sand and gravel; flooding hinders excavation in places.
Rushville: 16	Severe: seasonal high water table; slow to very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: seasonal water table near surface; slow to very slow permeability in subsoil, but it can be sealed to prevent seepage.	Severe: poorly drained and very poorly drained; seasonal water table near surface.	Severe: poorly drained and very poorly drained; moderate to high shrink-swell potential in subsoil; seasonal water table near surface.	Severe: poorly drained and very poorly drained; seasonal water table near surface; susceptible to frost heave; moderate to high shrink-swell potential in subsoil.	Poor: poorly drained to very poorly drained; moderate to high shrink-swell potential and fair to poor compaction in subsoil; susceptible to frost heave.
Sable: 68	Severe: seasonal high water table; subject to ponding in places.	Severe: seasonal high water table; subject to ponding; upper 18 inches high in content of organic matter and poor for floor of lagoon or embankment material.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; moderate shrink-swell potential in subsoil; seasonal high water table; susceptible to frost heave.	Severe: poorly drained; seasonal high water table; susceptible to frost heave; moderate shrink-swell potential in subsoil.	Poor: poorly drained; seasonal high water table; plasticity index more than 15.
Sexton: 208	Severe: slow permeability; seasonal high water table; subject to ponding.	Severe: seasonal high water table at depth of 0 to 2 feet; subject to ponding.	Severe: poorly drained; subject to ponding.	Severe: poorly drained; moderate shrink-swell potential in subsoil; seasonal high water table; subject to ponding.	Severe: poorly drained; seasonal high water table; susceptible to frost heave; moderate shrink-swell potential in subsoil.	Poor: poorly drained; moderate shrink-swell potential in subsoil; plasticity index more than 20.
Shale rock land: 95F.	Severe: moderately steep to steep; shale near surface.	Severe: moderately steep to steep; shale near surface.	Severe: moderately steep to steep; shale near surface.	Severe: moderately steep to steep; shale near surface.	Severe: moderately steep to steep; shale near surface.	Poor: moderately steep to steep; shale near surface.
Starks: 132	Severe: temporary seasonal water table at depth of 1 to 3 feet; moderate to moderately slow permeability in subsoil; estimated percolation rate ranges from 45 minutes per inch to slower than 60 minutes per inch.	Moderate: temporary seasonal water table at depth of 1 to 3 feet; hazard of moderate seepage below depth of about 4 feet.	Severe: somewhat poorly drained; seasonal high water table.	Moderate: somewhat poorly drained; seasonal high water table; moderate shrink-swell potential in subsoil.	Moderate: somewhat poorly drained; susceptible to frost heave; seasonal high water table.	Poor: moderate shrink-swell potential in subsoil; plasticity index more than 15; seasonal high water table.
*Sylvan: 962E2, 962F, 962F2, 962G. For Bold part of these mapping units, see the Bold series.	Severe: slope limits use.	Severe: slope limits use.	Severe: slope limits use.	Severe: slope limits use.	Severe: slope affects amount of cut and fill needed; severe hazard of erosion; well drained.	Fair on 962E2, 962F, and 962F2; poor on 962G; slope hinders excavation; poor compaction.
Tama: 36B, 36C	Slight on 36B; moderate on 36C (slope limits use); moderate permeability in subsoil; estimated percolation rate faster than 45 minutes per inch.	Moderate: hazard of moderate seepage; slopes of 2 to 7 percent.	Slight: well drained	Moderate: well drained; moderate shrink-swell potential in subsoil to depth of about 4 feet.	Moderate: well drained but has moderate shrink-swell potential in subsoil to depth of about 4 feet; fair to good stability.	Poor in subsoil: moderate shrink-swell potential; plasticity index more than 15. Fair to poor in underlying material; fair to poor compaction; plasticity index generally less than 15.

