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SOIL SURVEY

Lafayette County Wisconsin



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF WISCONSIN
Wisconsin Geological and Natural History Survey
Soil Survey Division
and
Wisconsin Agricultural Experiment Station

HOW TO USE THIS SOIL SURVEY REPORT

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

Locating the Soils

At the back of this report is an index map and a soil map consisting of many sheets. The index map is numbered to correspond to the sheets of the soil map so that the sheet showing any area can be located easily. On each map sheet, the soil boundaries are outlined and there is a symbol for each kind of soil. 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 the area and a pointer shows where it belongs.

Finding Information

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

Farmers and those who work with farmers can learn about the soils on a farm by reading the description of each soil and the descriptions of its capability unit and other groupings. A convenient way of doing this is to turn to the soil map and

list the soil symbols of a farm and then to use the "Guide to Mapping Units, Capability Units, and Woodland Suitability Groups" in finding the pages where each soil and its groupings are described.

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

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

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

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

Newcomers in Lafayette County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Additional Facts About the County."

* * * *

Fieldwork for this survey was completed in 1960. Unless otherwise indicated, all statements in the report refer to conditions in the county at the time the survey was in progress. The soil survey of Lafayette County was made as part of the technical assistance furnished by the Soil Conservation Service to the Lafayette County Soil and Water Conservation District.

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SOIL SURVEY OF LAFAYETTE COUNTY, WISCONSIN

BY BRUCE G. WATSON, SOIL CONSERVATION SERVICE

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY, SOIL SURVEY DIVISION, AND THE WISCONSIN AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF WISCONSIN

LAUFAYETTE COUNTY is in southwestern Wisconsin along the border of the State of Illinois (fig. 1). The land area of the county is 643 square miles, or 411,520 acres. The county has 18 civil townships. Darlington, the county seat, is near the center of the county.

Agriculture is the leading enterprise in the county. More than half the people in the county are employed at work related to agriculture. The rest are engaged in merchandising, in manufacturing, in providing personal and professional services, in mining, or in the construction business. Dairying and the raising of hogs are the chief agricultural enterprises.

Description of the County

In this section the general geographic features of the county are described. Also described are the climate and the kinds of vegetation.

Physiography, Drainage, and Geology

Lafayette County lies within the unglaciated part of Wisconsin in the western upland physiographic region of the State. In general, the county is a dissected plateau that has fairly broad, rolling ridges and steep-sided valleys (fig. 2).

The Platte Mounds in the northwestern part of Lafayette County are the most prominent topographical feature in the county. These mounds rise 180 to 300 feet above the ground and are 1,200 to 1,500 feet above sea level. The valley of the Pecatonica River, in contrast, is about 800 to 860 feet above sea level. The bottom of this valley seldom exceeds one-half mile in width, and it is widest where the river leaves the county in Wayne township.

Drainage in Lafayette County is provided mainly by the Pecatonica and Galena Rivers and their tributaries. About three-fourths of the county is drained by the Pecatonica River, and the rest is drained by the Galena River

(fig. 3). Both rivers drain into the Mississippi River. Most parts of the county are well drained. Only in the bottom lands along the rivers or in depressions in those

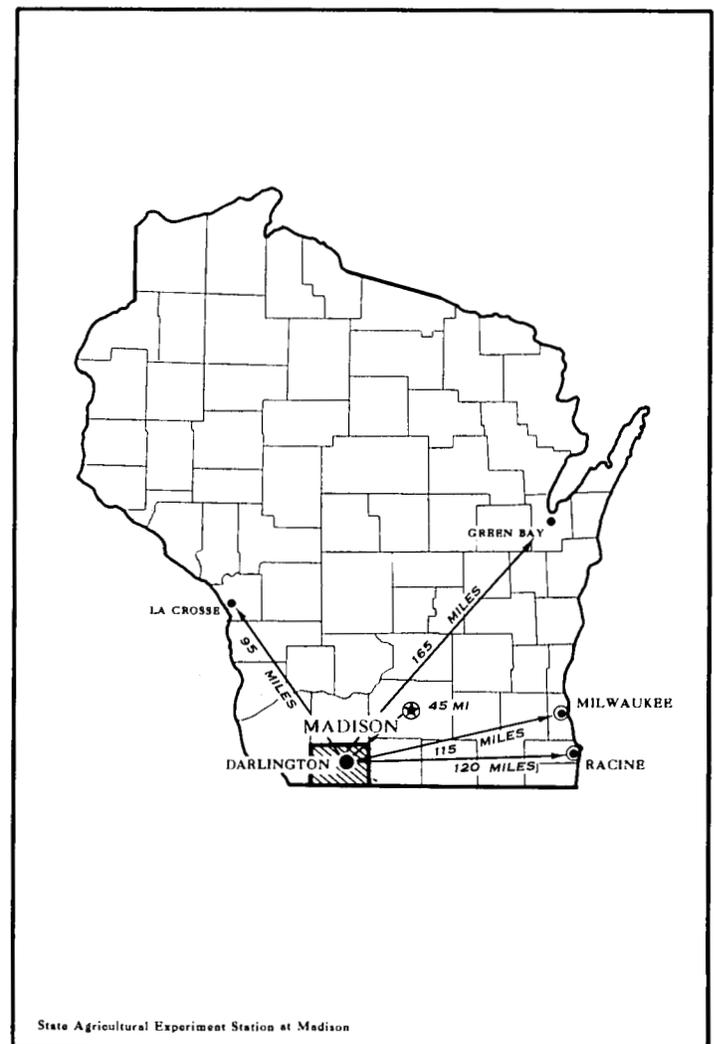


Figure 1.—Location of Lafayette County in Wisconsin.

¹ Other soil scientists who assisted in mapping are GEORGE J. BRESKA, CARL L. GLOCKER, RONALD C. WEBER, FENTON GRAY, and FRED C. WESTIN.

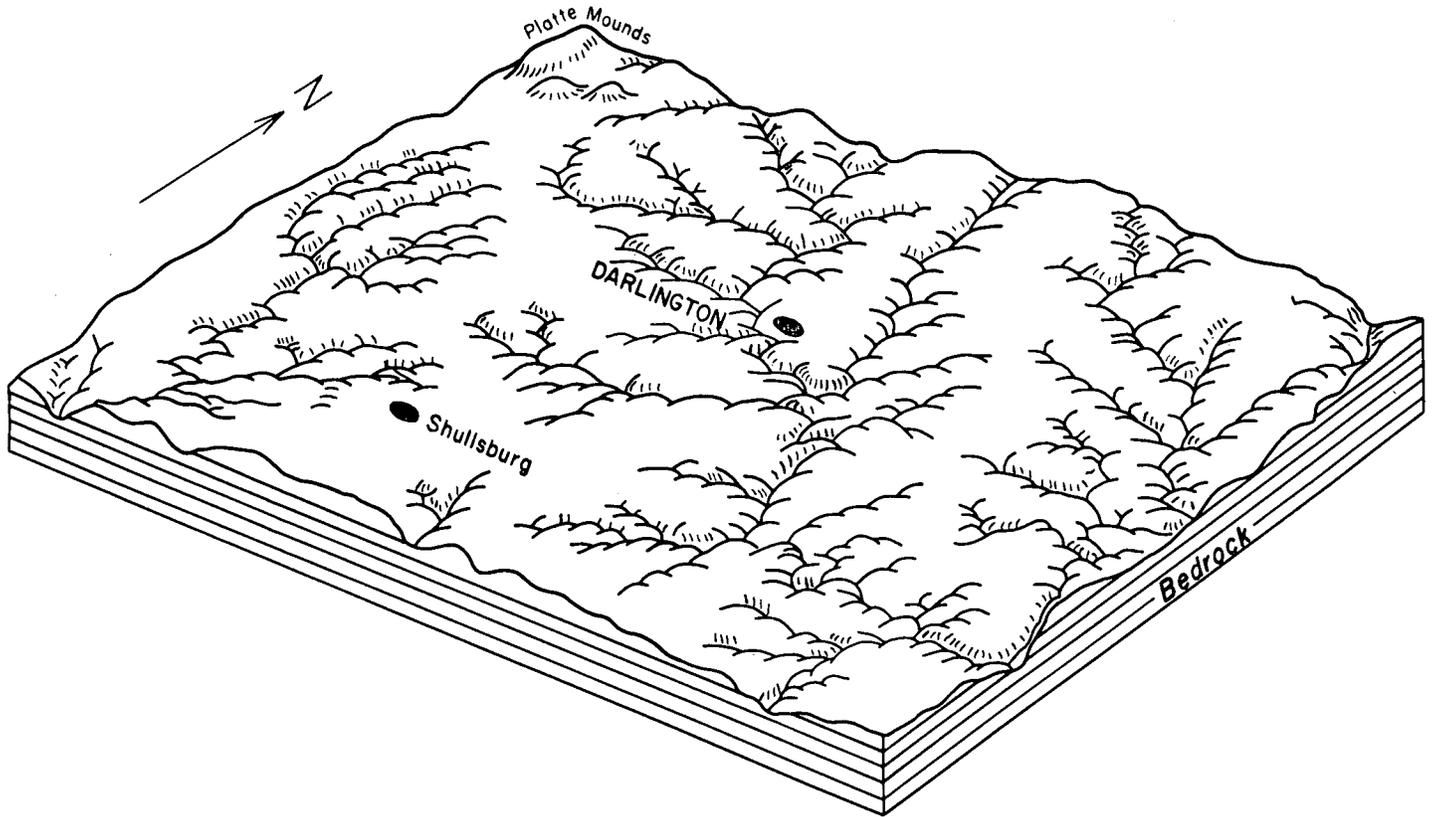


Figure 2.—Relief map showing the physiography of Lafayette County, Wis.

parts of the county that are underlain by shale bedrock are the soils poorly drained.

Galena dolomite (limestone) of Ordovician age is the bedrock that is dominant in Lafayette County (fig. 4). Consequently, most soils in the county overlie this bedrock. Limestone bedrock typical of that underlying the soils of the county is shown in figure 5.

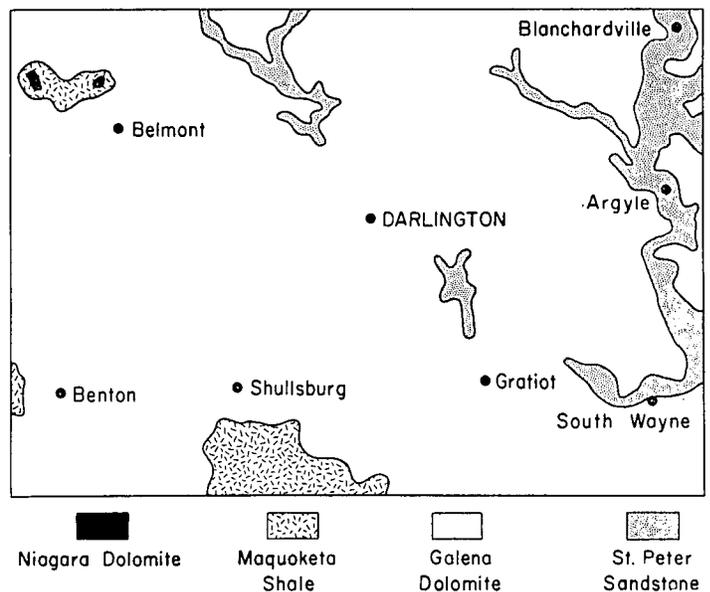


Figure 4.—Diagram showing the kinds of bedrock in Lafayette County, Wis.

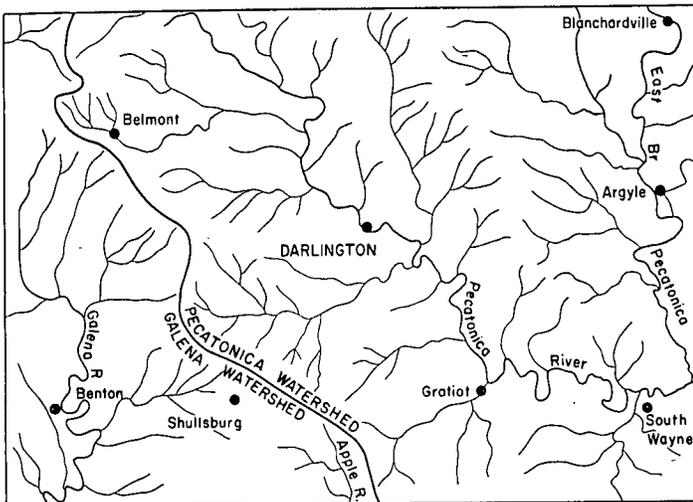


Figure 3.—Relief map showing the drainage pattern in Lafayette County, Wis.

St. Peter sandstone underlies the Galena formation. Outcrops of this sandstone occur along the Pecatonica River and form its steep-sided valleys (fig. 6).

Maquoketa shale and Niagara dolomite occur as mounds above the Galena dolomite. These formations once cov-

ered Lafayette County, but they were removed by weathering and erosion. Only the Platte Mounds, near Belmont, and the prominent hills south of Shullsburg remain of these formations in the county.

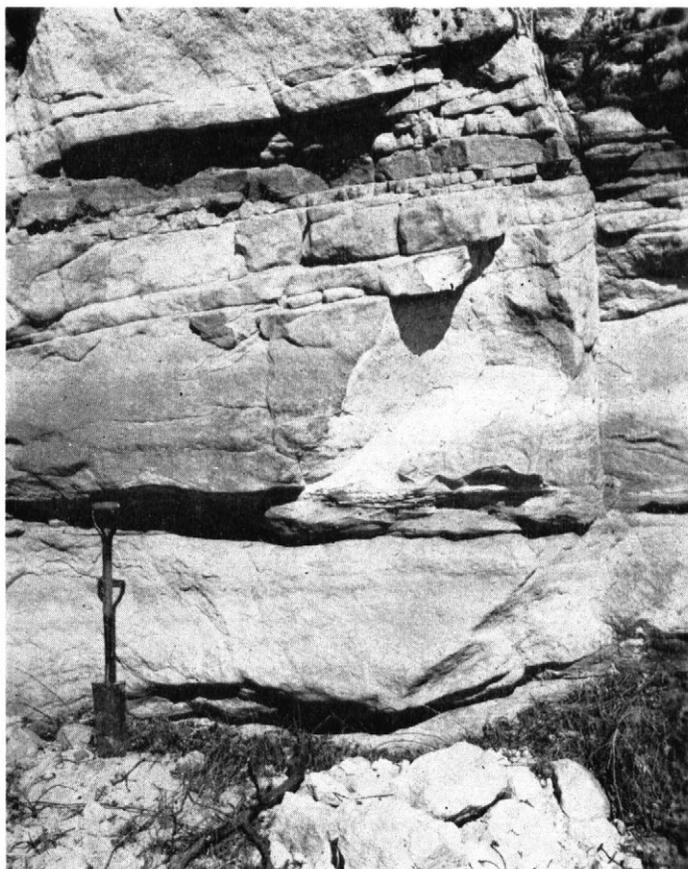
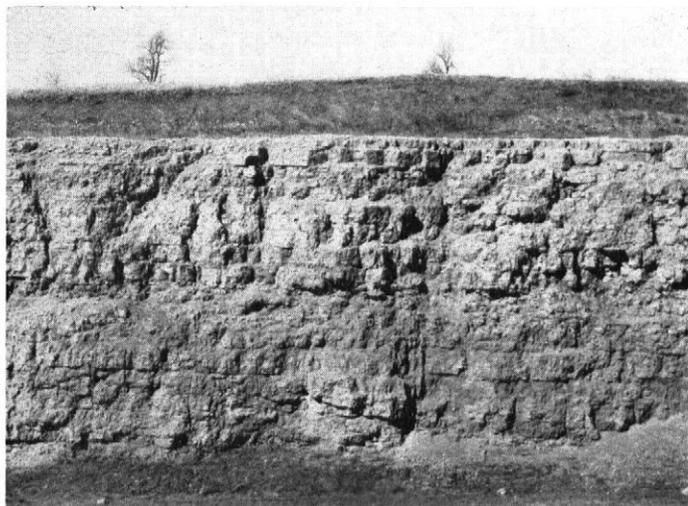


Figure 6.—St. Peter sandstone showing the different strata; sandstone such as this outcrops along the Pecatonica River south of Blanchardville.

Climate ²

Table 1, compiled from records of the U.S. Weather Bureau at Darlington, gives climatic data that are typical for the climate of Lafayette County. The station is in a valley, however, and minor adjustments in the temperatures shown are needed to get those typical of areas on slopes and on the tops of hills. Daily and annual ranges in temperature are greater in the valleys than on the slopes because cold air collects in the valleys and causes a lower minimum temperature. The slopes tend to moderate extremes in temperatures.

In addition to the average temperatures given in table 1, temperatures are given in terms of degree days.³ The number of degree days is the difference between the average temperature for a given day and 65° F. It is a measure of the amount of heat needed to keep the temperature that day at 65°. For example, a day that has an average temperature of 50° would be counted as 15 degree days. A knowledge of accumulated degree days for a stated time is helpful in calculating the amount of fuel needed for heating buildings and for determining the rate of growth and the maturity date of crops.

The climate of Lafayette County is continental. Winters are long, cold, and snowy. The summers are warm and have periods of hot, humid weather. Spring and fall are generally short and are marked by sharp changes in temperature. The area is in the path of pressure systems that move across the country from west to east and sometimes cause storms of cyclonic intensity.

Temperatures vary considerably from season to season and from year to year. In the last 30 years, for example, there were 49 days in 1934 when the temperature was 90° or higher, and in 1950 and 1951 there were no days when the temperature was that high. The number of days when the temperature was zero or lower ranged from 37 days in 1936 to 3 days in 1931. The occurrence, by months, of extremes in temperature and in precipitation are shown in table 2.

Precipitation is generally adequate for the crops grown in the county. About 60 percent of the annual rainfall normally comes during the months of May through September, when the main crops are grown. In summer the probability of 1 inch or more of rain falling in a 7-day period is greatest during the first part of June; the chance is that that amount of rain will fall during the first part of June more often than 4 years in 10. The driest part of summer is the last part of August. A 7-day period with a trace or less of moisture will occur 2 years in 10. About once in 2 years, intensive rainfall occurs at the rate of about 1.45 inches in 1 hour, 2.55 inches in 6 hours, and 3.10 inches in 24 hours. The average number of days in a year having 0.01 inch or more of precipitation is 112, but in 2 out of 3 years it ranges from 100 to 124.

The amount of snowfall varies widely. The range is from 14 inches, recorded in the winter of 1933-34, to 65 inches, recorded in 1958-59. The average date when the first snowfall of 1 inch or more occurs is November 25. The chance that 1 inch or more of snow will fall by

²By MARVIN W. BURLEY, State climatologist for Wisconsin, Weather Bureau, U.S. Department of Commerce.