interpretations—Continued

Suitability as a source of—Continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Grassed waterways
Not suitable	Good: about 2 feet of silt loam high in content of organic matter.	Relief suitable for dugout ponds only; seasonal high water table; subject to flooding.	Poor to fair stability and compaction; high content of organic matter in upper 2 feet.	Drainage needed; seasonal high water table; subject to flooding; tile drains and open ditches used.	High available water capacity; moderate intake rate; moderate permeability; subject to flooding; somewhat poor drainage.	Not applicable	Not applicable.
Good: poorly graded sand and gravel.	Poor: sand and gravel.	Not suited: sand and gravel; rapid seepage rate.	Rapid permeability; sand and gravel; needs binder.	Natural drainage is adequate.	Very low available water capacity; rapid intake rate; rapid permeability.	Not applicable	Not applicable.
Not suitable	Good if remaining soil is not to be revegetated; poor if remaining soil is to be revegetated; poorly drained.	Suitable for dugout ponds only; seasonal high water table; slow seepage.	Fair to poor stability and compaction; moderate to high shrink-swell potential in subsoil.	Drainage needed; open ditches used; slow to very slow permeability; seasonal water table near surface.	Poor and very poor drainage; high available water capacity; slow water intake rate; slow to very slow permeability.	Not applicable	Not applicable.
Not suitable	Fair if remaining soil is not to be revegetated; poor if remaining soil is to be revegetated; poorly drained; seasonal high water table.	Relief suitable for dugout ponds only; seasonal high water table; hazard of seepage in areas that are tile drained.	Upper 18 inches high in content of organic matter and poor for these uses; fair to good stability and compaction and good resistance to piping in subsoil.	Drainage needed; seasonal high water table; poorly drained; tile drains function satisfactorily.	Poor drainage; very high available water capacity; moderate intake rate; moderate permeability; poor drainage.	Not applicable	Generally not needed; seasonal wetness hinders construction in places.
Not suitable	Good if remaining soil is not to be revegetated; poor if remaining soil is to be revegetated; poorly drained; seasonal high water table.	Relief suitable mainly for dugout ponds; seasonal high water table at depth of 0 to 2 feet.	Fair to poor stability and compaction; good resistance to piping.	Drainage needed; slow permeability; open ditches generally used.	High available water capacity; moderate to slow intake rate; slow permeability; poor drainage.	Not applicable	Generally not needed; seasonal wetness hinders construction in places.
Not suitable	Poor: moderately steep to steep; shale near surface.	Hazard of lateral seepage; slope ranges from 15 to 40 percent.	Moderately steep to steep; shale near surface; some clayey material in places.	Natural drainage is adequate.	Moderately steep to steep; shale near surface; rapid runoff.	Moderately steep to steep; shale near surface.	Moderately steep to steep; shale near surface; difficult to establish and maintain vegetation.
Not suitable	Good in surface layer; silt loam; low in content of organic matter. Fair in subsoil; silty clay loam; seasonal high water table.	Relief suitable mainly for dugout ponds; seasonal high water table; hazard of moderate seepage in places.	Fair to good stability and compaction and good resistance to piping to a depth of about 5 feet.	Drainage needed; tile drains and surface ditches used.	High to very high available water capacity; moderate intake rate; moderate to moderately slow permeability; poor drainage.	Generally not needed, because of low slope gradients.	Generally not needed; generally a need of drainage.
Not suitable	Poor: slope limits use; low in content of organic matter; severe hazard of erosion.	Underlying material of coarse silt; severe hazard of seepage.	Poor stability and compaction; poor resistance to piping.	Natural drainage is adequate.	High available water capacity; moderate intake rate; slope limits use; severe hazard of erosion.	Too sloping for this use; highly erodible.	Difficult to establish grass because of steepness; low fertility in exposed subsoil.
Not suitable	Good in surface layer; silt loam high in content of organic matter. Fair in subsoil: silty clay loam; sticky when wet; hard when dry.	Moderate permeability in subsoil; moderate hazard of seepage below depth of about 4 feet.	Fair to good stability and compaction in subsoil. Fair to poor stability and compaction in underlying material.	Natural drainage is adequate.	High to very high available water capacity; moderate intake rate; moderate permeability; slopes of 2 to 7 percent.	Slopes of 2 to 7 percent; exposed subsoil is silty clay loam low in content of organic matter.	Slopes of 2 to 7 percent; exposed subsoil is silty clay loam low in content of organic matter.