³THOM, H. C. S. THE RATIONAL RELATIONSHIP BETWEEN HEATING DEGREE DAYS AND TEMPERATURE. Monthly Weather Rev. 82: 1-6, illus. 1954.

TABLE 1.—*Temperature and precipitation*

[Elevation

Month	Temperature							Average degree days
	Average daily maximum	Average daily minimum	Average monthly	Record high	Year	Record low	Year	
	°F.	°F.	°F.	°F.		°F.		Number
January.....	29.5	9.8	19.7	58	1944	-41	1951	1,400
February.....	33.1	13.8	23.5	60	1932	-36	1959	1,160
March.....	43.6	23.1	33.4	79	² 1943	-14	1943	980
April.....	59.4	34.8	47.1	90	1930	12	1954	540
May.....	70.1	45.9	58.0	104	1934	21	1935	260
June.....	79.1	56.3	67.7	104	1934	32	1945	80
July.....	84.4	60.0	72.2	107	1936	41	1947	20
August.....	82.3	58.0	70.2	101	1936	33	1934	30
September.....	74.4	49.6	62.0	98	1939	21	1949	160
October.....	63.7	38.3	51.0	89	1953	9	1952	440
November.....	45.9	26.2	36.1	79	1933	-20	1947	870
December.....	33.0	15.4	24.2	64	1951	-33	1950	1,270
Year.....	58.2	35.9	47.1	107	1936	-41	1951	7,210

¹ Based on climatological summary compiled by the U.S. Weather Bureau, Darlington, Wis. Data for period 1931-59. Average length of record is 30 years.

² Also on earlier dates, months, or years.

³ Less than one-half day.

⁴ Trace.

TABLE 2.—*Monthly extremes in temperature and precipitation at Darlington, Lafayette County, Wis.*

Month	2 years in 10, month will have at least 4 days with—		1 year in 10, month will have—	
	Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—	Precipitation less than—	Precipitation more than—
	°F.	°F.	Inches	Inches
January.....	44	-15	0.48	2.47
February.....	48	-8	.32	2.08
March.....	62	6	.50	3.50
April.....	77	21	.93	5.01
May.....	83	32	.90	6.26
June.....	90	44	2.84	8.67
July.....	96	49	1.48	6.94
August.....	93	45	1.75	7.44
September.....	90	33	.66	7.06
October.....	79	24	.61	4.06
November.....	65	8	.39	3.87
December.....	48	-6	.53	2.24

November 1 is 1 year in 10, and the chance that 1 inch or more will fall by December 19 is 9 years in 10.

Thunderstorms occur on an average of 43 days a year, but in individual years the range of occurrence is from 25 to 60 days. Hail falls as often as 7 days in a single year, but on an average there are 3 days a year when hail occurs. In some summers there are violent thunderstorms accompanied by heavy rain, strong winds, and much hail. Sometimes the hail is large enough to damage small grain and corn by lodging. Seven tornadoes have been recorded in the county since 1916.

Records on wind, sunshine, and relative humidity are not available for Lafayette County, but the data in the paragraphs that follow, from records kept at Madison, are representative of conditions in the county.

Prevailing winds are westerly in winter and southerly in summer. The strongest winds are in March, April, and November, and these have an average velocity of 12 miles per hour. The months of July and August are the least windy; the average velocity of the wind is 9 miles per hour. On the average, the wind speed is less than 4 miles per hour about 10 percent of the time, 4 to 12 miles per hour about 50 percent of the time, 13 to 31 miles per hour about 40 percent of the time, and more than 31 miles per hour less than 1 percent of the time. The most destructive winds generally are from the west or southwest.

An average of about 40 percent of possible sunshine is received during November and December, and 60 percent or more is received from May through October. During the rest of the year, the sun shines between 50 and 60 percent of the daylight hours.

The approximate variations in relative humidity for the seasons of the year are given in table 3. The relative humidity is generally higher in winter than in other seasons of the year.

The average date of the last freezing temperature, 32° F., in spring is May 12, and the first in fall is September 29. The growing season, which is the number of days between the last freezing temperature in spring and the first in fall, averages 140 days. The probabilities of freezing temperatures are shown in table 4. The data given are more representative of freezing temperatures in the valleys of the county than of those in the hills. The probable dates that the several minimum temperatures will occur average about 1 week earlier in spring and 1 week later in fall at the higher elevations than in the valleys.

at Darlington, Lafayette County, Wis.¹

820 feet]

Precipitation								Average days precipitation is 0.10 inch or more	Average days temperature is—			
Average	Greatest daily	Year	Snow, sleet						Maximum of 90° and above	Maximum of 32° and below	Minimum of 32° and below	Minimum of zero and below
			Average	Maximum monthly	Year	Greatest daily	Year					
<i>Inches</i>	<i>Inches</i>		<i>Inches</i>	<i>Inches</i>		<i>Inches</i>		<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1.30	1.29	1950	9.6	22.8	1947	11.0	1940	4	0	17	30	8
1.04	2.00	1948	6.4	20.0	1936	9.0	1950	3	0	12	27	6
1.94	2.14	1943	7.7	24.0	1932	9.0	1959	5	0	5	25	1
2.98	2.42	1950	.7	5.0	1936	3.5	1938	6	(³)	(³)	13	0
3.63	2.52	1933	.1	4.0	1935	4.0	1935	7	1	0	2	0
4.88	3.05	1947	0	0	-----	0	-----	8	3	0	(³)	0
3.86	3.58	1951	0	0	-----	0	-----	6	6	0	0	0
4.26	4.92	1942	0	0	-----	0	-----	6	5	0	0	0
3.44	2.92	1941	(⁴)	(⁴)	1942	(⁴)	1942	6	2	0	2	0
2.43	2.63	1943	.1	2.0	1959	2.0	1959	5	0	(³)	10	0
2.18	1.77	1952	2.1	10.5	1959	5.0	1959	5	0	4	22	1
1.38	1.31	1942	7.8	20.0	1951	8.0	1959	4	0	14	29	5
33.32	4.92	1942	34.5	24.0	1932	11.0	1940	65	17	52	160	21

TABLE 3.—Approximate variations of relative humidity for the seasons of the year

Relative humidity	Time in winter	Time in spring	Time in summer	Time in fall
Less than 50 percent.....	<i>Percent</i> 5	<i>Percent</i> 20	<i>Percent</i> 15	<i>Percent</i> 20
50 to 80 percent.....	55	50	45	50
More than 80 percent.....	40	30	40	30

Vegetation

Most of Lafayette County is in the Central Hardwood Forest region of the United States. Some of it, however, is in the prairie area that extends northward from Illinois. The county lies within an area, called a tension zone, in which minor changes in climate may cause changes in the vegetation. For example, if the climate be-

comes cooler or wetter than it is at the present time, the forests will encroach upon the prairie areas. But, if the climate becomes drier and warmer, the grasses will encroach upon the forests.

Originally, much of the county had a thin cover of forest that included small areas of dense underbrush. The timber was mostly on the more rolling and steeper areas and consisted of black, red, and bur oaks. About one-third of the county was covered by prairie. The prairie areas were generally nearly level to sloping. The general distribution of prairie and forest soils in the county is shown in figure 7.

Today, nearly all of the land that is accessible and suitable for crops is used for that purpose or is pastured. The acreage in woodland is small. If cleared, some of the wooded areas could be used for crops, but the steeper areas are best suited to timber or to pasture.

The forests probably were encroaching upon the prairies when settlers came into the area. Evidence of such

TABLE 4.—Probabilities of last freezing temperatures in spring and first in fall

Probability	Dates for given probability and temperature				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
2 years in 10 later than.....	Apr. 4.....	Apr. 15.....	Apr. 29.....	May 13.....	May 22.....
4 years in 10 later than.....	Mar. 27.....	Apr. 8.....	Apr. 21.....	May 5.....	May 15.....
6 years in 10 later than.....	Mar. 21.....	Apr. 1.....	Apr. 15.....	Apr. 29.....	May 9.....
8 years in 10 later than.....	Mar. 14.....	Mar. 24.....	Apr. 7.....	Apr. 22.....	May 3.....
Fall:					
2 years in 10 earlier than.....	Oct. 31.....	Oct. 21.....	Oct. 9.....	Sept. 28.....	Sept. 19.....
4 years in 10 earlier than.....	Nov. 8.....	Oct. 29.....	Oct. 16.....	Oct. 6.....	Sept. 26.....
6 years in 10 earlier than.....	Nov. 15.....	Nov. 4.....	Oct. 23.....	Oct. 12.....	Oct. 2.....
8 years in 10 earlier than.....	Nov. 23.....	Nov. 12.....	Oct. 31.....	Oct. 20.....	Oct. 8.....

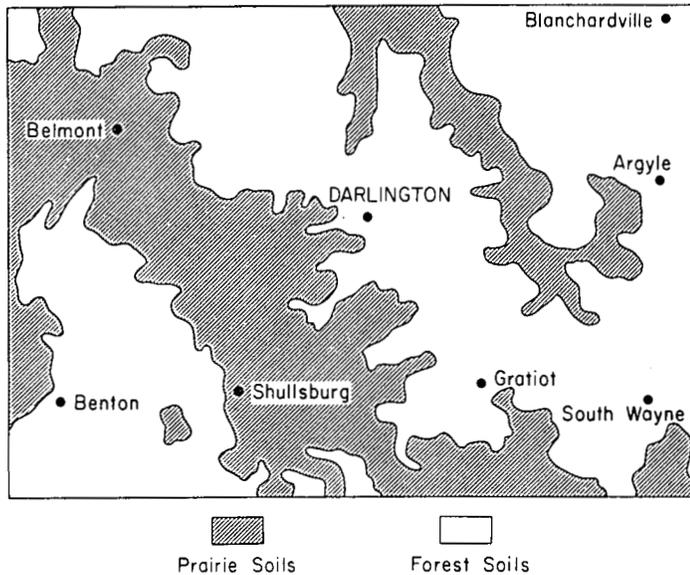


Figure 7.—Distribution of prairie and forest soils in Lafayette County, Wis.

extension can be seen in woodlands of oak and hickory that still have an understory of prairie plants and in the isolated prairie areas that are surrounded by forests. The rate at which the forests encroached probably was slowed by the Indians who burned the trees so they could have open areas for their campsites and fields.

How This Soil Survey Was Made

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

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

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, 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 described and mapped. Fayette and Gale, for example, are the names of two soil series. All the soils in the United States having the same series name

are essentially alike in those characteristics that go with their behavior in the natural landscape. Soils of one series can differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

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

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases. The name of a soil phase indicates a feature that affects management. For example, Northfield sandy loam, 2 to 6 percent slopes, moderately eroded, is one of several phases of Northfield sandy loam, a soil type that ranges from nearly level to steep.

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 greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientists find that the differences between two or more soils are sometimes too small to be shown separately on the map. Therefore, the soils are shown as one mapping unit or as an undifferentiated group, even though the soils are not regularly associated geographically. The unit is named for the major soil series and land types in it, for example, Fayette and Dubuque soils and Pits. Also, on most soil maps, areas are shown that are so rocky, so shallow, or so frequently worked by wind and water that they scarcely can be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Stony and rocky land, steep, and are called land types rather than soils.

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

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different

groups of readers, among them farmers, ranchers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil survey reports. On the basis of the yield and practice tables and other data, the soil scientists set up trial groups, and test them by further study and by consultation with farmers, agronomists, engineers, and others. Then, the scientists adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

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

The soils within any one association are likely to differ in some or in many properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general soil map shows, not the kind of soil at any particular place, but several distinct patterns of soils. Each pattern furthermore contains several kinds of soils.

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

The general soil map is useful to people who want a general idea of the soils, who want to compare different parts of a county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use. It is not detailed enough to permit planning for use of the soils on an individual farm. However, the general soil map is helpful for planning, on a county-wide basis, many agricultural programs, rural and urban projects, highway locations, recreational developments, and programs for the use and conservation of water. The soil associations in Lafayette County are discussed in the pages that follow.

1. Tama-Ashdale Association: Dark-colored, Deep Soils of the Limestone Uplands

This soil association consists of dark-colored, deep, and silty soils underlain by limestone. These soils are mostly on broad ridgetops and adjoining side slopes in the uplands, but some areas are on narrow bottom lands. This association makes up about 30 percent of the county.

The Tama soils, on ridges one-half mile to 1 mile wide, and the Ashdale soils, on adjoining side slopes, are the dominant soils in this association. Typically, slopes are long and gentle. Narrow areas on bottom lands within the association are occupied by the Worthen, Huntsville, and Lawson soils.

The Tama soils formed in wind-laid silt more than 50 inches thick, and the Ashdale soils formed in like mate-

rial 30 to 50 inches thick. Depth to the underlying limestone is more than 6 feet in the Tama soils, but it is between 4 and 6 feet in the Ashdale. A layer of red clay weathered from the limestone occurs in the lower subsoil of the Ashdale soils.

The Worthen, Huntsville, and Lawson soils are minor soils in this association that formed in silty sediments deposited by water.

The soils in this association are among the best in the county for agriculture. Erosion is the main hazard, and the soils are slightly eroded to moderately eroded. Practices generally needed are those that help control erosion and conserve water. Dairy farming and the raising of hogs are the main enterprises.

2. Dodgeville-Sogn Association: Dark-colored, Moderately Deep to Shallow Soils of the Limestone Uplands

This soil association is made up of dark-colored, moderately deep to shallow, gently sloping to steep soils underlain by limestone. The areas are on ridges and side slopes in the eastern part of the county. These soils formed under prairie grasses in wind-laid silt that is underlain by limestone or red clay. This association makes up about 4 percent of the county.

Dominant in this association are the Dodgeville and Sogn soils, but minor areas are occupied by Edmund soils. Dodgeville soils, the most extensive in this association, occupy the less sloping ridgetops and side slopes. They formed in silt, 15 to 30 inches thick, underlain by red clay weathered from limestone. The minor areas of Edmund soils formed in like material less than 15 inches thick over red clay.

The Sogn soils occupy small, scattered areas on steep side slopes that border stream valleys. In these soils depth to limestone is less than 12 inches. Sogn soils are very droughty, lack space for development of roots, are stony in many places, and locally have outcrops of bedrock.

If protected from erosion and otherwise well managed, areas of the Dodgeville soils are suited to cultivation. The Sogn soils, however, are too shallow and steep for cultivated crops. Consequently, most areas of the Sogn soils are in pasture or woodland. The wooded areas generally are unproductive and yield only small quantities of low-grade timber.

Erosion is moderate or severe on much of the cleared land in this association. Practices are needed that help prevent further erosion and that conserve water. Dairy farming is the principal use.

3. Fayette-Palsgrove Association: Light-colored, Deep Soils of the Limestone Uplands

This soil association consists of light-colored, deep soils. These soils are mostly on gently sloping, broad to narrow ridgetops and moderately steep to steep side slopes, but some are on narrow bottom lands. This association is chiefly in the southwestern part of the county. The soils formed mainly in wind-laid silt underlain by limestone. Many small piles of waste from lead and zinc mines are on the soils. The piles consist of gravelly and stony material

and range from 2 to 20 acres in size. This soil association covers about 9 percent of the county.

Dominant in this association are the Fayette and Palsgrove soils. Fayette soils, the most extensive, are on the gently sloping, broad ridgetops and moderately steep side slopes. Palsgrove soils are on the more sloping, narrower ridgetops and steep side slopes. Narrow areas on bottom lands are occupied by the Arenzville and the Orion soils.

Fayette soils formed in wind-laid silt more than 50 inches thick, and the Palsgrove soils in like material 30 to 50 inches thick. Depth to the underlying limestone is more than 6 feet in the Fayette soils, but it ranges from 4 to 6 feet in the Palsgrove soils. A layer of red clay weathered from the limestone is in the lower part of the subsoil of the Palsgrove soils.

The Arenzville and Orion soils, minor soils in this association, consist of light-colored, silty material deposited recently by water over darker colored, silty material. Areas of these soils are subject to flooding.

Much of this association is cultivated intensively because the soils are among the best for agriculture in the county. Generally, practices that control erosion and conserve water are needed. The Fayette soils are better suited to cultivation than the Palsgrove soils. The Palsgrove soils are steeper than the Fayette and are more subject to erosion. Nevertheless, if the less steeply sloping areas of Palsgrove soils are protected from erosion and are otherwise well managed, they are very productive. Steep areas are best suited to forage crops or to trees.

4. Dubuque-Sogn Association: Light-colored, Moderately Deep Soils and Dark-colored, Shallow Soils of the Limestone Uplands

The soils in this association are light-colored and moderately deep to shallow over limestone. These soils are mostly on ridges in the northern and eastern parts of the county (fig. 8). A small acreage is on narrow bottom lands of streams. The ridgetops in this association are



Figure 8.—Typical landscape in the Dubuque-Sogn association. Dubuque soils occupy the less sloping areas, and the Sogn soils are on the steep side slopes that border the stream valleys.

narrower than those in the Fayette-Palsgrove association, and the slopes are steeper. Originally, the vegetation consisted of various kinds of hardwoods. This association makes up about 50 percent of the county.

Dominant in this association are the Dubuque and Sogn soils, but minor areas are occupied by the Dunbarton soils. Dubuque soils, the most extensive, are on the gently sloping to sloping ridgetops and moderately steep to steep side slopes. These soils formed in wind-laid silt 15 to 30 inches thick over red, clayey material; depth to limestone bedrock ranges from 18 to 36 inches. The minor areas of Dunbarton soils are on steeper slopes, where the silty material is less than 15 inches thick and bedrock is at a depth of less than 24 inches.

The Sogn soils are in small, scattered areas on steep side slopes that border stream valleys. In these soils depth to limestone is less than 12 inches. Sogn soils are very droughty, lack space for development of roots, and are stony in many places.

Narrow stream valleys, too small to be shown on the general soil map, occur throughout this association. The soils in these valleys are discussed in the Arenzville-Huntsville-Sable, benches, association.

Most areas of the Dubuque and Dunbarton soils have been cleared and are suited to cultivation if they are protected from erosion and are otherwise well managed. Steep areas of these soils are better suited to forage crops or to trees than to cultivated crops. The Sogn soils have severe limitations for cultivated crops and are in pasture or woodland. The wooded areas generally are unproductive and yield only small amounts of low-grade timber.

Drainage generally is not a serious problem on soils in this association, but practices that control erosion are needed. Erosion is moderate or severe on much of the cleared land. Many of the soils are moderately shallow or shallow to bedrock and have moderately low water-holding capacity. Conservation of water is therefore important. In many places nearness of bedrock to the surface and steep slopes prevent construction of diversion terraces. Contour farming, stripcropping, and other such practices should be used to control erosion and to conserve water.