TABLE 10.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					Suitability as a source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Buildings, three stories or less	Local roads and streets	Road fill
Tice: 284	Severe: seasonal high water table; subject to flooding; moderate permeability.	Severe: subject to flooding; high content of organic matter.	Severe: somewhat poorly drained; seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; moderate shrink-swell potential; seasonal high water table; subject to flooding.	Severe: somewhat poorly drained; susceptible to frost heave; seasonal high water table; subject to flooding.	Poor: moderate shrink-swell potential; seasonal high water table; plasticity index generally more than 20.
Titus: 404	Severe: slow permeability in subsoil; high water table; subject to flooding.	Severe: subject to flooding; high water table.	Severe: poorly drained; high water table; subject to flooding.	Severe: poorly drained; subject to flooding; high shrink-swell potential; high water table; susceptible to frost heave.	Severe: poorly drained; high water table; subject to flooding: susceptible to frost heave; high shrink-swell potential.	Poor: poorly drained; high plasticity; high water table; high shrink-swell potential.
Virden: 47	Severe: seasonal high water table; moderate to moderately slow permeability in subsoil; subject to ponding.	Severe: seasonal high water table; subject to ponding; surface layer high in content of organic matter.	Severe: poorly drained; seasonal high water table.	Severe: poorly drained; moderate to high shrink-swell potential in subsoil; seasonal high water table; susceptible to frost heave.	Severe: poorly drained; seasonal high water table; susceptible to frost heave; moderate to high shrink-swell potential in subsoil.	Poor: poorly drained; moderate to high shrink-swell potential in subsoil; seasonal high water table.
Wagner: 26	Severe: very slow to slow permeability; high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: poorly drained; high water table; subject to flooding.	Severe: poorly drained; subject to flooding; high shrink-swell potential; high water table.	Severe: poorly drained; subject to flooding; high water table; susceptible to frost heave; high shrink-swell potential.	Poor: poorly drained; highly plastic; high shrink-swell potential.
Wakeland: 333	Severe: seasonal high water table; subject to flooding.	Severe: subject to flooding; seasonal high water table.	Severe: somewhat poorly drained; subject to flooding; seasonal high water table.	Severe: somewhat poorly drained; subject to flooding; seasonal high water table.	Severe: somewhat poorly drained; subject to flooding; seasonal high water table; susceptible to frost heave.	Poor to fair: fair to poor stability and compaction; seasonal high water table; subject to flooding; susceptible to frost heave.
Worthen: 37B, 37C	Slight on 37B; moderate on 37C; moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Moderate: moderate permeability; moderate hazard of seepage; slopes of 1 to 12 percent.	Slight: some slopes of more than 7 percent.	Slight on 37B; moderate on 37C; low shrink-swell potential; well drained and moderately well drained.	Moderate: fair to poor stability; highly erodible on exposed embankments; susceptible to frost heave.	Poor to fair: fair to poor stability and compaction; hazard of piping.

in terpretations—Continued

Suitability as a source of—Continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Grassed waterways
Not suitable	Fair: silty clay loam.	Relief suitable for dugout ponds only; seasonal high water table; subject to flooding.	Fair to good stability and compaction; good resistance to piping.	Drainage needed; seasonal high water table; subject to flooding; tile drains and open ditches used.	Very high available water capacity; moderate intake rate; moderate permeability; subject to flooding; somewhat poor drainage.	Not applicable	Generally not needed; seasonal wetness or flooding hinders construction in places.
Not suitable	Fair if remaining soil is not to be revegetated; poor if it is to be revegetated; poorly drained; high water table.	Relief suitable for dugout ponds only; high water table; subject to flooding.	Fair to poor stability and compaction; good resistance to piping.	Drainage needed; high water table; subject to flooding; slow permeability.	High available water capacity; slow intake rate; slow permeability; subject to flooding; poor drainage.	Not applicable	Not applicable.
Not suitable	Fair if remaining soil is not to be revegetated; poor if it is to be revegetated; poorly drained; seasonal high water table.	Relief suitable for dugout ponds only; seasonal high water table; hazard of seepage in areas that are tile drained.	Fair to poor stability and compaction; good resistance to piping.	Drainage needed; seasonal high water table; tile drains function satisfactorily.	High to very high available water capacity; moderate intake rate; moderate to moderately slow permeability; subject to ponding; poor drainage.	Not applicable	Generally not needed; seasonal wetness hinders construction in places.
Not suitable	Fair if remaining soil is not to be revegetated; poor if it is to be revegetated; poorly drained; high water table.	Relief suitable for dugout ponds only; high water table; subject to flooding.	Fair to poor stability and compaction; high shrink-swell potential; good resistance to piping.	Drainage needed; slow to very slow permeability; open ditches used; subject to flooding.	Moderate to high available water capacity; slow intake rate; slow to very slow permeability; subject to flooding; poor drainage.	Not applicable	Not applicable.
Not suitable	Good: fertile silt loam low in content of organic matter; seasonal high water table.	Relief suitable for dugout ponds only; seasonal high water table; subject to flooding.	Poor to fair stability and compaction; hazard of piping.	Drainage needed; subject to flooding; seasonal high water table; tile drains and open ditches used.	Very high available water capacity; moderate intake rate; moderate permeability; subject to flooding; somewhat poor drainage.	Not applicable	Generally not needed; seasonal wetness hinders construction in places.
Not suitable	Good: fertile silt loam high in content of organic matter.	Well drained and moderately well drained; moderate permeability; hazard of excessive seepage.	Poor to fair stability and compaction; hazard of piping.	Natural drainage is adequate.	Very high available water capacity; moderate intake rate; moderate permeability; slopes of 1 to 12 percent.	Slopes of 1 to 12 percent; hazard of erosion during construction.	Slopes of 1 to 12 percent; hazard of erosion during construction and until vegetation is established.

TABLE 11.—*Engineering*

[Tests performed by the Illinois Division of Highways, Bureau of Materials. Absence

Soil name and location	Parent material	Report No.	Depth from surface	Moisture-density [1]		Mechanical analyses [2]	
				Maximum dry moisture	Optimum moisture	Percentage less than 3 inches passing sieve—	
						No. 4 (4.7 mm.)	No. 10 (2.0 mm.)
			In.	*Lb. per cu. ft.*	*Pct.*		
La Hogue loam:							
T. 12 N., R. 13 W., sec. 20, SW. 160, NW. corner, thence 60 feet south. (Modal)	Sandy alluvium.	31–3–1	0–12	119	13	100	99
		31–3–2	17–41	114	15	----------	100
		31–3–3	49–65	117	12	----------	100
Littleton silt loam:							
T. 11 N., R. 13 W., sec. 9, NW. 160, SW. 40; from north abutment of highway bridge, thence north along centerline of highway 780 feet and west 111 feet. (Modal)	Silty alluvium.	31–1–2	8–24	104	19	----------	----------
		31–1–4	29–48	110	17	----------	----------
Onarga sandy loam:							
T. 12 N., R. 13 W., sec. 17, center of section, thence 86 feet east and 46 feet north. (Modal)	Sandy alluvium.	31–4–1	0–11	122	11	----------	100
		31–4–2	16–30	118	13	100	99
		31–4–3	43–58	119	11	----------	100
Sylvan silt loam:							
T. 10 N., R. 13 W., sec. 15, SE. 160, SW. 40, on ridge point approximately 150 feet west of gate and north of gravel road. (Modal)	Loess.	31–1–3	12–19	105	19	----------	----------
		31–1–6	32–45	108	17	----------	100

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

[2] Mechanical analyses according to AASHO Designation T 88–57 (*1*). Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method

The ratings for suitability of the soils as a source of sand are based on the probability that delineated areas of the soil contain deposits of sand. The ratings provide guidance in finding deposits, but do not indicate the quality or size of the deposits.

The rating for topsoil is based on the suitability of the soil material for spreading over barren surfaces, lawns, and gardens, so that soil conditions are improved for establishing and maintaining adapted vegetation.

Pond reservoir areas are affected mainly by seepage loss of water. Soil features that influence seepage are mentioned.

Among the features that are important to the use of soils for constructing embankments, dikes, and levees are compaction characteristics, susceptibility to piping, and shear strength. Both the subsoil and underlying material are evaluated where they are contrasting and have significant thickness for use as borrow material.

Drainage of cropland and pasture is affected mainly by such soil qualities and features as permeability, location of water table, soil slope, susceptibility to flooding, and availability of outlets.

Irrigation refers mainly to sprinkler irrigation. Soil features important to irrigation are available water capability, permeability, intake rate, slope, and natural drainage.

Factors that influence the use of soils for terraces, diversions, and grassed waterways are those features and qualities of soils that affect layout and construction and the establishment, growth, and maintenance of plants. These features include soil slope, texture and reaction of subsoil, depth to bedrock or other limiting layers, and natural soil drainage.

Engineering test data

Table 11 shows test data for samples of several types of soil in Greene County. The test results do not represent the entire range of characteristics of soils within the county, nor do they represent the entire range of characteristics of the soils tested. The results, nevertheless, can be used as a general guide in estimating properties of the other soils in the county.