5. Tama-Muscatine-Sable Association: Dark-colored, Deep Soils of the Shale Uplands

In this association are dark-colored, deep, nearly level to sloping soils underlain by limestone or shale. These soils are on broad ridgetops southeast of Shullsburg and near the Platte Mounds. They formed under prairie grasses in 4 feet or more of wind-laid silt. Depth to bedrock ranges from 4 to 10 feet. This soil association covers about 1 percent of the county.

The Tama, Muscatine, and Sable soils are dominant in this association (fig. 9). Tama soils, which occupy the more sloping areas, do not require drainage but are likely to erode if cultivated. The Muscatine soils are somewhat poorly drained, and the Sable soils are poorly drained. Water moves slowly through these soils because they are underlain by impervious shale.

All of the soils in this association are high in fertility and organic matter. The Muscatine and Sable soils, however, require drainage in most places, but if drained and otherwise well managed, they are highly productive.



Figure 9.—A view of the Tama-Muscatine-Sable association, south of Gratiot. In many places in this association, impeded drainage is a problem.

The soils in this association respond readily to good management. They are cropped intensively, and much of the acreage is planted to corn.

6. Schapville-Calamine Association: Dark-colored, Moderately Deep to Shallow Soils of the Shale Uplands

This soil association consists of dark-colored, moderately deep to shallow soils underlain by shale. These soils are on ridgetops and steep slopes and in flat or depressed areas south of Shullsburg and in the Platte Mounds area. They formed under prairie grasses in wind-laid silt 15 to 50 inches thick over shale bedrock. The soils all have yellowish clay, weathered from the shale, in the lower part of the subsoil. This association occupies about 1 percent of the county.

Dominant in the association are the Schapville and Calamine soils, but minor areas are occupied by the Keltner soils. Schapville soils, on the steep slopes, formed in silty material less than 30 inches thick and are well drained to moderately well drained. The minor Keltner soils are on the ridgetops where the mantle of silt is 30 to 50 inches thick.

The wet subsoil variant from the Schapville series and the soils of the Calamine series have slopes from 0 to 6 percent. They are somewhat poorly drained and poorly drained, respectively. Internal drainage is moderately slow to slow in these soils because the underlying clay and shale bedrock is impervious. Surface drainage is also restricted in places in flat or depressed areas.

Practices that control runoff and erosion and that improve internal drainage are needed. The more sloping Schapville soils, especially in cultivated areas where erosion is moderate to severe, require protection from erosion. Soils in low areas and on seepage slopes need artificial drainage. In some places, particularly on steep seepage slopes, nearness of shale bedrock to the surface prevents use of tile for drainage and hinders construction of diversion terraces.

Except for the steep, shallow, or undrained soils, the soils in this association are suited to farming. Most farms

have some soils that are too steep, too shallow, or too wet for row crops. These areas are best suited to permanent pasture or to forage crops. Dairy farming is the main enterprise.

7. Derinda-Calamine Association: Light-colored, Moderately Deep to Shallow Soils of the Shale Uplands

In this soil association are light-colored, moderately deep to shallow soils underlain by shale. These soils are on ridgetops and steep slopes or are on level to gently sloping low areas. The areas are south of Shullsburg and near the Platte Mounds. The soils formed under various kinds of hardwoods in wind-laid silt 15 to 50 inches thick over shale bedrock. All of the soils have yellowish clay, weathered from the shale, in the lower part of the subsoil. This association makes up about 1 percent of the county.

Dominant in this association are the Derinda and Calamine soils, but minor areas are occupied by the Eleroy soils. Derinda soils, on the gently sloping to moderately steep side slopes, formed in silty material less than 30 inches thick and are well drained to moderately well drained. The minor Eleroy soils are on the ridgetops where the mantle of silt is 30 to 50 inches thick. The wet subsoil variant from the Derinda series and the poorly drained Calamine soils occupy level to gently sloping low areas and steep areas on seepage slopes.

Internal drainage is moderately slow to slow in these soils because the underlying clay and the shale bedrock are impervious. Surface drainage also is restricted in places in flat or depressed areas.

Practices that control runoff and erosion and that improve drainage are needed. Erosion is moderate to severe in cultivated areas, and protection from erosion is needed, especially on the more sloping soils. Soils in low areas and on seepage slopes generally require artificial drainage. In some places, particularly on seepage slopes, nearness of shale bedrock to the surface prevents use of tile for drainage and hinders construction of diversions.

The soils in most of this association are suited to cultivated crops if practices are applied to control erosion and if artificial drainage is provided. Most farms, however, have some soils that are too steep, too shallow, or too wet for row crops. These areas are best suited to permanent pasture or to forage crops. Small wooded areas are common on many farms, but the quality of the trees generally is poor and yields are low.

8. Hixton-Northfield-Stony and Rocky Land Association: Light-colored, Moderately Deep to Shallow Soils of Valley Slopes and Sandstone Uplands

This soil association consists mainly of light-colored, moderately deep to shallow soils and of Stony and rocky land. The areas are mostly on steep side slopes along the Pecatonica River between Blanchardville and South Wayne. This association makes up about 1 percent of the county.

Soils of the Hixton and Northfield series and areas of Stony and rocky land are dominant in this association.

Minor areas consist of Fayette soils on valley slopes and of soils of the Lindstrom, Gale, and Boone series.

The Hixton and Northfield soils are near each other and formed in material from sandstone. Hixton soils, however, are less sloping than the Northfield and are deeper to sandstone bedrock. Depth to bedrock ranges from 24 to 42 inches in the Hixton soils, but it is less than 24 inches in the Northfield soils. Northfield soils are moderately low in moisture-supplying capacity and are stony in many places. In places small areas of the minor Boone soils occur near the Hixton and Northfield soils. Boone soils consist mainly of loose sand, and the areas have many outcrops of sandstone.

Areas of Stony and rocky land are on the steeper slopes in this soil association where the soil material is thin and outcrops of sandstone are common. Most areas have a thin cover of hardwood trees.

Below areas of Stony and rocky land are the minor Fayette valley soils and Lindstrom soils. These soils formed in silt more than 42 inches thick, but the surface layer of the Fayette, valleys, is light colored and that of the Lindstrom is dark colored. These soils are similar to the Fayette, uplands, and to the Tama soils on ridgetops, but they are less well developed and in places contain coarse-textured material. Also, there are boulders in or on the surface in a few places.

The minor Gale soils are on the less sloping areas in this association. They formed in wind-laid silt, 24 to 42 inches thick, and are underlain by sandstone bedrock or by sand weathered from the sandstone.

Most soils in this association are shallow or moderately deep to bedrock and have moderately low to low moisture-storage capacity. Practices that control erosion are needed, but drainage generally is not a serious problem. In many areas steep slopes and nearness of bedrock to the surface hinder construction of diversion terraces. Contour farming, stripcropping, or other such practices should be used to control erosion and to conserve water.

Most of this association is poorly suited to cultivated crops because the soils are too shallow to bedrock, too sandy, or too steep. Consequently, the areas are best suited to permanent pasture, to forage crops, or to use as woodland.

9. Arenzville-Huntsville-Sable, Benches, Association: Soils of Stream Bottoms and Benches

This association consists of nearly level soils on bottom lands and of gently sloping soils on terraces. These soils are along the Pecatonica and Galena Rivers and their tributaries. This association makes up about 3 percent of the county.

Dominant in this association are the Arenzville and Huntsville soils and the Sable soils on benches. Minor areas of other soils are also included.

The principal soils along the stream bottoms are the Arenzville, Huntsville, Orion, and Lawson soils on the low bottoms and the Boaz soils and Sable, benches, on slightly higher bottoms. Also included are a few small areas of Houghton mucky peat along seepage slopes. All of these soils are subject to flooding and generally have a high water table.

Of the soils on low bottoms, the Arenzville and Huntsville soils are moderately well drained, but the minor

Orion and Lawson soils are somewhat poorly drained. Arenzville and Orion soils consist of light-colored, silty alluvium over dark-colored silty alluvium, and the Huntsville and Lawson soils consist of deep, dark-colored, silty alluvium. The soils on slightly higher bottoms—the poorly drained Sable, benches, and the minor somewhat poorly drained Boaz soils—have better developed subsoils than the soils on low bottoms. Boaz soils are lighter colored than Sable, benches.

The principal soils on terraces are the bench phases of the Fayette, Stronghurst, Tama, and Muscatine soils and the coarser textured Meridian and Dakota soils.

All of the bench soils on terraces formed in silt more than 40 inches thick, and differences between them are mainly in drainage and in color of their surface layer. The well-drained Tama soils and the somewhat poorly drained Muscatine soils have a dark-colored surface layer, and the well-drained Fayette soils and the somewhat poorly drained Stronghurst soils have a light-colored surface layer.

The Meridian and Dakota soils, also on terraces, have moderately well developed, loamy subsoils underlain by loose sand at a depth between 24 and 36 inches. Dakota soils formed under prairie grasses and are dark colored, but the Meridian soils formed under various kinds of hardwoods and are light colored.

The soils along the stream bottoms require drainage and protection from flooding. The water table is at or near the surface in many places, and the areas are flooded periodically. The soils can be cultivated only if natural drainage is good or if the areas have been drained artificially. Wet areas and areas subject to frequent flooding are best suited to pasture, timber, and wildlife.

Generally, on the terraces, drainage is not needed and flooding is not a hazard. In places, however, the soils are subject to slight or moderate erosion and lack of moisture is a problem. The deep, silty terrace soils have high moisture-supplying capacity and are well suited to cultivation. The moderately deep, loamy soils also are well suited to cultivation, but in places yields are lowered somewhat by lack of moisture.

Use and Management of the Soils

This section first explains the system of capability classification used by the Soil Conservation Service. Next the basic practices of management that apply to all of the soils are summarized. Then management of soils by capability units is discussed. Following this are estimated average yields of principal crops and information about the management of the soils for woodland and for engineering.

Capability Groups of Soils

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

In this system all the kinds of soils are grouped at three levels, the capability class, subclass, and unit. The eight capability classes in the broadest grouping are designated

by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

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

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

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about the management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIe-2.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations. The grouping does not take into consideration major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil. It also does not take into consideration possible but unlikely major reclamation projects.

The capability classes, subclasses, and units in which the soils of Lafayette County are classified are defined in the listing that follows. The soils were assigned to capability units on a statewide basis. Because not all of the capability units in the State are represented in this county, the numbering of the units is not consecutive. For example, no soils of capability unit IIIe-5 have been recognized in Lafayette County; therefore, this capability unit is not discussed in this report.

Class I. Soils that have a few limitations that restrict their use. (No subclasses)

Unit I-1. Deep, well-drained to somewhat poorly drained, nearly level soils.

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

Subclass IIe. Soils subject to moderate erosion if they are not protected.

Unit IIe-1. Deep, well drained and moderately well drained, gently sloping soils.

Unit IIe-2. Moderately deep, well-drained, gently sloping soils underlain by sand, sandstone, or limestone.

Unit IIe-5. Deep, well drained to moderately well drained, gently sloping soils developed in local silty alluvium.

Unit IIe-6. Moderately deep, well drained to moderately well drained, gently sloping soils underlain by shale.

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

Unit IIw-1. Deep, poorly drained, nearly level soils.

Unit IIw-2. Deep, somewhat poorly drained, nearly level to gently sloping soils.

Unit IIw-3. Moderately deep, somewhat poorly drained, gently sloping soils underlain by shale bedrock.

Unit IIw-5. Moderately deep, somewhat poorly drained and poorly drained, nearly level to gently sloping soils underlain by loose sand and gravel.

Unit IIw-11. Deep, moderately well drained to well drained, nearly level to gently sloping soils that are subject to occasional flooding.

Unit IIw-13. Deep, somewhat poorly drained, nearly level soils on bottom lands; generally subject to flooding.

Subclass IIc. Soils that have moderate limitations of moisture capacity, tilth, or rooting zone.

Unit IIc-1. Moderately deep, well-drained, nearly level to gently sloping soils underlain by loose sand.

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

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

Unit IIIe-1. Deep, well drained and moderately well drained, sloping soils.

Unit IIIe-2. Moderately deep, well-drained, sloping soils underlain by loose sand, clay, or sandstone or limestone bedrock.

Unit IIIe-3. Shallow, well-drained, gently sloping soils underlain by sandstone, shale, or limestone.

Unit IIIe-4. Moderately deep to shallow, well-drained, gently sloping soils underlain by sandstone bedrock or by loose sand and gravel.

Unit IIIe-6. Dominantly moderately deep, moderately well drained to well drained, sloping soils underlain by clayey residuum from shale and by shale bedrock.

Unit IIIe-8. Moderately deep, somewhat poorly drained, sloping soils underlain by shale.

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

Unit IIIw-9. Deep, poorly drained, nearly level organic soils.

Subclass IIIc. Soils that have severe limitations of moisture-supplying capacity, tilth, or rooting zone.

Unit IIIc-2. Moderately deep, well-drained, nearly level soils underlain by loose sand.

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

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

Unit IVe-1. Deep, well-drained, sloping to moderately steep soils on uplands.

Unit IVe-2. Moderately deep, well-drained, sloping to moderately steep soils underlain by loose sand over sandstone or by clay over limestone.

Unit IVe-3. Shallow, well drained to moderately well drained, sloping soils underlain by sandstone or limestone bedrock.

Unit IVe-4. Moderately deep, well-drained, sloping soils underlain by sandstone bedrock.

Unit IVe-6. Moderately deep to deep, moderately well drained to well drained, sloping to moderately steep soils underlain by shale bedrock.

Subclass IVw. Soils that have very severe limitations for cultivation, because of excess wetness.

Unit IVw-3. Moderately deep, poorly drained, nearly level to gently sloping, silty soils underlain by shale bedrock.

Subclass IVs. Soils that have very severe limitations because of low moisture capacity.

Unit IVs-3. Deep, somewhat excessively drained, nearly level to gently sloping soils underlain by loose sand.

Class V. Soils not likely to erode, but with other limitations impractical to remove without major reclamation, that limit their use largely to pasture, to woodland, or to food and cover for wildlife.

Subclass Vw. Soils too wet for cultivation; drainage or protection not feasible.

Unit Vw-14. Deep, poorly drained, nearly level, alluvial soils subject to frequent flooding.

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

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

Unit VIe-1. Deep, well-drained, moderately steep to steep soils underlain by limestone bedrock.

Unit VIe-2. Moderately deep, well-drained, moderately steep to steep soils underlain by loose sand over sandstone or by clay over limestone.

Unit VIe-3. Shallow, well drained, sloping to moderately steep, loamy soils underlain by sandstone or limestone bedrock.

Unit VIe-4. Moderately deep, well-drained, moderately steep soils underlain by sandstone bedrock.

Unit VIe-6. Moderately deep, well drained to moderately well drained soils underlain by shale bedrock.

Unit VIe-9. Deep, somewhat excessively drained, sloping to steep soils underlain by loose, sandy outwash.

Subclass VIi. Soils generally unsuitable for cultivation and limited for other uses by their moisture-supplying capacity, stones, or other features.

Unit VIi-5. Very shallow, excessively drained, gently sloping to steep soils underlain by limestone bedrock.

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

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

Unit VIIe-2. Moderately deep, well-drained, very steep soils underlain by clay over limestone bedrock.

Unit VIIe-3. Shallow, well-drained to somewhat excessively drained, steep to very steep soils underlain by sandstone or limestone bedrock.

Unit VIIe-4. Moderately deep, well drained, moderately steep to steep soils underlain by sandstone bedrock.

Subclass VIIi. Soils very severely limited by moisture-supplying capacity, stones, or other soil features.

Unit VIIi-5. Very shallow, well-drained to excessively drained, steep to very steep soils that have many outcrops of sandstone and limestone.

Unit VIIi-9. Deep, excessively drained, sloping to steep soils.

Class VIII. Soils and landforms that, without major reclamation, have limitations that preclude their use for growing plants commercially and that restrict their use to recreation, wildlife, water supply, or esthetic purposes.

Subclass VIIIw. Extremely wet or marshy land.

Unit VIIIw-15. Marshy areas that are flooded most of the time.

Subclass VIIIi. Gravelly or stony materials that have little potential for growing plants.

Unit VIIIi-10. Mine pits and dumps.

Basic Practices of Soil Management

In the following pages basic practices of management suitable for all of the soils of Lafayette County are discussed. In addition to these general practices, however, the farmer will also need to take into account all of the resources available on his particular farm. Besides the soils, he needs to take into account the livestock, machinery, and other equipment he owns, and the labor and capital available.

Most of the soils in the county require practices that prevent erosion. Therefore, the farmer will need to know what kinds of crops to grow to protect his soils and what kind of cropping system to choose. He must decide what kinds of practices—terracing, stripcropping, using grassed waterways, or tilling on the contour—he will need to use to protect his soils. In addition, he must determine whether his soils should be used for crops or whether they should be kept under a protective cover of grass or trees. Practices that fit all the soils that are

suitable for crops, pasture, trees, or wildlife are summarized in the paragraphs that follow and are to be considered along with the practices suggested in each capability unit.

CROPPING SYSTEMS

1. Choose a cropping system in which crops that add organic matter to the soils and improve tilth are grown at least part of the time. Plowing under a crop for green manure or plowing under crop residues also adds organic matter and improves tilth.

2. Include close-growing crops, such as small grains, legumes, and grasses, in the cropping system to help protect the soils from erosion.

TILLED CROPS

1. Apply lime and fertilizer in the amounts indicated by soil tests and field trials. Generally, supplemental applications of nitrogen are required on most soils for corn grown after a nonleguminous crop.

2. Return crop residues to the soil and add barnyard manure and green manure to supply fresh organic matter and improve soil tilth.

3. Dispose of excess water by building new waterways or reshaping old ones where necessary. Reseed and maintain the waterways to keep them working well.

4. Seed headlands (areas at the edges of fields in which to turn machinery) and keep them in grass.

5. Cultivate only enough to prepare the seedbed and to control weeds. Do not cultivate if the soil is wet, or it may puddle.

PASTURE RENOVATION

1. Test the soil to determine the need for lime and fertilizer.

2. Apply lime 6 months before seeding.

3. If feasible, remove stones, stumps, and other obstructions that interfere with the use of farm equipment.

4. Prepare a good seedbed:

- (a) Plow the gently sloping soils on the contour.
- (b) Work the more sloping soils so as to leave a mulch on the surface, but do not plow. Start preparing the seedbed in mid summer or early fall before the date of seeding by destroying the weeds through cultivation, spraying, or both.