Moisture density data are obtained by compacting soil material at a successively higher content. Assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed *maximum dry density*. Generally, optimum stability is obtained if the

test data

of an entry indicates no determination was made or information does not apply]

Mechanical analyses [2]—Continued						Liquid limit	Plasticity index	Classification	
Percentage less than 3 inches passing sieve—Continued		Percentage smaller than—						AASHO [3]	Unified [4]
No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
						Pct.			
82	53	50	35	22	17	25	9	A-4(2)	CL
82	51	48	36	24	22	32	17	A-6(5)	CL
81	14	12	9	6	5	[5] NP	(5)	A-2-4(0)	SM
100	99	86	53	20	16	35	10	(A-4(11)	ML
100	99	88	57	22	19	33	11	(A-6(12)	CL
79	43	37	26	16	12	21	6	A-4(0)	SM-SC
78	48	47	31	20	18	29	8	A-4(1)	SC
77	15	14	10	7	6	(5)	(5)	A-2-4(0)	SM
100	100	89	63	34	32	47	29	A-7-6(31)	CL
99	98	85	41	12	8	26	7	A-4(6)	CL-ML

and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[3] Based on AASHO Designation M 145-49 (*1*).

[4] Based on the Unified Soil Classification System (*16*).

[5] NP=Nonplastic.

soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

Mechanical analysis refers to the measurement of the amounts of various size classes of soil grains (sand, silt, or clay) in a sample. Proportions of the size classes determine the textural class of the material. Names used by engineers for various size classes of particles differ from those used by soil scientists. For example, fine sand in engineering terminology consists of particles 0.42 to 0.74 millimeter in diameter; whereas fine sand, as determined by the soil scientist, consists of particles 0.25 to 0.10 millimeter in diameter.

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

Formation and Classification of Soils

This section discusses the factors that affected the formation of the soils of Greene County and explains the system of soil classification currently used. The soil series represented in the county are placed in some of the higher categories of the current system.

Factors of Soil Formation

The principal factors of soil formation are parent material, climate, plant and animal life, relief and drainage, and time. All five of these factors are involved in the formation of each soil. The relative importance of each factor differs from place to place, and each modifies the effect of the other four. In some instances, one factor may dominate the formation of a soil. Man, by such activities as clearing forests and cultivating and fertilizing fields, also can change the course of soil formation; but so far he has had little effect on the overall development of soils in this survey area.

Parent material

Peoria loess is the predominant parent material of the soils in Greene County. The loess is very thick on the uplands near the valley of the Illinois River, the main

source of loess, and it thins toward the eastern part of the county. The soils on uplands in the eastern part generally are more highly developed than those near the bluffs along the Illinois River where the loess is thicker. On very steep soils, where the loess is thin or has been removed by erosion, the Hickory and similar soils formed in Illinoian glacial till (*8*). The Hickory soils contain more sand and pebbles than the soils that formed in loess.

Soils that formed in alluvium in the valley of the Illinois River vary in texture, but many tend to be moderately fine textured to fine textured. In the smaller valleys in the county, the soils tend to be medium textured because they formed largely in silty sediment washed from soils on uplands. They can be light colored, as are the Haymond and Wakeland soils, or dark colored, as are the Huntsville and Lawson soils.

A few areas of terraces or second bottoms are in the valley of the Illinois River and the valleys of the larger creeks. In some of these areas, the McGary and similar soils formed in very fine textured sediment. In other areas such soils as the Onarga formed in sandy material.

Limestone and some shale crop out on some steep soils of the bluff along the valley of the Illinois River, but these materials have had little effect on soil formation in the county.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of parent material. The temperature and wetness of the climate are conducive to the relatively rapid breakdown of soil minerals, to the formation of clay, and to the movement of these materials downward in the soil profile. Most of the soils on uplands in the county have considerably more clay in the subsoil than in the surface layer.

Plants and animals

Plants have had a greater effect than animals on the formation of soils in the survey area, but the animals and organisms that live on and in the soils also have been important. The changes that they bring about depend mainly on the kind of life processes peculiar to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by the climate, the parent material, the relief, and the age of the soil.

Some soils in the county formed under trees, and some formed under prairie grasses. Most of the sloping soils formed under trees, mainly oak and hickory. The nearly level soils formed under prairie grasses. They have a darker colored surface layer than those that formed under trees, and they have a higher content of organic matter.

Relief and drainage

Relief influences the amount of runoff, the degree of erosion, and the amount of water that infiltrates and percolates through the soil profile. Where the soils formed in uniform, permeable parent material, such as loess, natural drainage is closely associated with slope. The moderately well drained and well drained soils are in the more rolling areas, and the somewhat poorly drained to very poorly drained soils are mainly on flats or in depressions. Slopes in the county range from less than 2 percent on the bottom lands and the nearly level uplands to more than 50 percent on the steeper parts of the uplands that border valleys.

Time

The length of time needed for a given soil to develop depends on the other factors of soil formation. Soils formed in parent material that is low in content of lime develop more rapidly and become acid more readily than soils formed in material that is high in content of lime. Permeable soils are leached of lime and other soluble minerals much faster than slowly permeable soils. Soils develop faster under trees than under prairie vegetation because the grasses are more efficient in recycling calcium and other bases from the subsoil to the surface layer. Soils generally develop faster in humid climates than in dry climates. Soils normally are more strongly developed or have greater horizon differentiation when they have been exposed to weathering processes over a long period.

Many of the soils on uplands in the survey area are strongly developed. The thicker soils in loess and the soils on terraces are only moderately well developed. Most of the soils on bottom lands have weak horizon differentiation or none at all because there has not been enough time for changes to take place.

Organic matter has accumulated in all the soils. Those developed under prairie vegetation have a thicker, darker colored surface layer than those formed under trees. In the poorly drained soils, iron compounds have been reduced and moved downward in the profile, causing the subsoil to have a gray color. Some of this iron has accumulated in the form of concretions or small, rounded pellets. In the well-drained soils, the iron compounds are oxidized and are generally more diffuse. These compounds impart a brown or yellowish-brown color to the subsoil.

Classification of Soils

The current system used to classify soils was adopted for general use by the National Cooperative Soil Survey in 1965, and it was revised in March 1967, September 1968, and April 1969 (*14*). This system is under continual study, and readers interested in the development of the system should refer to the latest literature available. Table 12 shows the current classification of each of the soil series represented in the county.

The classification system defines classes in terms of observable or measurable properties of soils. The properties chosen are primarily those that permit the grouping of soils that are similar in genesis. The classification is designed to encompass all soils. It has six categories. Beginning with the most inclusive, they are order, suborder, great group, subgroup, family, and series. The categories of the current system are briefly defined in the following paragraphs.

ORDERS.—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. The four orders

TABLE 12.—*Classification of soil series into higher categories of the current system*

Soil series	Family	Subgroup	Order
Ambraw	Fine-loamy, mixed, noncalcareous, mesic	Fluvaquentic Haplaquolls	Mollisols.
Beardstown	Fine-loamy mixed, mesic	Udollic Ochraqualfs	Alfisols.
Beaucoup	Fine-silty, mixed, noncalcareous, mesic	Fluvaquentic Haplaquolls	Mollisols.
Bloomfield	Coarse-loamy, mixed, mesic	Psammentic Hapludalfs	Alfisols.
Bold	Coarse-silty, mixed, calcareous, mesic	Typic Udorthents	Entisols.
Camden	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Clarksdale	Fine, montmorillonitic, mesic	Udollic Ochraqualfs	Alfisols.
Clinton	Fine, montmorillonitic, mesic	Typic Hapludalfs	Alfisols.
Darwin	Fine, montmorillonitic, noncalcareous, mesic	Vertic Haplaquolls	Mollisols.
Denny	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Downs	Fine-silty, mixed, mesic	Mollic Hapludalfs	Alfisols.
Dupo	Coarse-silty over clayey, mixed, nonacid, mesic	Aquic Udifluvents	Entisols.
Fayette	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Hamburg	Coarse-silty, mixed, calcareous, mesic	Typic Udorthents	Entisols.
Haymond	Coarse-silty, mixed, nonacid, mesic	Typic Udifluvents	Entisols.
Hennepin	Fine-loamy, mixed, mesic	Typic Eutrochrepts	Inceptisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Huntsville	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Keomah	Fine, montmorillonitic, mesic	Aeric Ochraqualfs	Alfisols.
La Hogue	Fine-loamy, mixed, mesic	Aquic Argiudolls	Mollisols.
Lawson	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Littleton	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
McFain	Clayey over loamy, montmorillonitic, noncalcareous, mesic.	Fluvaquentic Haplaquolls	Mollisols.
McGary	Fine, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Muscatine	Fine-silty, mixed, mesic	Aquic Argiudolls	Mollisols.
Onarga [1]	Coarse-loamy, mixed, mesic	Typic Argiudolls	Mollisols.
Petrolia	Fine-silty, mixed, nonacid, mesic	Typic Fluvaquents	Entisols.
Proctor	Fine-silty, mixed, mesic	Typic Argiudolls	Mollisols.
Radford	Fine-silty, mixed, mesic	Fluventic Hapludolls	Mollisols.
Rushville	Fine, montmorillonitic, mesic	Typic Albaqualfs	Alfisols.
Sable	Fine-silty, mixed, mesic	Typic Haplaquolls	Mollisols.
Sexton	Fine, montmorillonitic, mesic	Typic Ochraqualfs	Alfisols.
Starks	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Sylvan	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Tama	Fine-silty, mixed, mesic	Typic Argiudolls	Mollisols.
Tice	Fine-silty, mixed, mesic	Fluvaquentic Hapludolls	Mollisols.
Titus	Fine, montmorillonitic, mesic	Fluvaquentic Haplaquolls	Mollisols.
Virden	Fine, montmorillonitic, mesic	Typic Argiaquolls	Mollisols.
Wagner	Fine, montmorillonitic, mesic	Mollic Albaqualfs	Alfisols.
Wakeland	Coarse-silty, mixed, nonacid, mesic	Aeric Fluvaquents	Entisols.
Worthen	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.