5. Reseed:

- (a) Use legumes and grasses that are best suited to the soils and that are productive at the season when pasture is needed.
- (b) Inoculate the legumes.
- (c) Seed the pasture mixture with a companion crop that will help control erosion; use no more than 1 bushel of oats per acre.
- (d) Cover seed lightly and use a cultipacker seeder or similar implement that will put seed at the proper depth. If seed is broadcast, a cultipacker will help cover the seed and firm the seedbed.
- (e) Apply phosphate and potash at the time of seeding. If fertilizer is broadcast, work it into the soil before seeding. Band seeding (drilling the fertilizer in a band 1 inch be-

low the seed of the grass or legume) helps get the stand of pasture plants established.

- (f) Keep the companion crop from competing too strongly with the young forage plants by pasturing it when the plants are 8 inches high.

PASTURE IMPROVEMENT AND MAINTENANCE

1. Control grazing:

- (a) Avoid overgrazing throughout the season.
- (b) Delay grazing in spring until the ground is firm and growth is well started.
- (c) Do not graze pastures for 1 month before the first hard frost in fall (normally, September 30). Provide this protection every year if the pasture contains alfalfa, and at least every other year if the pasture is grass.
- (d) Divide the pasture into three or more parts, and rotate grazing. This gives the plants a chance to recover and prolongs the life of legumes and grasses.

2. Control weeds and brush:

- (a) Mow weeds before they set seed.
- (b) Control weeds and brush by spraying where it is more economical and effective than mowing.

3. Topdress with lime and fertilizer:

- (a) Lime acid soils to encourage legumes that will furnish nitrogen for the grasses in the pasture mixture.
- (b) Test the soils and apply phosphate and potash to increase yields.
- (c) Apply nitrogen to grass in spring if early grazing is desired. If enough moisture is available, nitrogen increases the total yield of grasses and improves its protein content. Applying nitrogen repeatedly tends to encourage the grasses and forces the legumes out of the pasture mixture.

WOODLAND

Management and improvement:

1. Protect wooded areas from grazing and trampling by livestock.
2. Prevent fires.
3. Remove cull and weed trees.
4. Practice selective cutting to favor the more desirable kinds of trees.

WILDLIFE AREAS

1. Do not burn fence rows, roadsides, odd areas, or sloughs.
2. On upland soils plant low-growing shrubs along permanent fences, and maintain existing shrubs.
3. Improve for wildlife all abandoned land, odd corners of fields, and idle areas. For best results, areas need to be at least one-fourth acre in size. Keep livestock out of these areas.
4. On upland soils plant and maintain evergreens and shrubs in a rod-wide border between woods and fields.
5. Do not drain ponds and depressed areas that are suitable for wildlife.
6. Improve marshy areas by providing level ditches or by otherwise controlling the level of the water.

DRAINAGE

1. Use surface and tile drains to improve soils that normally are wet.

2. For wet soils that cannot be tilled or ditched, choose crops that tolerate wetness and add adequate amounts of fertilizer.

Management by Capability Units

Soils in one capability unit have about the same limitations and similar risks of damage. The soils in one unit, therefore, need about the same kind of management, though they may have formed from different kinds of parent material and in different ways. The capability units are described in the following pages. The soils in each unit are listed, and management suitable for all the soils of one unit is suggested.

Capability unit I-1

The soils in this unit are deep, well drained to somewhat poorly drained, and nearly level. They are moderately permeable, have high moisture-supplying capacity, and are moderate to high in fertility. These soils are easy to manage and are easy to keep in good tilth. The following soils are in this unit:

Chaseburg silt loam, 0 to 2 percent slopes.
 Muscatine silt loam, 0 to 2 percent slopes.
 Muscatine silt loam, benches, 0 to 2 percent slopes.
 Rozetta silt loam, benches, 0 to 2 percent slopes.
 Tama silt loam, 0 to 2 percent slopes.
 Tama silt loam, benches, 0 to 2 percent slopes.
 Worthen silt loam, 0 to 2 percent slopes.

If fertility is kept high, these soils can be used intensively for corn, small grain, and forage crops and for the special crops commonly grown. The soils are also well suited to trees and for use as wildlife habitats. The dark-colored soils in this unit contain more organic matter, are more permeable, and are easier to keep in good tilth than the light-colored soils.

Suitable cropping systems are—

- 2 years of row crops and 1 year of a small grain and hay.
- 3 years of row crops, 1 year of a small grain, and 2 years of hay.

Row crops can be grown continuously if all crop residues are returned to the soil, minimum tillage is used, fertility is kept high, and good tilth is maintained.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion or leaching and thus maintains high yields. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown. For legumes, the lime should be applied before a row crop is seeded and a year or more before the legume is seeded. These soils also need practices that maintain their content of organic matter and promote good soil structure.

In many areas of the somewhat poorly drained Muscatine soils, tile drains and shallow surface drains would improve drainage and permit earlier use of those soils in spring.

Capability unit II-1

In this unit are deep, well drained and moderately well drained, gently sloping soils. These soils are moderately permeable, have high moisture-supplying capacity, and are moderate to high in fertility. Good tilth is fairly easy to maintain. The following soils are in this unit:

Ashdale silt loam, 2 to 6 percent slopes.
 Ashdale silt loam, 2 to 6 percent slopes, moderately eroded.
 Downs silt loam, 2 to 6 percent slopes, moderately eroded.
 Fayette silt loam, benches, 2 to 6 percent slopes.
 Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded.
 Fayette silt loam, uplands, 2 to 6 percent slopes.
 Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.
 Fayette silt loam, valleys, 2 to 6 percent slopes.
 Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded.
 Fayette and Dubuque soils and Pits, gently sloping, eroded (Fayette part only).
 Lindstrom silt loam, 2 to 6 percent slopes.
 Muscatine silt loam, 2 to 6 percent slopes.
 Muscatine silt loam, 2 to 6 percent slopes, moderately eroded.
 Muscatine silt loam, benches, 2 to 6 percent slopes.
 Palsgrove silt loam, 2 to 6 percent slopes.
 Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded.
 Rozetta silt loam, benches, 2 to 6 percent slopes.
 Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded.
 Tama silt loam, 2 to 6 percent slopes.
 Tama silt loam, 2 to 6 percent slopes, moderately eroded.
 Tama silt loam, benches, 2 to 6 percent slopes.

These soils are suited to corn, small grains, grasses, and legumes. They are also suitable for use as permanent pasture, woodland, or wildlife habitats. The dark-colored soils contain more organic matter, are more permeable, and are easier to keep in good tilth than the light-colored.

If these soils are cultivated, they are subject to water erosion. Practices are needed that protect them from erosion and that maintain supplies of plant nutrients and organic matter.

Suitable combinations of conservation practices and cropping systems are—

- Contour stripcropping: 2 years of row crops, 1 year of a small grain, and 2 years of hay.
- Terracing: 3 years of row crops, 1 year of a small grain, and 1 year of hay.

If no special management practices are used, a suitable cropping system is 1 year each of a row crop and a small grain and 2 or 3 years of hay. If wheel-track planting or similar special management is used, a row crop could be grown 1 more year in the rotation or hay could be grown 1 year less.

If row crops are grown, tilling on the contour, growing cover crops in winter, returning crop residues to the soil, and using terraces on long, regular slopes are practices that help to control erosion and permit more intensive cropping. Diversions can be used to remove runoff from adjacent higher areas. If properly designed grassed waterways are installed, excess water is removed and gullies are prevented. In a few seepage areas along grassed waterways, tile drains are required. A cropping system that includes several years of meadow crops also helps to reduce erosion.

If hybrid corn is grown and large amounts of fertilizer are applied, yields are high and large amounts of residue are produced. After harvesting the corn, the stalks can be

shredded and spread over the soil and thus provide protection from erosion during winter and spring. When plowed under, the stalks help maintain the content of organic matter and promote good soil structure.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion and leaching. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown.

Capability unit IIe-2

The soils in this unit are moderately deep, well-drained, and gently sloping. They are underlain by sand, sandstone, or limestone. These soils are slightly droughty and are likely to erode unless protected. The following soils are in this unit:

- Dakota loam, 2 to 6 percent slopes.
- Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded.
- Dubuque silt loam, 2 to 6 percent slopes.
- Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.
- Fayette and Dubuque soils and Pits, gently sloping, eroded (Dubuque part only).
- Hixton loam, 2 to 6 percent slopes, eroded.
- Meridian loam, 2 to 6 percent slopes.
- Mifflin soils, 2 to 6 percent slopes, eroded.

These soils are used principally for corn, small grains, grasses, and legumes. A few areas are used for permanent pasture, as woodland, or as wildlife habitats.

If these soils are used for cultivated crops, practices are required that control erosion. Yields are moderately high if the soils are well managed. On long slopes, terraces or diversions should be used. If intensive practices are used to control erosion, more cultivated crops can be used in the cropping system than if such practices are not used.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 2 years of row crops, 1 year of a small grain, and 2 years of hay.

Terracing: 3 years of row crops, 1 year of a small grain, and 1 year of hay.

If no conservation practices are used, suitable cropping systems are 1 year each of a row crop and a small grain and 3 years of hay on slopes less than 200 feet long or 4 years of hay on slopes up to 300 feet long.

Crops on these soils respond if lime and fertilizer are added in amounts indicated by soil tests. Soils that are cropped intensively require regular applications of lime.

Capability unit IIe-5

This unit consists of deep, well drained to moderately well drained, gently sloping soils. These soils developed in local silty alluvium along upland drainageways, on lower slopes, and in fan-shaped areas on valley slopes and on bottom lands. They are moderately permeable and have high moisture-supplying capacity. These soils are subject to slight erosion. They are likely to be flooded occasionally for short periods. The following soils are in this unit:

- Chaseburg silt loam, 2 to 6 percent slopes.
- Worthen silt loam, 2 to 6 percent slopes.

These soils are well suited to corn, small grains, grasses, and legumes if they are protected from runoff. The fre-

quency of flooding is more severe in some areas than in others, and the need for protection from flooding therefore varies. Areas that are not easily accessible or that are flooded frequently are best suited to permanent pasture, to trees, or to use as wildlife areas.

Diversions are needed in many places to protect the soils from runoff from higher areas and to obtain good yields. Also, sloping, shaping, and seeding of natural waterways in areas above these soils help to reduce flooding.

A suitable combination of conservation practice and cropping system is—

Contour stripcropping: 2 years of row crops, 1 year of a small grain, and 2 years of hay.

If no conservation practices are used, a suitable cropping system is 1 year each of a row crop and a small grain and 2 years of hay. Areas that are too small or odd in shape for contour stripcropping can be planted on the contour in places. If wheel-track planting or similar special management is used, a row crop can be grown 1 more year in the rotation, or hay can be grown 1 year less.

Capability unit IIe-6

This unit consists of moderately deep, well drained to moderately well drained, gently sloping soils on uplands. These soils are underlain by clayey shale residuum and shale bedrock. They have moderately high to high moisture-supplying capacity. Water moves slowly through these soils because of the moderately slow to slow permeability of the underlying material, and the soils therefore are slow to warm up and to dry out in spring. These soils are subject to erosion if they are not protected. The following soils are in this unit:

- Derinda silt loam, 2 to 6 percent slopes, moderately eroded.
- Eleroy silt loam, 2 to 6 percent slopes.
- Eleroy silt loam, 2 to 6 percent slopes, moderately eroded.
- Keltner silt loam, 2 to 6 percent slopes.

These soils are used mainly for corn, small grains, and hay, but they can also be used for permanent pasture, woodland, or wildlife. Practices that prevent erosion are needed if the soils are cultivated.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 2 years of row crops followed by 1 year of a small grain and 2 years of hay.

Terracing: 2 years of row crops followed by 1 year of a small grain and 1 or 2 years of hay.

If no conservation practices are used, a suitable cropping system is 1 year each of a row crop and a small grain and 4 years of hay on slopes of more than 200 feet long or 3 years of hay on slopes less than 200 feet long. If wheel-track planting or similar special management is used, a row crop can be grown 1 more year in the rotation, or hay can be grown 1 year less.

Placing guidelines for contour stripcropping on a slight gradient toward the waterways helps to keep the soil from becoming too wet in spring or after a heavy rain.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion and leaching and thus maintains high yields. The kind and amount of fertilizer used

should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown.

Capability unit IIw-1

The soils in this unit are deep, poorly drained, and nearly level. They have a thick, dark-colored surface layer that has a high content of organic matter. Permeability is moderately slow to slow. The water table is at or near the surface, unless these soils have been artificially drained. These soils are high in moisture-supplying capacity and moderately high in fertility. They are subject to flooding. The following soils are in this unit:

Sable silt loam.
Sable silt loam, benches.

If flooding is controlled and if these soils are adequately drained, they are suited to corn, small grains, grasses and legumes. If not adequately drained, the areas should be kept in meadow or pasture. Many areas are in permanent pasture.

In some places surface ditches provide adequate drainage (fig. 10). In other places tile drains, surface ditches, and diversions are needed for adequate drainage. If suitable outlets are available, tile can be used to provide drainage. If tile drains are used, good structure must be maintained so that excess moisture can enter the soil and move down to the tile. Growing grasses and legumes, adding barnyard manure or green manure, and working the soils only when dry enough to prevent puddling help to maintain good structure.

If these soils are adequately drained, a suitable cropping system is—

2 or 3 years of row crops and 1 year each of a small grain and hay.



Figure 10.—Drainage ditch, south of Shullsburg, in Sable silt loam of capability unit IIw-1; the ditch helps to remove excess water from this poorly drained soil.

Row crops can be grown continuously if the content of organic matter is maintained, fertility is kept high, minimum tillage is used, and good tilth is maintained.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion or leaching and thus helps to keep yields high. The kind and amount of fertilizer used should be determined by soil tests.

Capability unit IIw-2

In this unit are deep, somewhat poorly drained, nearly level to gently sloping soils. These are silty soils on stream terraces or on broad ridgetops. They are high in moisture-supplying capacity and moderate in fertility. Permeability is moderately slow. The following soils are in this unit:

Stronghurst silt loam, 0 to 2 percent slopes.
Stronghurst silt loam, 2 to 6 percent slopes.
Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded.
Stronghurst silt loam, benches, 0 to 2 percent slopes.
Stronghurst silt loam, benches, 2 to 6 percent slopes.

If adequately drained, these soils are well suited to corn, small grains, and grasses, and to alfalfa and other legumes. Yields are moderately high. On areas where drainage is somewhat impeded, alsike clover or ladino clover can be grown instead of alfalfa.

Surface drains or tile drains can be used on these soils to provide drainage. In some places surface ditches provide adequate drainage, but in other places surface ditches and tile drains are needed. If tile drains are used, good structure must be maintained so that excess moisture can enter the soil and move down to the tile.

A suitable cropping system for the nearly level soils, if they are adequately drained, is 2 years of row crops, 1 year of grain, and 2 years of hay. The same cropping system is suitable for the gently sloping soils if contour stripcropping is used.

Row crops can be grown continuously on the nearly level soils if the content of organic matter is maintained, fertility is kept high, minimum tillage is used, and good structure and good tilth are maintained. If no special practices are used for the gently sloping soils, a suitable cropping system would be 1 year each of a row crop and a spring grain and 2 or 3 years of hay. In places diversions are needed on these soils to reduce the length of the slope and to remove excess surface water.

Growing grasses and legumes, adding barnyard manure or plowing under green-manure crops, and working the soils only when dry enough to prevent puddling help to maintain good structure and good tilth and thus maintain yields.

Lime and fertilizer are needed on the soils in this unit for high yields. The needs should be determined by soil tests.

Capability unit IIw-3

This unit consists of moderately deep, somewhat poorly drained, gently sloping soils underlain by shale bedrock. These soils are in the uplands. Depth to shale bedrock is between 8 and 42 inches. Water moves slowly through the soils because the underlying clayey shale residuum and shale bedrock are slowly permeable. These soils are moderate in moisture-supplying capacity and fertility. They generally require drainage for best yields. On long

slopes in the steeper areas, the soils are subject to erosion. The following soils are in this unit:

Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes.
Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes.

If adequately drained, these soils are well suited to corn, small grains, grasses, and legumes. In areas that have not been adequately drained, alsike or ladino clover can be grown instead of alfalfa. The Schapville soil has better structure and contains more organic matter than the Derinda soil. Practices are needed that maintain the content of organic matter, keep fertility high, and keep the soils in good tilth. Only minimum tillage should be used.

Surface drains can generally be used on these soils, but in places where bedrock is deep enough that it does not interfere, tile drains can be used. If tile drains are used, good structure must be maintained so that excess moisture can enter the soil and move down to the tile. Diversions are needed on the more sloping areas of these soils to remove surplus water and reduce water erosion.

If these soils are adequately drained, a suitable cropping system is—

2 years of row crops, 1 year of a small grain, and 2 years of hay.

Growing grasses and legumes, adding barnyard manure or plowing under green-manure crops, and working the soils only when dry enough to prevent puddling help to improve permeability and to maintain soil structure. These practices also help to improve tilth and to maintain yields.

Crops on these soils respond if lime and fertilizer are applied in amounts indicated by soil tests. If the soils are cropped intensively, regular applications of lime are needed.

Capability unit IIw-5

This unit consists of moderately deep, somewhat poorly drained and poorly drained, nearly level to gently sloping soils underlain by loose sand and gravel. These soils are on low stream terraces. Depth to loose sand and gravel is between 24 and 42 inches.

These soils are moderately permeable and have high moisture-supplying capacity. Their water table is high, and consequently, the growth of plants is restricted in places. On all of the soils, excess water is the major hazard. The following soils are in this unit:

Dakota loam, mottled subsoil variant, 0 to 3 percent slopes.
Marshan silt loam.

If adequately drained and protected from flooding, these soils are suited to corn, small grains, and grasses and to alfalfa and other legumes. Alsike clover or ladino clover can be grown instead of alfalfa in wetter areas. Areas that are not drained are suitable for producing forage, or they can be used for pasture or wildlife areas.

Generally, open ditches and surface drains can be used to provide drainage; in some areas, however, tile drains can be used if the tiles are adequately blinded. Diversions help to protect the soils from runoff from adjoining higher areas.

If these soils are adequately drained, a suitable cropping system for the nearly level areas is 2 years of row crops, 1 year of small grain, and 1 year of hay.

Row crops can be grown continuously if fertility is kept high, all crop residues are returned to the soils, minimum tillage is used, and soil structure is maintained. Diversions are needed in some areas to intercept and remove runoff from higher areas above.

Crops on soils in this unit require lime and fertilizer for increased yields. The lime and fertilizer should be applied in the amounts indicated by soil tests.