[1] Placement into family is not firm at this time. Laboratory data shown for Onarga sandy loam indicates that these soils have a finer texture than the defined range for the series. This difference does not affect their usefulness or behavior.

represented in Greene County are Alfisols, Entisols, Inceptisols, and Mollisols.

Alfisols have a clay-enriched B horizon that is high in base saturation. *Entisols* are recent mineral soils that have no genetic horizons, or they have only the beginnings of such horizons. *Inceptisols* generally develop on young, but not recent, land surfaces. *Mollisols* generally develop under grass vegetation. They have a thick, dark-colored surface layer.

SUBORDERS.—Each order is divided into suborders, primarily on the basis of characteristics that seem to produce classes having genetic similarity. The soil properties used to separate suborders are mainly those that reflect the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. The climatic range is narrower than that of the orders.

GREAT GROUPS.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major horizons and other features. The horizons used as a basis for distinguishing between great groups are those in which clay, iron, or humus have accumulated or those that have pans that interfere with growth of roots or movement of water. The features used are the self-mulching properties of clays, the soil temperature, and chemical composition (mainly calcium, magnesium, sodium, and potassium).

SUBGROUPS.—Each great group is divided into subgroups, one representing the central (typic) segment of the group, and other groups, called integrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in instances where soil properties intergrade outside the range of any other great group, suborder, or order.

FAMILIES.—Families are established within a subgroup primarily on the basis of properties that affect the growth of plants or the behavior of soils when used for engineering. Among the properties considered are texture, min-

eralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

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

Laboratory Data

Table 13 gives laboratory data that are representative for selected soil profiles in Greene County. A detailed description of the soil profile of each series is given in the section "Descriptions of the Soils." These data are helpful in characterizing and classifying the soils and in understanding their genesis. They are also helpful in estimating available water capacity, tilth, and other properties important in the management of the soils.

The soils were tested by the Department of Agronomy of the University of Illinois. The data in the table for particle-size distribution were obtained by the following methods. Sand was separated by wet sieving and the clay by the pipette method (*6*) (*7*). Organic carbon was determined by wet combustion, using a modification of the Walkley-Black method (*10*). Reaction was determined by using a glass electrode and a 1:1 soil-water suspension.

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TABLE 13.—*Laboratory data*

[The symbol < means less than]