Capability unit IIw-11

This unit consists of deep, moderately well drained to well drained, nearly level to gently sloping soils that are subject to occasional flooding. These soils consist of recent silty alluvium and are on the bottom lands. They have high moisture-supplying capacity, are moderately permeable, and are nearly neutral in reaction. The soils in this unit also are subject to streambank cutting. Gently sloping areas are subject to slight erosion. The following soils are in this unit:

Arenzville silt loam.
Huntsville silt loam, 0 to 2 percent slopes.
Huntsville silt loam, 2 to 6 percent slopes.

If adequately protected from flooding, these soils are well suited to corn, small grains, and legumes. The need for protection from flooding varies because frequency of flooding varies from one area to another. Areas that are somewhat inaccessible or that are flooded frequently are better suited to permanent pasture, to trees, or to wildlife areas than to cultivated crops.

A suitable cropping system for the nearly level areas is 1 year each of a row crop and small grain and 1 or 2 years of hay. For gently sloping areas a similar cropping system can be used, but no less than 2 years of hay should follow the small grain. Row crops can be grown continuously on nearly level areas if the soils are protected from flooding, minimum tillage is used, the organic matter and fertility are kept high, and good soil structure is maintained.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and to maintain high yields. For high yields of corn that is grown continuously, it also is necessary to sidedress with nitrogen.

Capability unit IIw-13

In this unit are deep, somewhat poorly drained, nearly level soils on bottom lands. Lawson and Orion soils consist of recent alluvium, and they are subject to flooding. The Boaz soils, however, are in somewhat higher areas and are flooded only infrequently. They have been in place long enough to form a subsoil that has clearly expressed structure. The following soils are in this unit:

Boaz silt loam.
Lawson silt loam.
Orion silt loam.

If these soils are adequately drained and protected from flooding, they are suited to corn, small grains, and legumes. Yields are moderately high. Generally, drainage can be provided by surface ditches. Areas that are flooded frequently or that are somewhat inaccessible are better suited to permanent pasture, to trees, or to wildlife than to row crops.

If these soils are adequately drained and protected from flooding, a suitable cropping system is—

2 years of row crops followed by 1 year each of a small grain and hay.

Continuous row crops can be grown if all crop residues are returned to the soil, fertility and organic matter are kept high, minimum tillage is used, and good tilth is maintained.

Lime and fertilizer should be applied in amounts indicated by soil tests.

Capability unit II-1

This unit consists of moderately deep, well-drained, nearly level to gently sloping soils. These soils are underlain by loose sand and are therefore slightly droughty. Erosion is generally not a hazard. The following soils are in this unit:

Dakota loam, 0 to 2 percent slopes.
Meridian loam, 0 to 2 percent slopes.

These soils are used mainly for corn, small grains, grasses, and legumes. A few areas are used for permanent pasture, as woodland, or as wildlife habitats. The dark-colored soils have slightly higher moisture-supplying capacity and contain a little more organic matter than the light-colored ones. Also, tilth is easier to maintain.

Because these soils are only moderately deep to sand, practices that conserve moisture are needed. A cropping system that helps maintain a good supply of organic matter also helps to conserve moisture.

Suitable cropping systems are—

3 years of row crops, 1 year of a small grain, and 1 year of hay if crop residues are returned to the field.

1 year each of a row crop and a small grain and 1 year of hay, or 2 years of row crops, 1 year of a small grain, and 2 years of hay if crop residues are removed from the field.

Row crops can be grown continuously if minimum tillage is used, fertility is kept high, and good tilth is maintained.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops, and those lost through erosion and leaching, and thus maintains high yields. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown.

Capability unit III-1

This unit consists of deep, well drained and moderately well drained, sloping soils. These soils are on uplands and on terrace benches. They are moderately permeable, have high moisture-supplying capacity, and are moderate to high in fertility. Good tilth is easy to maintain if good management is used. The following soils are in this unit:

Ashdale silt loam, 6 to 12 percent slopes.
Ashdale silt loam, 6 to 12 percent slopes, moderately eroded.
Downs silt loam, 6 to 12 percent slopes, moderately eroded.
Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded.
Fayette silt loam, uplands, 6 to 12 percent slopes.

Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded.

Fayette silt loam, valleys, 6 to 12 percent slopes.

Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded.

Fayette and Dubuque soils and Pits, moderately sloping, eroded (Fayette part only).

Lindstrom silt loam, 6 to 12 percent slopes, eroded.

Palsgrove silt loam, 6 to 12 percent slopes.

Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded.

Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded.

Tama silt loam, 6 to 12 percent slopes, moderately eroded.

These soils are well suited to corn, small grains, grasses, and legumes. They also are suited to trees and to use as wildlife areas. The dark-colored soils in this unit contain more organic matter, are more permeable, and are easier to keep in good tilth than the light-colored ones.

All of these soils require protection from runoff. Using a suitable cropping system, adding barnyard manure, plowing under green-manure crops, and returning the residues of crops to the fields help keep the soils in good tilth. When the soils are in good tilth, moisture soaks into them more readily. Growing crops in contour strips with alternate strips of hay slows runoff. Properly installed terraces divert runoff from the fields and help to prevent serious erosion. If properly designed grassed waterways are installed, excess water is removed and gullies are prevented.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 2 years of row crops, 1 year of a small grain, followed by 2 years of hay on slopes less than 200 feet long and by 3 years of hay on slopes more than 200 feet long.

Terracing: 2 years of row crops, 1 year of a small grain, and 2 years of hay.

If no conservation practices are used, a suitable cropping system is 2 years of a small grain and 3 years of hay on slopes less than 200 feet long or 1 year of a small grain and 3 years of hay on slopes more than 200 feet long. If wheel-track planting or similar special management is used, a row crop could be grown 1 more year in the rotation or hay could be grown 1 year less.

Crops on the soils in this unit respond if lime and fertilizer are applied in amounts indicated by soil tests. If the soils are cropped intensively, regular applications of lime are needed.

Capability unit III-2

In this unit are moderately deep, well-drained, sloping soils underlain by loose sand, clay, or sandstone or limestone bedrock. These soils are slightly droughty and are likely to erode unless protected. The following soils are in this unit:

Dodgeville silt loam, 6 to 12 percent slopes.

Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded.

Dubuque silt loam, 6 to 12 percent slopes.

Dubuque silt loam, 6 to 12 percent slopes, moderately eroded.

Fayette and Dubuque soils and Pits, moderately sloping, eroded (Dubuque part only).

Gale silt loam, 6 to 12 percent slopes, eroded.

Hixton loam, 6 to 12 percent slopes, eroded.

Mifflin soils, 6 to 12 percent slopes, eroded.

These soils are suited to corn, small grains, grasses, and legumes and are used mainly for those crops. They also

are suited to pasture or to use as woodland or wildlife areas.

If these soils are cultivated, they are highly susceptible to water erosion and require practices that protect them from erosion. These soils are only moderately deep, and further erosion would reduce the thickness of the root zone, lower the moisture-supplying capacity, and make the soils less productive.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 1 year each of a row crop and a small grain followed by 3 years of hay on slopes 200 feet long or of 2 years of hay on slopes 100 feet long.

Terracing: 1 year each of a row crop and a small grain and 3 years of hay.

If no conservation practices are used, suitable cropping systems are 1 year of a small grain and 4 years of hay on slopes 200 feet long or 1 year of a row crop and 3 years of hay on slopes 100 feet long. If wheel-track planting or similar special management is used, a row crop could be grown 1 more year in the rotation or hay could be grown 1 year less.

Crops on these soils respond if lime and fertilizer are applied in amounts indicated by soil tests. If the soils are cropped intensively, regular applications of lime are needed.

Capability unit IIIe-3

This unit consists of shallow, well-drained, gently sloping soils underlain by sandstone or limestone. This underlying material is at a depth between 1 and 2 feet. These soils have low moisture-supplying capacity. They are subject to moderate erosion and are droughty. Permeability of the Dubuque and Dunbarton soils is moderate, but that of the Northfield soils is moderately rapid. The following soils are in this unit:

Dunbarton silt loam, 2 to 6 percent slopes.

Edmund silt loam, 2 to 6 percent slopes, moderately eroded.

Northfield sandy loam, 2 to 6 percent slopes, moderately eroded.

These soils are suited to corn, small grains, grasses, and legumes, and they are used mainly for those crops. They also are suitable for permanent pasture, trees, and wildlife areas. The soils are shallow to bedrock and need practices that control erosion and conserve moisture if they are used for row crops. The dark-colored soils in this unit are higher in organic matter, are more permeable, and are easier to keep in good tilth than the light-colored ones.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 1 year each of a row crop and a small grain and 2 years of hay on slopes 300 feet long; or 2 years of row crops, 1 year of a small grain, and 2 years of hay on slopes 200 feet long; or 2 years of row crops and 1 year each of a small grain and hay on slopes 100 feet long.

If no conservation practices are used, suitable cropping systems are 1 year of a small grain and 3 years of hay on slopes 300 feet long, or 2 years of small grain and 3 years of hay on slopes 200 feet long, or 1 year each of a row

crop and a small grain and 4 years of hay on slopes 100 feet long. If wheel-track planting or similar special management is used, a row crop could be grown 1 more year in the rotation or hay could be grown 1 year less. These soils generally are not suited to terracing, but diversions can be used in some areas.

Applying barnyard manure and commercial fertilizer helps to replace the nutrients removed by crops and those lost through erosion and leaching. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown.

Capability unit IIIe-4

In this unit are moderately deep, well-drained, gently sloping soils underlain by sandstone bedrock or by loose sand and gravel. These soils are on uplands and terraces. They have low moisture-supplying capacity, and crops on them are likely to be damaged by lack of water during prolonged dry periods. If cultivated, these soils are subject to moderate erosion. The following soils are in this unit:

Hixton sandy loam, 2 to 6 percent slopes, eroded.

Meridian sandy loam, 2 to 6 percent slopes.

Most areas of these soils are cultivated, but some areas are used for pasture and woodland. The principal crops are corn, small grains, grasses, and legumes.

If the soils in this unit are to be cropped safely over a long period, and if good yields are to be obtained, special management practices are required. These practices include adding barnyard manure and plowing under green-manure crops and crop residues to improve the moisture-supplying capacity of the soils. These practices also help to control wind and water erosion. Using a shelterbelt on the more nearly level areas, in conjunction with strip-cropping, is a good practice to prevent damage from warm, drying winds during the growing season. With this practice, hay crops are grown in strips that alternate with strips of small grains or row crops.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 2 years of row crops, 1 year of a small grain, and 2 or 3 years of hay.

Terracing: 1 year each of a row crop, a small grain, and hay.

If no conservation practices are used, suitable cropping systems are 1 year of a small grain and 3 years of hay on slopes 300 feet long or 1 year each of a row crop and a small grain and 4 years of hay on slopes 200 feet long.

On sloping areas the use of contour stripcropping or of terraces and diversions helps to control water erosion. Adequate amounts of fertilizer must be applied for good yields.

Capability unit IIIe-6

This unit consists of dominantly moderately deep, moderately well drained to well drained, sloping soils. These soils are underlain by clayey residuum from shale and by shale bedrock. They are in the uplands. Their moisture-supplying capacity is moderately high to high. Water moves slowly through these soils because permeability of

the underlying clay and shale bedrock is moderately slow to slow. The following soils are in this unit:

Derinda silt loam, 6 to 12 percent slopes.
 Derinda silt loam, 6 to 12 percent slopes, moderately eroded.
 Eleroy silt loam, 6 to 12 percent slopes.
 Eleroy silt loam, 6 to 12 percent slopes, moderately eroded.
 Keltner silt loam, 6 to 12 percent slopes, moderately eroded.
 Schapville silt loam, 6 to 12 percent slopes, moderately eroded.

These soils are used mainly for corn, small grains, and hay, but they also can be used as permanent pasture, as woodland, or as wildlife areas. They are subject to moderate erosion if cultivated and not protected. These soils are slow to warm up and dry out in spring because of the slowly permeable underlying material.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 1 year each of a row crop and a small grain followed by 4 years of hay on slopes 300 feet long or by 3 years of hay on slopes 200 feet long.

Terracing: 2 years of row crops, 1 year of a small grain, and 3 years of hay.

If no conservation practices are used, suitable cropping systems are 1 year of a small grain and 4 years of hay on slopes 300 feet long or 3 years of hay on slopes 200 feet long. If wheel-track planting or similar special management is used, a row crop could be grown 1 more year in the rotation or hay could be grown 1 year less.

When contour stripcropping is used, the guidelines should be placed on a slight grade toward waterways.

Crops on these soils respond if lime and fertilizer are added in amounts indicated by soil tests. If the soils are cropped intensively, regular applications of lime are needed.

Capability unit IIIe-8

The only soil in this unit is Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded. It is a moderately deep, somewhat poorly drained, sloping soil underlain by shale. Most areas are in the uplands in seepage positions on the lower parts of slopes. Depth to shale is between 18 and 42 inches. Water moves slowly through the soil because of the slow permeability of the underlying shale. Runoff is rapid, especially in spring and after periods of heavy rains. The soil is also subject to moderate erosion.

If protected from erosion, this soil is suited to corn, small grains, grasses, and legumes. In some areas less than 2 acres in size, seepage interferes with tillage. Diversions are needed in places to remove runoff water and reduce erosion. If depth to shale is sufficient, tile drains can be used to drain seepage areas. Growing grasses and legumes, adding barnyard manure or plowing under green-manure crops, and working the soil only when dry enough to prevent puddling help improve soil structure and permeability and thus increase yields.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 1 year each of a row crop and a small grain followed by 3 years of hay on slopes 200 feet long or of 2 years of hay on slopes 100 feet long.

If no conservation practices are used, suitable cropping systems are 1 year of a small grain and 3 years of hay on slopes 200 feet long or 2 years of small grain and 3 years of hay on slopes 100 feet long. If wheel-track planting or similar special management is used, a row crop could be grown 1 more year in the rotation or hay could be grown 1 year less. When contour stripcropping is used, the guidelines should be set on a slight grade toward waterways.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion and leaching. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown.

Capability unit IIIw-9

Only one soil, Houghton mucky peat, is in this unit. It is a deep, poorly drained, nearly level, organic soil. This soil consists of remains of fibrous plant materials. It is in seepage areas and in depressions on the bottom lands. The soil has slow internal drainage. It is low in fertility. Runoff is slow, and the soil is subject to flooding.

Most areas of this soil are too wet for cultivation and are used for pasture or for wildlife areas. If this soil is cropped, artificial drainage is needed, and ditches or tile drains can be used to provide drainage. Diversions can be used to intercept runoff from adjacent higher areas.

If this soil is adequately drained and fertility is kept high, row crops can be grown continuously. Large amounts of fertilizer are required. If the soil is not drained, it should be kept in meadow or pasture or should be used for wildlife. Reed canarygrass and other tame grasses should be planted to replace sedges if the areas are used for production of forage.

Capability unit IIIs-2

The only soil in this unit is Meridian sandy loam, 0 to 2 percent slopes. It is a moderately deep, well-drained, nearly level soil underlain by loose sand. This soil is on stream terraces. It has moderately low moisture-supplying capacity, and lack of water late in summer reduces yields of crops somewhat. This soil is moderate in fertility and is fairly low in organic matter. Unless limed, this soil is medium acid to slightly acid.

If the fertility and organic matter are kept high and if minimum tillage is used and wind erosion is controlled, a cropping system that includes 2 years of row crops and 1 year each of a small grain and hay can be used. Row crops can be grown continuously if irrigation is practiced and if cover crops are grown. Lime and fertilizer should be applied in amounts indicated by soil tests.

Capability unit IVe-1

In this unit are deep, well-drained, sloping to moderately steep soils on uplands. These soils have moderate permeability and high moisture-supplying capacity. They are moderately high in fertility. Good tillage is easy to maintain if good management is used. If these soils are cultivated, the hazard of erosion is severe. The following soils are in this unit:

Ashdale silt loam, 6 to 12 percent slopes, severely eroded.
 Ashdale silt loam, 12 to 20 percent slopes.
 Ashdale silt loam, 12 to 20 percent slopes, moderately eroded.

Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded.

Fayette silt loam, uplands, 12 to 20 percent slopes.

Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded.

Fayette silt loam, valleys, 12 to 20 percent slopes.

Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded.

Fayette and Dubuque soils and Pits, moderately steep, eroded (Fayette part only).

Lindstrom silt loam, 12 to 20 percent slopes, eroded.

Palsgrove silt loam, 6 to 12 percent slopes, severely eroded.

Palsgrove silt loam, 12 to 20 percent slopes.

Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded.

Tama silt loam, 6 to 12 percent slopes, severely eroded.

Some areas of these soils are used for crops and pastures, and others are in trees. A fairly large acreage that consists mainly of areas not easily accessible for farming is used for permanent pasture and woodlots. The dark-colored soils in this unit contain more organic matter and have better tilth than the light-colored ones.

The soils in this unit are too steep or too severely eroded to be cropped intensively. Nevertheless, if erosion is controlled and other good management is used, row crops can be grown safely on them. Careful management is required, however, to maintain a good supply of plant nutrients and organic matter in the soils. Good returns can be realized by growing a small grain and hay crop in rotation or by renovating and seeding the pastures. In addition to other practices described, diversions may be needed for control of erosion, especially on long slopes.

Suitable combinations of conservation practices and cropping systems are—

On slopes of 6 to 12 percent—

Contour stripcropping: 1 year each of a row crop and a small grain followed by 4 years of hay on slopes 300 feet long or by 3 years of hay on slopes 200 feet long.

Terracing: 2 years of row crops, 1 year of a small grain, and 3 years of hay or 1 year each of a row crop and a small grain and 2 years of hay.

On slopes of 12 to 20 percent—

Contour stripcropping: 2 years of small grain and 3 years of hay on slopes 300 feet long or 1 year each of a row crop and a small grain and 4 years of hay on slopes 200 feet long.

If no conservation practices are used on soils that have slopes of 6 to 12 percent, suitable cropping systems are 1 year of a small grain and 4 years of hay on slopes 300 feet long or 1 year of a small grain and 3 years of hay on slopes 200 feet long. On slopes of 12 to 20 percent, a suitable cropping system, if no conservation practices are applied, is 1 year of a small grain and 4 years of hay on slopes 200 feet long. Areas 300 feet long on slopes of 12 to 20 percent should be renovated.

Applying large amounts of manure and fertilizer on the severely eroded soils helps to improve their structure, rate of infiltration, tilth, and productivity. Terracing generally is not practiced on soils that have slopes of 12 to 20 percent, but diversions can be used to reduce the length of the slope and thus control erosion.

Crops on these soils respond well if lime and fertilizer are applied. Moderate amounts of phosphate and potash are needed. Legumes generally are the main crops grown,

and lime therefore is essential in most areas. The lime and fertilizer should be applied in the amounts indicated by soil tests. If these soils are cultivated, the content of organic matter should be increased by adding large amounts of manure. If feasible, all crop residues should be turned under.

Capability unit IVe-2

In this unit are moderately deep, well-drained, sloping to moderately steep soils underlain by loose sand over sandstone or by clay over limestone. The bedrock is at a depth between 2 and 3 feet. These soils have moderate permeability. The soils that have slopes of 6 to 12 percent are severely eroded. Most of the soils, however, have slopes of 12 to 20 percent and are slightly eroded or moderately eroded. Because the soils are limited in depth and have steep slopes, their moisture-supplying capacity for plants is only moderate. In all of the soils, good tilth can be maintained only by managing the soils carefully. The hazard of further erosion is severe. The following soils are in this unit:

Dodgeville silt loam, 12 to 20 percent slopes.

Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded.

Dodgeville soils, 6 to 12 percent slopes, severely eroded.

Dubuque silt loam, 12 to 20 percent slopes.

Dubuque silt loam, 12 to 20 percent slopes, moderately eroded.

Dubuque soils, 6 to 12 percent slopes, severely eroded.

Fayette and Dubuque soils and Pits, moderately steep, eroded (Dubuque part only).

Gale silt loam, 12 to 20 percent slopes, eroded.

Hixton loam, 12 to 20 percent slopes.

Hixton loam, 12 to 20 percent slopes, moderately eroded.

Millin soils, 12 to 20 percent slopes, eroded.

The soils in this unit are suited to small grains and hay, and they are also suited to trees and to use as wildlife areas. Most of the acreage is in crops. Many areas, however, are unfavorable for tillage because of their shape or steep slope and are in permanent pasture or trees. Other areas are not easily accessible for farming.

These soils require practices that maintain a good supply of plant nutrients and that prevent further erosion. Loss of additional soil material through erosion would reduce the thickness of the root zone and would permanently reduce the productive capacity of the soils. Using contour stripcropping and establishing diversions and grassed waterways help to control erosion. Applying barnyard manure, plowing down green-manure crops, and returning crop residues to the soils help to maintain fertility and to increase yields.

Suitable combinations of conservation practices and cropping systems are—

On slopes of 6 to 12 percent—

Contour stripcropping: 2 years of small grains and 3 years of hay on slopes 300 feet long or 1 year each of a row crop and a small grain and 3 years of hay on slopes 200 feet long.

Terracing: 2 years of row crops, 1 year of a small grain, 3 years of hay or 1 year each of a row crop and a small grain and 2 years of hay.

On slopes of 12 to 20 percent—

Contour stripcropping: 1 year each of a row crop and a small grain followed by 3 years of hay on

slopes 200 feet long or by 2 years of hay on slopes 100 feet long.

If no conservation practices are used for soils that have slopes of 6 to 12 percent, a suitable cropping system would be 1 year of a small grain and 4 years of hay on slopes 300 feet long, but on slopes 200 feet long 1 year less of hay could be grown. If conservation practices are not used on slopes of 12 to 20 percent, a suitable cropping system is 1 year of a small grain and 3 years of hay on slopes 200 feet long and 2 years of small grain and 3 years of hay on slopes 100 feet long.

Applying large amounts of manure and fertilizer to the severely eroded soils helps improve the structure, rate of infiltration, tilth, and productivity. Terracing generally is not practical on the soils that have slopes of 12 to 20 percent, but diversions can be used to reduce the length of the slope and thus control erosion.

Lime and fertilizer should be applied in the amounts determined by soil tests.

Capability unit IVe-3

This unit consists of shallow, well-drained, sloping soils underlain by sandstone or limestone bedrock. The underlying material is at a depth between 1 and 2 feet. These soils are subject to erosion and some are eroded or moderately eroded. They have low moisture-supplying capacity, are subject to severe erosion, and are droughty. Permeability of the Dunbarton and Edmund soils is moderate, but that of the Northfield is moderately rapid. The following soils are in this unit:

- Dunbarton silt loam, 6 to 12 percent slopes.
- Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded.
- Edmund silt loam, 6 to 12 percent slopes, moderately eroded.
- Northfield loam, 6 to 12 percent slopes.
- Northfield loam, 6 to 12 percent slopes, moderately eroded.
- Northfield sandy loam, 6 to 12 percent slopes.
- Northfield sandy loam, 6 to 12 percent slopes, moderately eroded.

These sloping soils are too shallow to be used intensively for crops. Nevertheless, row crops can be grown if practices that control erosion are applied and if other good management is used. Many areas, however, are unfavorable for tillage because of their shape or steep slope and are in permanent pasture or trees. The dark-colored soils in this unit contain more organic matter, are more permeable, and are easier to keep in good tilth than the light-colored ones.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 2 years of small grain and 3 years of hay on slopes 300 feet long, or 1 year each of a row crop and a small grain and 4 years of hay on slopes 200 feet long, or 1 year each of a row crop and a small grain and 3 years of hay on slopes 100 feet long.

If no conservation practices are used, a suitable cropping system is 1 year of a small grain followed by 4 years of hay on slopes 200 feet long or by 3 years of hay on slopes 100 feet long. Areas on slopes 300 feet long are suitable only for renovation. Generally terracing is not practical on the soils in this unit because of nearness of bedrock to the surface, but diversions can be used to reduce the length of the slope and to help control erosion.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion and leaching, and thus maintains high yields. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown.

Capability unit IVe-4

The only soil in this unit is Hixton sandy loam, 6 to 12 percent slopes, eroded. It is a moderately deep, well-drained, sloping soil and is in the uplands. This soil is underlain by sandstone bedrock at a depth between 2 and 3 feet. Its moisture-supplying capacity is low; consequently, during prolonged dry spells crops on this soil are likely to be damaged by lack of water. Permeability is moderately rapid. If cultivated, this soil is subject to moderate erosion.

Nearly all of this soil is cultivated, but some areas are in pasture or in woodland. Practices are needed that protect the soil from erosion, that maintain supplies of plant nutrients and organic matter, and that also maintain moisture-supplying capacity.

Suitable combinations of conservation practices and cropping systems are—

Contour stripcropping: 1 year each of a row crop and a small grain followed by 4 years of hay on slopes 300 feet long or by 3 years of hay on slopes 200 feet long.

If no conservation practices are used, a suitable cropping system would be 1 year of a small grain and 3 years of hay.

Contour stripcropping and grassed waterways help to control erosion. In places diversions can be used to reduce the length of the slope and intercept runoff from adjacent higher areas and thus control erosion. Adding barnyard manure, returning all crop residues to the soil, and growing more grasses or legumes than row crops in the rotation are ways of supplying additional organic matter. These practices also maintain moisture-supplying capacity and fertility.

The kind and amount of fertilizer used should be determined by soil tests. In general, moderate amounts of phosphate and potash are needed, and unless lime has been applied recently, lime is needed. If legumes are grown, supplemental applications of potash are needed each year.

Capability unit IVe-6

In this unit are moderately deep to deep, moderately well drained to well drained, sloping to moderately steep soils underlain by shale bedrock. These soils are in the uplands. They have moderately high moisture-supplying capacity. Water moves slowly through the soils because of the moderately slow to slow permeability of the underlying materials. These soils are slightly eroded to severely eroded and are subject to further erosion if cultivated. The severely eroded soils have poorer tilth and soil structure than the less eroded ones and contain less organic matter. The following soils are in this unit:

- Derinda silt loam, 12 to 20 percent slopes, eroded.
- Eleroy silt loam, 12 to 20 percent slopes.

Eleroy silt loam, 12 to 20 percent slopes, moderately eroded.
Schapville soils, 6 to 12 percent slopes, severely eroded.

These soils are too steep or too severely eroded to be used intensively for row crops. If they are adequately protected from erosion and if other good management is used, row crops can be grown safely on them. Practices are also needed that maintain the supplies of plant nutrients and organic matter.

Suitable combinations of conservation practices and cropping systems are—

On slopes of 6 to 12 percent—

Contour stripcropping: 2 years of small grain and 3 years of hay on slopes 300 feet long or 1 year each of a row crop and a small grain and 4 years of hay on slopes 200 feet long.

Terracing: 1 year each of a row crop and a small grain and 2 or 3 years of hay.

On slopes of 12 to 20 percent—

Contour stripcropping: 1 year of a small grain and 3 years of hay on slopes 200 feet long or 2 years of small grain and 3 years of hay on slopes 100 feet long.

If no conservation practices are used, a suitable cropping system for the soil that has 6 to 12 percent slopes is 1 year of a small grain and 3 years of hay on slopes 200 feet long. All areas that have slopes 300 feet long and all soils that have 12 to 20 percent slopes are suitable only for pasture renovation if no conservation practices are used.

Guidelines for contour stripcropping should be placed on a slight grade toward the waterway. Terracing is not practical on the soils that have 12 to 20 percent slopes, but diversions can be used in places to reduce the length of the slope.

Crops on all of the soils in this unit respond well if lime and fertilizer are applied. Also, large amounts of manure and fertilizer applied to the severely eroded soils help improve their structure, rate of infiltration, tilth, and productivity. Moderate amounts of phosphate and potash are needed on all of the soils. Legumes are the main crop grown, and lime therefore is essential in most places. The soils should be tested to determine the kind and amount of fertilizer needed.

Capability unit IVw-3

This unit consists of moderately deep, poorly drained, nearly level to sloping soils underlain by shale bedrock. Depth to bedrock is between 2 and 4 feet. These soils are slightly eroded and moderately eroded. They have a thick, dark-colored surface layer that is high in organic matter. Permeability is moderately slow to slow. The water table is at or near the surface, unless the soils have been artificially drained. Fertility is moderately high, and the moisture-supplying capacity is high. Flooding occurs periodically following a heavy rain and the many small depressions in these soils retain water long enough to interfere with tillage. The following soils are in this unit:

Calamine silt loam, 0 to 2 percent slopes.
Calamine silt loam, 2 to 6 percent slopes.
Calamine silt loam, 6 to 12 percent slopes.
Calamine silt loam, 6 to 12 percent slopes, moderately eroded.

If flooding is controlled and if these soils are adequately drained, they are suited to corn, small grains, grasses, and legumes. If not adequately drained, the areas should be kept in pasture or be used as woodland or as wildlife areas. Many areas are in permanent pasture.

In some places surface ditches are adequate for drainage, but in other places tile drains, surface ditches, and diversions are needed for adequate drainage. If depth to shale bedrock is sufficient and if outlets are available, tile can be used to provide drainage. If tile drains are used, good structure must be maintained so that excess water can enter the soil and move down to the tile. Growing grasses and legumes, adding barnyard manure or green manure, and working the soils only when dry enough to prevent puddling help maintain good structure.

If the soils are adequately drained, suitable cropping systems are—

On 0 to 6 percent slopes—

2 years of row crops and 1 year each of a small grain and hay.

On 2 to 6 percent slopes—

2 years of row crops, 1 year of a small grain, and 2 years of hay.

On 6 to 12 percent slopes—

Contour stripcropping: 1 year each of a row crop and a small grain and 2 years of hay.

Applying barnyard manure and commercial fertilizer helps to replace nutrients removed by crops and those lost through erosion and leaching. The kind and amount of fertilizer used should be determined by soil tests. The amount of lime used should be based on the pH of the soil, the type of liming material, and the crop to be grown. Guidelines for contour stripcropping should be on a grade toward the waterway.

If no conservation practices are used, these soils should be planted to pasture grasses that tolerate wetness.

Capability unit IVs-3

The only soil in this unit is Gotham loamy fine sand, 2 to 6 percent slopes, eroded. It is a deep, somewhat excessively drained, nearly level to gently sloping soil underlain by loose sands. This soil consists of sand laid down by wind and water. It is droughty and is subject to wind erosion. Permeability is rapid, and the moisture-supplying capacity is low. The soil is low in fertility, and large amounts of fertilizer and manure are needed for moderate yields.

This soil is poorly suited to intensive use for crops. Most areas were cultivated at some time but are now used for forage crops or for permanent pasture. Some areas are being planted to trees.

A suitable combination of conservation practice and cropping system is—

Wind or contour stripcropping: 1 year each of a row crop and a small grain and 2 years of hay.

If no conservation practices are used, suitable cropping systems are 2 years of small grain and 3 years of hay on slopes 200 feet long or 1 year each of a row crop and a small grain and 3 years of hay on slopes 100 feet long.

Growing cover crops, using crop residues for mulch, and keeping high the supplies of plant nutrients and organic matter all help prevent erosion and thus increase yields. Lime and fertilizer should be applied in the amounts indicated by soil tests.

Capability unit Vw-14

This unit consists of deep, poorly drained, nearly level alluvial soils. The areas are on flood plains where they are subject to frequent flooding. They consist of a mixture of silty and sandy alluvial land and of soil from silty alluvium. In all areas the water table is high. The following soils are in this unit:

Alluvial land.
Orion silt loam, wet variant.

It generally is not economical to protect the areas in this unit from overflow or to provide enough drainage to grow tilled crops. The soils are well suited to pasture, trees, or wildlife. Some pastured areas can be protected from overflow and then improved by fertilizing and renovating them. Plantings that provide cover and food in winter for wildlife will encourage many kinds of songbirds and game animals.

Capability unit VIe-1

The soils in this unit are deep, well drained, and moderately steep to steep. They consist of silty materials 30 to 60 inches thick over clayey material weathered from limestone bedrock. Permeability is moderate in the silty part of these soils and moderately slow in the clayey part. All of the soils are fairly fertile and are easy to cultivate. They are slightly eroded to severely eroded, and the hazard of further erosion is severe. The following soils are in this unit:

Ashdale silt loam, 12 to 20 percent slopes, severely eroded.
Fayette silt loam, uplands, 20 to 30 percent slopes.
Falsgrove silt loam, 12 to 20 percent slopes, severely eroded.

The soils in this unit are not suited to row crops, but they are suited to use as meadow, pasture, or woodland, or to use as wildlife areas. If used for forage crops, the areas should be renovated no more often than once in 5 years.

Some of the soils have lost most of their surface layer, and their subsoil is exposed. If these areas are cultivated, they are difficult to keep in good tilth. Applying large amounts of manure and fertilizer helps to improve the structure, rate of infiltration, tilth, and productivity.

Capability unit VIe-2

This unit consists of moderately deep, well-drained, moderately steep to steep soils underlain by loose sand over sandstone or by clay over limestone. Depth to the bedrock is between 2 and 3 feet. These soils have moderate permeability and moderate to moderately low moisture-supplying capacity for plants. They are mostly moderately eroded and severely eroded, and if they are cultivated or overgrazed, they are subject to severe erosion. The steep slope and hazard of erosion restrict the type of tillage that can be used. In some places diversions are needed to divert runoff water from other areas away from these soils. The soils in this unit produce much of the forage and pasture grown in the county. They are—

Dodgeville soils, 12 to 20 percent slopes, severely eroded.
Dubuque silt loam, 20 to 30 percent slopes.
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.
Dubuque soils, 12 to 20 percent slopes, severely eroded.
Gale silt loam, 20 to 30 percent slopes, eroded.
Hixton loam, 20 to 30 percent slopes, eroded.
Mifflin soils, 20 to 30 percent slopes, eroded.

These soils are used for pasture or hay crops, for trees, or as wildlife areas. Generally, they are best suited to pasture, but if the areas are not too steep, hay crops can be grown. The soils are too steep and susceptible to erosion to be used for tilled crops.

If adequate lime and fertilizer are applied, good yields of legume and grass mixtures are obtained. Pastures should be seeded only when renovated, and preferably in contour strips, to protect the soils from erosion. Renovation permits tillage without causing serious loss of soil through erosion, and it limits the risk of gullies forming. It also leaves the surface soil in condition to absorb and hold large amounts of runoff water.

Moderately large amounts of lime, phosphate, and potash are needed for most of the soils that are not in trees. The soils should be tested to determine the needs for lime and fertilizer.

Many areas of these soils are in trees. If proper management is used, good returns can be realized from the woodlots. These areas need protection from livestock and fire. The damage caused by grazing greatly affects the value of the woodland. The woodland contains sparse forage of low quality, and some of the plants are harmful to livestock. The animals trample and damage the young trees. They also damage the leaf litter that absorbs and stores rainfall. In addition, runoff concentrates on the trails left by livestock and causes gullies to form in many places. Once gullies form, they are difficult to control and are likely to advance quickly into adjacent cropland.

If more pasture is needed, the brush and trees should be removed and the areas renovated. By doing this, higher returns will be realized than if an attempt is made to use the same area for both woodland and pasture.

Information about the management of woodland is in the section on woodland. If the woodlots are well managed, runoff is reduced and lower lying fields will be less damaged by erosion. Flooding in the valleys along streams also is reduced.

Capability unit VIe-3

In this unit are shallow, well-drained, sloping to moderately steep soils underlain by sandstone or limestone bedrock. Depth to bedrock is between 1 and 2 feet. These soils are mostly slightly eroded to moderately eroded. They are low in moisture-supplying capacity and moderate in fertility. Also, the soils are droughty and are subject to severe erosion. The Dunbarton and Edmund soils are underlain by limestone, and their permeability is moderate, but the Northfield soils are underlain by sandstone and their permeability is moderately rapid. The following soils are in this unit:

Dunbarton silt loam, 12 to 20 percent slopes.
Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded.
Edmund silt loam, 12 to 20 percent slopes.
Northfield loam, 12 to 20 percent slopes.
Northfield loam, 12 to 20 percent slopes, moderately eroded.

Northfield sandy loam, 12 to 20 percent slopes.
Northfield sandy loam, 12 to 20 percent slopes, moderately eroded.

The soils in this unit are too steep, too shallow, and too susceptible to erosion to be used for tilled crops. They are better suited to pasture or woodland or to use as wildlife areas. The dark-colored soils in this unit contain more organic matter than the light-colored ones and are more permeable.

Moderate yields of pasture can be obtained if a mixture of legumes and grasses is seeded and adequate amounts of lime and fertilizer are applied. In many areas the forage can be harvested for hay. Adding manure and returning crop residues help increase the moisture-supplying capacity and fertility of the soils.

Because of nearness of bedrock to the surface, the soils in this unit are only moderately well suited to trees, and the Northfield soils are less well suited than the other soils. Many areas of these soils are in trees. If proper management is used, moderately good returns can be realized from the woodlots. These areas need protection from livestock and fire. Information about the management of woodland is in the section on woodland.

Capability unit VIe-4

The only soil in this unit is Hixton sandy loam, 12 to 20 percent slopes, eroded. It is a moderately deep, well-drained, moderately steep soil. This soil is underlain by sandstone bedrock at a depth between 2 and 3 feet. Its moisture-supplying capacity and fertility are moderately low to low. The soil is somewhat droughty. It is subject to severe erosion if cultivated. Diversions or other water-spreading practices are needed to divert runoff water from higher lying areas.