Soil name and location	Horizon	Depth from surface	Reaction	Organic carbon [1]	Particle-size distribution		
					Sand (2–0.05 mm.)	Silt (0.05–0.002 mm.)	Clay (<0.002 mm.)
		Inches	*pH*	*Percent*	*Percent*	*Percent*	*Percent*
Fayette silt loam, T. 11 N., R. 13 W., sec. 22, NW. 160, NW. 40, SE. 10.	Ap	0–8	5.5	1.1	1.4	82.7	16.0
	A2	8–12	4.8	.4	1.4	77.1	21.6
	B1	12–17	4.4	.4	1.5	69.4	29.1
	B21t	17–25	4.5	.4	1.6	66.2	32.3
	B22t	25–42	4.8	.3	1.6	68.8	29.5
	B31	42–56	4.9	.2	1.4	72.6	26.0
La Hogue loam, T. 12 N., R. 13 W., sec. 20, SW. 160, NW. 40, NW. 10.	Ap	0–7	6.9	1.1	51.1	33.3	15.6
	A1	7–13	6.8	.8	50.6	32.6	16.8
	B1	13–18	5.8	.6	51.4	30.9	17.7
	B21t	18–24	5.3	.5	50.6	29.3	20.1
	B22t	24–31	5.1	.4	46.7	28.2	25.1
	B23t	31–36	5.1	.3	50.1	25.3	24.6
	B31	36–43	5.2	.2	62.3	19.2	18.5
	B32	43–50	5.2	.2	77.6	10.9	11.5
	B3 bands	50–73	5.5	0	86.9	6.0	7.1
	C bands	50–73	5.6	0	95.7	2.1	2.2
Muscatine silt loam, T. 12 N., R. 12 W., sec. 29, SE. 160, SE. 40, NE. 10.	A11	0–6	5.0	2.5	1.2	77.2	21.6
	A12	6–14	5.2	2.2	1.4	73.9	24.8
	A13	14–18	5.2	1.7	1.4	71.4	27.2
	B1	18–21	5.2	1.2	1.4	67.0	31.6
	B21t	21–27	5.4	1.0	1.2	64.2	34.5
	B22t	27–35	5.8	.7	1.3	66.2	32.5
	B31	35–40	6.0	.4	1.3	70.1	28.6
	B32	40–50	6.3	.2	1.2	73.6	25.2
Onarga sandy loam,[2] T. 12 N., R. 13 W., sec. 17, NE. 160, SW. 40, SW. 10.	Ap	0–8	7.2	.8	53.6	31.0	15.4
	A1	8–12	6.8	.5	60.2	24.8	15.0
	B1	12–17	6.5	.5	57.5	25.5	17.0
	B21t	17–23	5.9	.2	54.6	25.7	19.7
	B22t	23–30	5.5	.2	56.5	23.0	20.5
	B31	30–37	5.3	.2	57.4	23.0	19.6
	B32	37–45	5.3	0	67.6	16.1	16.3
	C	45–60	5.5	0	96.6	1.1	2.3

[1] Percentage of organic carbon times 1.7 equals the percentage of organic matter.

[2] Onarga sandy loam in Greene County is in a fine-loamy family but most soils in this series are believed to be coarse-loamy.

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Glossary

Acidity. See Reaction, soil.

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

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

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Bottom land. Nearly level land on the bottom of a valley that has a stream flowing through it. Subject to flooding and often referred to as a flood plain.

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.

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.

Contour farming. Plowing, planting, cultivating, and harvesting in rows that are at right angles to the natural direction of the slope and as nearly level as practical.

Cover crops. Close-growing crops, grown primarily to improve the soil and protect it between periods of regular crop production; or crops grown between trees in orchards.

Crop residue. The part of a plant, or crop, left in the field after harvest.

Depth of soil. Thickness of soil over a specified layer, generally one that does not permit the growth of roots. Classes used in this survey are—

Very shallow	Less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 36 inches
Deep	36 inches or more

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

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

Escarpment. A long, steep ridge of land or rock that resembles a cliff. It faces in one general direction and separates two areas of more nearly level land.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Glacial till. Unstratified glacial drift that consists of clay, silt, sand, gravel, and boulders transported and deposited by glacial ice.

Green-manure crop. A crop of grasses or legumes worked into the soil while green or soon after maturity to improve soil.

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

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

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

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A

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

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

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Intake rate. The rate of entry of water into the soil, usually expressed in inches per hour. In this survey three intake rate classes are used: (1) rapid, greater than 1.5 inches per hour; (2) moderate, 1.0 to 1.5 inches per hour; and (3) slow, less than 1.0 inch per hour. These rates apply to the upper 18 inches of soil where it is unsaturated and where the surface is covered by vegetation.

Leached soil. A soil from which most of the soluble constituents have been removed throughout the entire profile or removed from one part of the profile and accumulated in another part.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Mottling, soil. 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.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Natural soil drainage. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Organic matter. A general term for plant and animal matter, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition. Following are terms used in this soil survey to describe the content of organic matter: *very low*—1 to 2 percent; *moderate*—2 to 4 percent; and *high*—more than 4 percent.

Percolation, soil water. The downward movement of water through soil.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

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

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

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

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.

Slick spots. Small areas in a field that are slick when wet because they contain excess exchangeable sodium, or alkali.

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. The term is confined to geological materials. 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 either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subgrade material. The prepared and compacted soil material below the pavement system; called the "basement soil."

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

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

Subsurface layer. The horizon between the surface layer and the subsoil. Generally the A2 horizon.

Surface layer. A term used in nontechnical soil descriptions for one or more layers above the subsoil. Includes the A horizon and in places part of the B horizon; has no depth limit.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order

of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "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.

Upland. Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowland along rivers.

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.

Weathering. The physical and chemical disintegration and decomposition of rocks and minerals produced by atmospheric agents.

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