This soil is not suited to tilled crops, but it is suited to pasture, to trees, or to use as wildlife areas. Moderately high yields of pasture can be obtained if a mixture of legumes and grasses is seeded and adequate lime and fertilizer are applied. In areas where the soil is not too steep, the forage can be harvested for hay. Adding manure and returning crop residues to the soil help increase the moisture-supplying capacity and fertility.

Many areas of this soil are in trees. If proper management is used, good returns can be realized from the woodlots. The areas need protection from livestock and fire. Information about management of woodland is in the section on woodland.

Capability unit VIe-6

This unit consists only of Derinda soils, 12 to 20 percent slopes, severely eroded. These soils are moderately deep, are well drained to moderately well drained, and are underlain by shale bedrock. The surface layer is silt loam, and the subsoil is clayey. Permeability is moderately slow, and runoff is likely to be great during periods of heavy rainfall. The soils are droughty and are subject to severe water erosion. Their water-holding capacity and fertility are moderate.

These soils are not suited to tilled crops, but they are suited to pasture, to trees, or to use as wildlife areas. Moderately high yields of pasture can be obtained if a mixture of legumes and grasses is seeded and if adequate

lime and fertilizer are applied. In areas where the soils are not too steep, the forage can be harvested for hay. Adding manure and returning crop residues to the soils help increase the moisture-supplying capacity and fertility.

Many areas of these soils are in trees. If proper management is used, good returns can be realized from the woodlots. These areas need protection from livestock and fire. If the areas are planted to trees or are left in trees, they should be managed according to information in the section about woodland. A local agricultural technician or forester will also provide assistance.

Capability unit VIe-9

The only soil in this unit is Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded. It is a deep, somewhat excessively drained, sloping to moderately steep soil underlain by loose, sandy outwash. This soil is rapidly permeable, has low moisture-supplying capacity, and is droughty. It is subject to severe erosion by wind and water, and gullies form readily in it.

This soil is best suited to use as woodland and wildlife areas, and it is especially well suited to pine plantations. If it is used for pasture, grazing must be controlled so that a good cover of sod is maintained.

Capability unit VIe-5

This unit consists of very shallow, well-drained, gently sloping to steep soils underlain by limestone bedrock. Depth to the bedrock is less than 12 inches. These soils have very rapid permeability and low moisture-supplying capacity for plants. They are subject to moderate or severe erosion if cultivated. They are also droughty, especially in years when rainfall is low or is poorly distributed. The moderately steep soils are more subject to erosion than the gently sloping ones. They also are more droughty and are generally shallower to bedrock. The following soils are in this unit:

- Sogn silt loam, 2 to 12 percent slopes, eroded.
- Sogn silt loam, 12 to 20 percent slopes.
- Sogn silt loam, 12 to 20 percent slopes, moderately eroded.

The soils in this unit are too droughty and too susceptible to erosion to be used for row crops. They are suited, however, to hay and pasture if carefully managed. They are also suited to use as wildlife areas. If used for forage crops, the areas should be renovated once every 5 years. A complete fertilizer can be applied as a topdressing to areas that are too steep or too stony for renovation. If these soils are used for pasture, grazing must be controlled to prevent damage to the sod.

Trees on these soils are generally unproductive or yield only small quantities of low-grade timber. The principal hazards to trees are droughtiness and exposure. Planting of trees must be done by hand in many places because bedrock is so near to the surface.

Capability unit VIIe-2

The only soil in this unit is Dubuque silt loam, 30 to 45 percent slopes. It is a moderately deep, well-drained, very steep soil and is underlain by clay over limestone bedrock. This soil is subject to very severe erosion if a protective cover of grass or trees is not maintained.

The soil in this unit is too steep and too susceptible to erosion to be used for tilled crops. It is, however, suited to pasture, to woodland, or to use as wildlife areas. A good cover of plants should be kept on the pastured areas. Some of the pastured areas can be renovated once in every 5 years if the slopes are not too steep for tillage. In areas used for permanent bluegrass pasture, a fertilizer high in nitrogen is needed for increased yields and to provide a better protective cover of plants. Grazing needs to be managed carefully to keep gullies from forming.

Areas that are in trees should be kept in trees and the areas managed according to practices outlined in the section about woodland. Wooded areas and areas that are free of trees can be improved for wildlife by growing plants that provide food and cover for wildlife.

Capability unit VIIe-3

This unit consists of shallow, well-drained to somewhat excessively drained, steep to very steep soils underlain by sandstone or limestone bedrock. Depth to the bedrock is between 1 and 2 feet. These soils are moderately low to low in moisture-supplying capacity. Permeability is moderate to moderately rapid. The soils are droughty and are subject to severe water erosion. The following soils are in this unit:

- Dunbarton silt loam, 20 to 30 percent slopes.
- Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded.
- Dunbarton silt loam, 30 to 45 percent slopes.
- Northfield loam, 20 to 30 percent slopes.
- Northfield loam, 20 to 30 percent slopes, moderately eroded.
- Northfield sandy loam, 20 to 30 percent slopes.
- Northfield sandy loam, 20 to 30 percent slopes, moderately eroded.
- Northfield sandy loam, 30 to 45 percent slopes.

Steep slopes and severe hazard of erosion make these soils better suited to pasture or woodland or to wildlife than to tilled crops. A good cover of plants should be kept on the pastured areas. Some of the pastured areas can be renovated once in every 5 years if the slope is not too steep for tillage. Large amounts of manure and fertilizer are needed in places to help establish seedlings. In areas used for permanent bluegrass pasture, fertilizer high in nitrogen is needed for increased yields and to provide a better protective cover. Grazing must be controlled carefully to keep gullies from forming.

Areas that are in trees should remain in trees, and the areas managed according to practices outlined in the section on woodland. Wooded areas that are free of trees can be improved for wildlife by growing plants that provide food and cover for wildlife.

Capability unit VIIe-4

In this unit are moderately deep, well-drained, moderately steep to steep soils. These soils are underlain by sandstone bedrock. They have moderately rapid to rapid permeability and moderately low moisture-supplying capacity. They are droughty and are susceptible to very severe erosion by wind and water. The following soils are in this unit:

- Hixton sandy loam, 12 to 20 percent slopes, severely eroded.
- Hixton sandy loam, 20 to 30 percent slopes.

The soils in this unit are too steep, too droughty, and too susceptible to erosion to be used for tilled crops. They are, however, suited to pasture, woodland, or wildlife.

If used for pasture, the areas can be renovated once in every 5 years and a complete fertilizer can be applied as a topdressing. If these soils are used for pasture, grazing must be controlled to prevent damage to the sod.

Many areas of these soils are in trees. If proper management is used, good returns can be realized from the woodlots. These areas need protection from livestock and fire. If the areas are planted to trees or are left in trees, they should be managed according to information in the section about woodland. A local agricultural technician or forester can also provide assistance.

Capability unit VIIs-5

This unit consists of very shallow, well-drained to excessively drained, steep to very steep soils that have many outcrops of sandstone and limestone. These soils are underlain by bedrock, generally at a depth of less than 1 foot. They have very rapid permeability and low moisture-supplying capacity for plants. The following soils are in this unit:

- Sogn silt loam, 20 to 30 percent slopes.
- Sogn silt loam, 30 to 45 percent slopes.
- Stony and rocky land, moderately steep.
- Stony and rocky land, steep.

The soils in this unit are too droughty and steep to be used for row crops, but they are suited to use as woodland or as wildlife areas. The principal hazards to trees are drought and exposure. Trees on the shallower soils in this unit are generally unproductive or yield only small quantities of low-grade timber. Planting of trees generally must be done by hand, because of the steep slopes and nearness of bedrock to the surface. The soils have only limited use for pasture, and if used for grazing, a good cover of sod must be kept on the areas. This can be done if rotational grazing or other methods are used to control grazing.

Capability unit VIIs-9

Boone fine sand, 6 to 20 percent slopes, eroded, is the only soil in this unit. It is a deep, excessively drained, sloping to steep soil. This soil is very droughty and is very rapidly permeable. It is low in moisture-supplying capacity for plants and in fertility. This soil is subject to both wind and water erosion if not protected by a cover of plants. In places runoff water from higher adjacent areas has cut small gullies.

It is difficult to keep a cover of forage crops and pastures on this soil. The areas therefore are best suited to use as woodland or as wildlife areas. The wooded areas should be managed according to information outlined in the section on woodland.

Capability unit VIIIw-15

This unit consists only of Marsh, which is flooded most of the time. Most of the areas are small and are scattered along the wide bottom lands of some streams in the county. Cattails, bulrushes, sedges, and other plants that grow in shallow water cover the areas.

Marsh is not suited to pasture or trees, but it is well suited to use as wildlife areas. Some of the areas can be improved for ducks, muskrats, and other wildlife by building ditches to help control the water level.

Capability unit VIII-10

This land type consists of gravelly and stony materials from lead and zinc mines. The materials have little potential for growing plants. This waste material is piled around the mines. It is used for surfacing roads in nearby areas and therefore has some economic value. The following soils are in this unit:

- Fayette and Dubuque soils and Pits, gently sloping, eroded (Mine pits and dumps only).
- Fayette and Dubuque soils and Pits, moderately sloping, eroded (Mine pits and dumps only).
- Fayette and Dubuque soils and Pits, moderately steep, eroded (Mine pits and dumps only).
- Mine pits and dumps.

Predicted Yields

Predicted average yields per acre for the crops commonly grown in the county are given in table 5. The estimates were based on interviews with farmers, on results obtained by the agricultural experiment station on experimental test plots, and on observations made by soil surveyors and other agricultural workers who are familiar with the soils.

Yields in table 5 are given for each soil type under two levels of management. In the columns marked "Average" are yields to be expected under the system of management most farmers were practicing at the time the soil survey was made. The management used to obtain the yields in the columns marked "High" is at a level that is used by a few of the farmers in the county.

For corn, average management consists of growing about 12,000 plants of hybrid corn per acre and of applying about 8 tons of barnyard manure and about 100 pounds of commercial fertilizer as a starter. The seedbed is prepared in the usual manner. For seedings of oats or alfalfa-brome grass, 100 to 200 pounds of a fertilizer high in phosphorus and potassium is applied under average management. Only a minimum of lime is used, and no special practices are used in preparing the seedbed or in cultivating. Hayfields are cut twice a year and grazed in fall.

A variation of about 20 percent in yields may be expected from one year to another and between different areas in the county in any particular year. This is mainly because of the kind of management used and the variations in amount and spacing of rainfall during the growing season. Another reason for variations in yields is damage to plants by insects or diseases.

TABLE 5.—*Predicted average acre yields of principal crops under two levels of management*

[Dashes indicate soil is not suitable for the crop or that the crop ordinarily is not grown]

Soil units	Corn		Oats		Alfalfa-brome grass hay		Pasture	
	Average	High	Average	High	Average	High	Average	High
	Bu.	Bu.	Bu.	Bu.	Tons	Tons	Cow-acre-days ¹	Cow-acre-days ¹
Alluvial land.....							100	145
Arenzville silt loam ²	60	105	50	70	3.0	4.5	110	145
Ashdale silt loam, 2 to 6 percent slopes.....	60	95	50	68	2.8	3.5	100	135
Ashdale silt loam, 2 to 6 percent slopes, moderately eroded.....	58	90	48	65	2.6	3.4	95	125
Ashdale silt loam, 6 to 12 percent slopes.....	60	87	52	70	2.6	3.5	90	130
Ashdale silt loam, 6 to 12 percent slopes, moderately eroded.....	53	85	50	65	2.8	3.3	90	125
Ashdale silt loam, 6 to 12 percent slopes, severely eroded.....	45	80	40	60	2.0	3.5	85	125
Ashdale silt loam, 12 to 20 percent slopes.....	55	85	50	65	2.5	3.0	95	130
Ashdale silt loam, 12 to 20 percent slopes, moderately eroded.....	50	80	48	65	2.4	3.0	90	125
Ashdale silt loam, 12 to 20 percent slopes, severely eroded.....			40	60	2.0	3.0	80	120
Boaz silt loam ²		85		65		3.5	90	130
Boone fine sand, 6 to 20 percent slopes, eroded.....							20	35
Calamine silt loam, 0 to 2 percent slopes ²		85		70		3.5	80	145
Calamine silt loam, 2 to 6 percent slopes ²		85		70		3.5	80	145
Calamine silt loam, 6 to 12 percent slopes ²	50	90	40	75	2.5	3.5	85	145
Calamine silt loam, 6 to 12 percent slopes, moderately eroded ²	45	85	35	70	2.0	3.5	85	145
Chaseburg silt loam, 0 to 2 percent slopes.....	65	105	50	70	3.5	4.5	110	145
Chaseburg silt loam, 2 to 6 percent slopes.....	65	105	50	70	3.5	4.5	105	140
Dakota loam, 0 to 2 percent slopes.....	60	85	45	60	2.0	3.0	85	120
Dakota loam, 2 to 6 percent slopes.....	60	85	45	60	2.0	3.0	85	120
Dakota loam, mottled subsoil variant, 0 to 3 percent slopes.....	50	85	45	60	2.0	4.0	90	125
Derinda silt loam, 2 to 6 percent slopes, moderately eroded.....	55	85	50	70	2.3	3.8	80	125
Derinda silt loam, 6 to 12 percent slopes.....	60	87	50	70	2.5	4.0	80	125
Derinda silt loam, 6 to 12 percent slopes, moderately eroded.....	55	85	45	65	2.3	3.8	75	125
Derinda silt loam, 12 to 20 percent slopes, eroded.....	42	75	35	45	2.0	3.5	68	122
Derinda soils, 12 to 20 percent slopes, severely eroded.....			30	40	1.5	3.0	65	115
Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes ²	45	80	40	50	2.0	3.5	80	115
Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded ²	43	83	43	55	2.3	3.3	80	115
Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded.....	50	78	48	65	2.4	3.1	80	115
Dodgeville silt loam, 6 to 12 percent slopes.....	55	80	48	62	2.5	3.2	85	120

See footnotes at end of table.

TABLE 5.—*Predicted average acre yields of principal crops under two levels of management—Continued*

Soil units	Corn		Oats		Alfalfa-brome-grass hay		Pasture	
	Average	High	Average	High	Average	High	Average	High
	Bu.	Bu.	Bu.	Bu.	Tons	Tons	Cow-acre- days ¹	Cow-acre- days ¹
Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded.....	50	75	45	60	2.3	3.0	80	110
Dodgeville silt loam, 12 to 20 percent slopes.....	48	70	48	60	2.4	3.0	80	115
Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded.....	45	70	45	58	2.2	2.9	75	110
Dodgeville soils, 6 to 12 percent slopes, severely eroded.....	42	75	40	58	2.1	3.0	70	110
Dodgeville soils, 12 to 20 percent slopes, severely eroded.....			40	60	2.0	2.8	70	115
Downs silt loam, 2 to 6 percent slopes, moderately eroded.....	65	105	50	70	2.8	3.5	95	135
Downs silt loam, 6 to 12 percent slopes, moderately eroded.....	60	100	48	68	2.7	3.4	90	135
Dubuque silt loam, 2 to 6 percent slopes.....	50	75	40	60	2.4	3.0	75	115
Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.....	45	73	38	58	2.2	2.8	70	110
Dubuque silt loam, 6 to 12 percent slopes.....	48	75	38	60	2.2	2.8	70	115
Dubuque silt loam, 6 to 12 percent slopes, moderately eroded.....	45	70	35	55	2.0	2.7	65	100
Dubuque silt loam, 12 to 20 percent slopes.....	48	75	38	58	2.0	2.6	65	95
Dubuque silt loam, 12 to 20 percent slopes, moderately eroded.....	45	70	35	55	1.8	2.5	60	85
Dubuque silt loam, 20 to 30 percent slopes.....			35	50	1.8	2.5	60	85
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.....			32	48	1.5	2.3	55	80
Dubuque silt loam, 30 to 45 percent slopes.....							55	
Dubuque soils, 6 to 12 percent slopes, severely eroded.....	40	60	35	55	1.8	2.5	55	80
Dubuque soils, 12 to 20 percent slopes, severely eroded.....			32	55	1.7	2.5	50	80
Dunbarton silt loam, 2 to 6 percent slopes.....	35	60	30	55	1.8	2.3	55	80
Dunbarton silt loam, 6 to 12 percent slopes.....	35	60	30	55	1.8	2.3	55	80
Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded.....	32	58	28	55	1.6	2.3	53	80
Dunbarton silt loam, 12 to 20 percent slopes.....			25	50	1.6	2.2	53	75
Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded.....			23	50	1.3	2.2	50	75
Dunbarton silt loam, 20 to 30 percent slopes.....					1.3	2.0	50	70
Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded.....					1.2	2.0	48	70
Dunbarton silt loam, 30 to 45 percent slopes.....							45	
Edmund silt loam, 2 to 6 percent slopes, moderately eroded.....	40	60	35	55	1.8	2.3	60	80
Edmund silt loam, 6 to 12 percent slopes, moderately eroded.....	38	60	32	55	1.8	2.3	60	80
Edmund silt loam, 12 to 20 percent slopes.....			35	55	1.2	2.2	55	75
Eleroy silt loam, 2 to 6 percent slopes.....	60	90	50	65	2.8	3.4	90	135
Eleroy silt loam, 2 to 6 percent slopes, moderately eroded.....	55	85	48	65	2.6	3.2	85	125
Eleroy silt loam, 6 to 12 percent slopes.....	58	85	50	65	2.6	3.2	85	130
Eleroy silt loam, 6 to 12 percent slopes, moderately eroded.....	55	80	45	63	2.4	3.3	80	125
Eleroy silt loam, 12 to 20 percent slopes.....	50	80	45	65	2.4	3.2	80	125
Eleroy silt loam, 12 to 20 percent slopes, moderately eroded.....	45	75	40	62	2.2	3.0	75	115
Fayette silt loam, benches, 2 to 6 percent slopes.....	70	110	60	75	3.0	4.5	100	140
Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded.....	65	110	58	75	2.8	4.0	90	130
Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded.....	60	100	55	75	2.8	4.0	85	130
Fayette silt loam, uplands, 2 to 6 percent slopes.....	70	110	60	75	3.0	4.5	100	140
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.....	65	110	55	75	2.8	4.0	90	130
Fayette silt loam, uplands, 6 to 12 percent slopes.....	63	110	58	75	3.0	4.0	95	135
Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded.....	60	100	55	75	2.8	4.0	85	130
Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded.....	48	90	42	60	2.4	3.0	75	120
Fayette silt loam, uplands, 12 to 20 percent slopes.....	60	95	45	65	2.5	3.5	85	125
Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded.....	50	80	43	65	2.3	3.2	80	130
Fayette silt loam, uplands, 20 to 30 percent slopes.....			40	65	2.2	2.8	75	115
Fayette silt loam, valleys, 2 to 6 percent slopes.....	60	95	55	75	3.2	4.5	105	145
Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded.....	55	90	52	75	3.0	3.5	95	140
Fayette silt loam, valleys, 6 to 12 percent slopes.....	58	88	52	75	3.0	3.5	98	142
Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded.....	55	85	50	75	2.8	3.4	90	130
Fayette silt loam, valleys, 12 to 20 percent slopes.....	50	85	47	75	2.7	3.4	88	130
Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded.....	48	75	45	65	2.6	3.2	85	130

See footnotes at end of table.

TABLE 5.—Predicted average acre yields of principal crops under two levels of management—Continued

Soil units	Corn		Oats		Alfalfa-bromegrass hay		Pasture	
	Average	High	Average	High	Average	High	Average	High
	Bu.	Bu.	Bu.	Bu.	Tons	Tons	Cow-acre- days ¹	Cow-acre- days ¹
Fayette and Dubuque soils and Pits, gently sloping, eroded ³								
Fayette and Dubuque soils and Pits, moderately sloping, eroded ³								
Fayette and Dubuque soils and Pits, moderately steep, eroded ³								
Gale silt loam, 6 to 12 percent slopes, eroded	50	76	40	60	1.8	2.4	65	100
Gale silt loam, 12 to 20 percent slopes, eroded			38	55	1.6	2.2	55	90
Gale silt loam, 20 to 30 percent slopes, eroded			35	50	1.6	2.2	55	85
Gotham loamy fine sand, 2 to 6 percent slopes, eroded	40	60	40	60	1.6	2.2	50	85
Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded	35	45	35	50	1.5	2.0	40	65
Hixton loam, 2 to 6 percent slopes, eroded	48	75	45	63	2.0	3.0	70	110
Hixton loam, 6 to 12 percent slopes, eroded	40	73	40	50	1.5	3.0	60	100
Hixton loam, 12 to 20 percent slopes	38	68	38	48	1.3	2.5	58	95
Hixton loam, 12 to 20 percent slopes, moderately eroded			36	48	1.2	2.1	55	85
Hixton loam, 20 to 30 percent slopes, eroded			25	43	1.2	1.8	51	80
Hixton sandy loam, 2 to 6 percent slopes, eroded	43	75	40	58	1.8	2.4	60	90
Hixton sandy loam, 6 to 12 percent slopes, eroded	38	65	32	55	1.3	2.1	50	85
Hixton sandy loam, 12 to 20 percent slopes, eroded			30	50	1.0	2.0	45	80
Hixton sandy loam, 12 to 20 percent slopes, severely eroded					.8	2.0	30	65
Hixton sandy loam, 20 to 30 percent slopes							40	70
Houghton mucky peat ²		90		60		3.0	60	130
Huntsville silt loam, 0 to 2 percent slopes ²	65	100	55	70	3.2	4.5	115	150
Huntsville silt loam, 2 to 6 percent slopes ²	63	100	53	70	3.0	4.0	110	145
Keltner silt loam, 2 to 6 percent slopes	60	90	55	70	2.5	4.0	85	125
Keltner silt loam, 6 to 12 percent slopes, moderately eroded	55	85	45	65	2.3	3.8	75	125
Lawson silt loam	60	110	45	65	2.0	4.0	100	145
Lindstrom silt loam, 2 to 6 percent slopes	62	95	55	75	3.2	3.5	110	145
Lindstrom silt loam, 6 to 12 percent slopes, eroded	55	85	45	65	2.8	3.4	90	130
Lindstrom silt loam, 12 to 20 percent slopes, eroded	50	80	40	62	2.6	3.3	80	125
Marsh								
Marshan silt loam ²		80		65		3.3	80	145
Meridian loam, 0 to 2 percent slopes	55	87	48	68	2.2	2.8	70	110
Meridian loam, 2 to 6 percent slopes	55	85	48	85	2.2	2.8	68	105
Meridian sandy loam, 0 to 2 percent slopes	45	75	44	65	1.8	2.4	60	95
Meridian sandy loam, 2 to 6 percent slopes	42	75	42	60	1.6	2.2	55	90
Mifflin soils, 2 to 6 percent slopes, eroded	45	73	38	58	2.2	2.8	70	110
Mifflin soils, 6 to 12 percent slopes, eroded	45	70	35	55	2.0	2.7	65	100
Mifflin soils, 12 to 20 percent slopes, eroded	45	70	35	55	1.8	2.5	60	85
Mifflin soils, 20 to 30 percent slopes, eroded			32	48	1.5	2.3	55	80
Mine pits and dumps								
Muscatine silt loam, 0 to 2 percent slopes	65	115	45	70	2.5	4.0	95	150
Muscatine silt loam, 2 to 6 percent slopes	73	110	50	70	3.0	4.0	95	150
Muscatine silt loam, 2 to 6 percent slopes, moderately eroded	70	110	45	70	2.8	4.0	93	150
Muscatine silt loam, benches, 0 to 2 percent slopes	65	115	45	70	2.5	4.0	95	150
Muscatine silt loam, benches, 2 to 6 percent slopes	73	110	50	70	3.0	4.0	95	150
Northfield loam, 6 to 12 percent slopes	42	65	42	60	2.0	2.5	60	95
Northfield loam, 6 to 12 percent slopes, moderately eroded	38	60	40	58	1.8	2.2	55	85
Northfield loam, 12 to 20 percent slopes			40	60	1.9	2.4	60	90
Northfield loam, 12 to 20 percent slopes, moderately eroded			35	55	1.6	2.0	50	80
Northfield loam, 20 to 30 percent slopes							55	80
Northfield loam, 20 to 30 percent slopes, moderately eroded							50	75
Northfield sandy loam, 2 to 6 percent slopes, moderately eroded	38	60	40	55	1.8	2.4	50	80
Northfield sandy loam, 6 to 12 percent slopes	38	60	40	55	1.8	2.4	50	80
Northfield sandy loam, 6 to 12 percent slopes, moderately eroded	35	55	35	50	1.5	2.2	45	75
Northfield sandy loam, 12 to 20 percent slopes			38	52	1.6	2.2	45	75
Northfield sandy loam, 12 to 20 percent slopes, moderately eroded			32	48	1.4	2.0	40	70
Northfield sandy loam, 20 to 30 percent slopes							40	65
Northfield sandy loam, 20 to 30 percent slopes, moderately eroded							35	60
Northfield sandy loam, 30 to 45 percent slopes							25	50
Orion silt loam ²	45	85	42	65		3.5	95	105
Orion silt loam, wet variant							85	100
Palsgrove silt loam, 2 to 6 percent slopes	60	90	50	65	2.8	3.4	90	135

See footnotes at end of table.

TABLE 5.—Predicted average acre yields of principal crops under two levels of management—Continued

Soil units	Corn		Oats		Alfalfa-bromegrass hay		Pasture	
	Average	High	Average	High	Average	High	Average	High
Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded	Bu. 55	Bu. 85	Bu. 48	Bu. 65	Tons 2.6	Tons 3.2	Cow-acre-days ¹ 85	Cow-acre-days ¹ 125
Palsgrove silt loam, 6 to 12 percent slopes	58	85	50	65	2.6	3.3	85	130
Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded	55	80	45	63	2.4	3.2	80	125
Palsgrove silt loam, 6 to 12 percent slopes, severely eroded	50	80	40	60	2.0	3.2	80	125
Palsgrove silt loam, 12 to 20 percent slopes	50	80	45	65	2.4	3.2	80	125
Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded	45	75	40	62	2.2	3.0	75	115
Palsgrove silt loam, 12 to 20 percent slopes, severely eroded			35	60	2.0	3.0	70	115
Rozetta silt loam, benches, 0 to 2 percent slopes	60	90	55	75	3.0	3.5	100	145
Rozetta silt loam, benches, 2 to 6 percent slopes	60	90	55	70	3.0	3.5	95	140
Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded	55	90	52	70	2.8	3.3	85	130
Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded	58	100	50	60	2.5	3.8	95	135
Sable silt loam ²		85		70		3.5	80	145
Sable silt loam, benches ²		85		70		3.5	80	145
Schapville silt loam, 6 to 12 percent slopes, moderately eroded	60	85		65	2.4	3.8	80	125
Schapville soils, 6 to 12 percent slopes, severely eroded			35	55	1.5	2.8	60	110
Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes ²	50	85	45	55	2.2	3.5	85	115
Sogn silt loam, 2 to 12 percent slopes, eroded			15	25	1.0	1.8	40	65
Sogn silt loam, 12 to 20 percent slopes							40	65
Sogn silt loam, 12 to 20 percent slopes, moderately eroded							35	60
Sogn silt loam, 20 to 30 percent slopes								
Sogn silt loam, 30 to 45 percent slopes								
Stony and rocky land, moderately steep								
Stony and rocky land, steep								
Stronghurst silt loam, 0 to 2 percent slopes ²	50	90	50	65	2.0	4.0	90	125
Stronghurst silt loam, 2 to 6 percent slopes ²	55	90	55	65	2.5	4.0	90	125
Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded	50	90	45	65	2.0	4.0	85	120
Stronghurst silt loam, benches, 0 to 2 percent slopes	50	90	50	65	2.0	4.0	90	125
Stronghurst silt loam, benches, 2 to 6 percent slopes	55	90	55	65	2.5	4.0	90	125
Tama silt loam, 0 to 2 percent slopes	75	115	60	75	3.0	4.5	110	140
Tama silt loam, 2 to 6 percent slopes	70	110	58	75	3.0	4.5	105	140
Tama silt loam, 2 to 6 percent slopes, moderately eroded	60	90	50	75	2.8	4.5	100	140
Tama silt loam, 6 to 12 percent slopes, moderately eroded	50	85	45	65	2.8	3.4	85	130
Tama silt loam, 6 to 12 percent slopes, severely eroded	45	80	40	60	2.5	3.3	80	130
Tama silt loam, benches, 0 to 2 percent slopes	75	115	60	75	3.0	4.5	110	140
Tama silt loam, benches, 2 to 6 percent slopes	70	115	58	75	3.0	4.5	105	140
Worthen silt loam, 0 to 2 percent slopes	65	100	55	70	3.2	3.7	115	150
Worthen silt loam, 2 to 6 percent slopes	60	95	55	68	3.0	3.5	105	145

¹ Cow-acre-days is a term used to express the carrying capacity of pasture. This value is obtained by multiplying the number of animal units carried per acre times the number of days the pasture is grazed without injury to the sod.

² Soil requires adequate drainage and protection from overflow for maximum yields.

³ For yield information refer to soils of the Fayette and Dubuque series listed individually in the table and to Mine pits and dumps.

Woodland Uses of the Soils⁴

Originally, about 60 percent of the land area of Lafayette County was wooded. The rest was in brush or was in open prairie. Most of the wooded areas were in the northeastern part of the county. In 1959, according to the U.S. Census of Agriculture, slightly more than 7 percent of the land in farms, or 29,578 acres, was in trees. The wooded areas are mostly on steep valley slopes or are in other areas not suited to farming.

The woodland of Lafayette County is in the northern extension of the Central Hardwood Forest Region. The forest vegetation is classified as the oak-hickory forest

⁴ By A. WILLIAM JIPSON, woodland conservationist, Soil Conservation Service.

type but is transitional between that type and the northern hardwood type, which is widespread in the Northern Forest Region. Most stands are made up of trees of both types. Predominant on the uplands is northern red oak, which generally grows in mixtures with black oak, white oak, bur oak, and northern pin oak. Other trees in the stands include shagbark hickory, American elm, white ash, and black walnut. Along the streams are silver maple, river birch, black willow, cottonwood, green ash, and other lowland trees. A typical example of an old-growth stand of trees is shown in figure 11.

About 90 percent of the woodland is pastured. In most areas burning, grazing, and poor logging practices have hindered restocking, and as a result, the stands have been reduced to less than half of their capacity. Burning, as a



Figure 11.—A stand of white oak, bur oak, and basswood, 100 to 150 years old, on a Derinda silt loam. The area is moderately grazed, but the basswood reproduces rapidly.

practice, has been largely eliminated. Grazing and poor logging practices, however, seriously threaten the remaining stands of timber.

Most products harvested from the woodland are used on the farms; only a small amount is sold. Of the seven sawmills operating in the county in 1960, only two produced lumber and ties for commercial use. Among the woodland products are firewood, fence posts, pulpwood, saw logs and veneer logs, and ties. There were 155,000 board feet of saw logs and veneer logs cut on the farms in 1959. In the same year 4,329 cords of wood were cut for fuel. Also, 32,758 fence posts and 40 cords of pulpwood were harvested.

In the pages that follow, the limitations to the growing of trees and the ratings given for each limitation are discussed. Then each woodland suitability group is discussed, and following that, yield information for hardwoods and conifers is given.

Woodland suitability groups

The soils of Lafayette County have been placed in woodland suitability groups to assist owners of woodland in planning the use of their soils. Each group is made up of soils that have about the same water-supplying capacity and other characteristics that influence the growth of trees. The soils also have similar limitations and are subject to the same hazards when used for trees. All of the soils in one group, therefore, support similar kinds of trees, have about the same potential productivity, and require similar kinds of conservation practices and other management.

The kind and quantity of wood products that can be grown on a given area largely determine the kind of management that should be used. Not all soils produce alike; productivity may range from none to several hundred board feet per acre annually. Soils suitable for pine may not be suitable for spruce. Soils that now grow trees of low quality may be good locations for black walnut or other trees that are highly prized. Therefore, it is

important to learn as much as possible about the suitability of the soils for different kinds of trees. Information given in the suitability groups can be used along with other information in the soil survey to determine the kind of trees that grow best on a particular soil and their potential productivity. It can also be used to determine the special hazards related to the soil and the kind of management needed.

In the pages that follow, each suitability group is discussed. The soils in each group are listed, the hazards discussed, and management suitable for all the soils in the group is suggested. The groups have been numbered according to a statewide system. Groupings 2, 8, and 11, however, do not occur in Lafayette County and are therefore not discussed.

For each group, site index ratings are given for suitable trees. The site index, as given, is the total height of the dominant and codominant trees in the stand at 50 years of age and is a rating of potential productivity. The ratings are based on measurements made on individual plots of representative sites of most of the groups and on interpolations from plots on similar soils.

Discussed for each suitability group are the hazards of seedling mortality, or the loss of seedlings as related to the kinds of soils; the risk of plant competition, or competition from undesirable plants; the limitations to the use of equipment; the hazards to seedlings from disease, insects, or animals; and the hazards of windthrow and erosion. A rating of *slight* means that no special problems are recognized, and that the use of the soils in the group for trees would not be affected, except as noted, by the particular hazard. A rating of *moderate* means that the use of the soils for trees would be affected by the stated hazard, but not to the extent of precluding such use, and that ordinary management practices can be used to control the hazard. A rating of *severe* means that the stated hazard makes it impractical to manage the soils for trees, or that difficult or expensive practices are required for control of the hazard. Also discussed are the kinds of trees that grow best on the soils of each group.

WOODLAND SUITABILITY GROUP 1

The soils in this group have the highest potential for production of timber of any soils in the county. They have sufficient depth for good development of roots, have good moisture-supplying capacity, are high in fertility, and have good internal drainage. Because these soils are highly desirable for agriculture, stands of timber generally occupy only small isolated areas of the soils or areas that are too steep for farming. The following soils are in this group:

- Arenzville silt loam.
- Chaseburg silt loam, 0 to 2 percent slopes.
- Chaseburg silt loam, 2 to 6 percent slopes.
- Derinda silt loam, 2 to 6 percent slopes, moderately eroded.
- Derinda silt loam, 6 to 12 percent slopes.
- Derinda silt loam, 6 to 12 percent slopes, moderately eroded.
- Derinda silt loam, 12 to 20 percent slopes, eroded.
- Derinda soils, 12 to 20 percent slopes, severely eroded.
- Downs silt loam, 2 to 6 percent slopes, moderately eroded.
- Downs silt loam, 6 to 12 percent slopes, moderately eroded.
- Dubuque silt loam, 2 to 6 percent slopes.
- Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.
- Dubuque silt loam, 6 to 12 percent slopes.
- Dubuque silt loam, 6 to 12 percent slopes, moderately eroded.
- Dubuque silt loam, 12 to 20 percent slopes.

Dubuque silt loam, 12 to 20 percent slopes, moderately eroded.
 Dubuque silt loam, 20 to 30 percent slopes.
 Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.
 Dubuque silt loam, 30 to 45 percent slopes.
 Dubuque soils, 6 to 12 percent slopes, severely eroded.
 Dubuque soils, 12 to 20 percent slopes, severely eroded.
 Eleroy silt loam, 2 to 6 percent slopes.
 Eleroy silt loam, 2 to 6 percent slopes, moderately eroded.
 Eleroy silt loam, 6 to 12 percent slopes.
 Eleroy silt loam, 6 to 12 percent slopes, moderately eroded.
 Eleroy silt loam, 12 to 20 percent slopes.
 Eleroy silt loam, 12 to 20 percent slopes, moderately eroded.
 Fayette silt loam, benches, 2 to 6 percent slopes.
 Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded.
 Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded.
 Fayette silt loam, uplands, 2 to 6 percent slopes.
 Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.
 Fayette silt loam, uplands, 6 to 12 percent slopes.
 Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded.
 Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded.
 Fayette silt loam, uplands, 12 to 20 percent slopes.
 Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded.
 Fayette silt loam, uplands, 20 to 30 percent slopes.
 Fayette silt loam, valleys, 2 to 6 percent slopes.
 Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded.
 Fayette silt loam, valleys, 6 to 12 percent slopes.
 Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded.
 Fayette silt loam, valleys, 12 to 20 percent slopes.
 Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded.
 Fayette and Dubuque soils and Pits, gently sloping, eroded (Fayette and Dubuque parts only).
 Fayette and Dubuque soils and Pits, moderately sloping, eroded (Fayette and Dubuque parts only).
 Fayette and Dubuque soils and Pits, moderately steep, eroded (Fayette and Dubuque parts only).
 Gale silt loam, 6 to 12 percent slopes, eroded.
 Gale silt loam, 12 to 20 percent slopes, eroded.
 Gale silt loam, 20 to 30 percent slopes, eroded.
 Mifflin soils, 2 to 6 percent slopes, eroded.
 Mifflin soils, 6 to 12 percent slopes, eroded.
 Mifflin soils, 12 to 20 percent slopes, eroded.
 Mifflin soils, 20 to 30 percent slopes, eroded.
 Palsgrove silt loam, 2 to 6 percent slopes.
 Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded.
 Palsgrove silt loam, 6 to 12 percent slopes.
 Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded.
 Palsgrove silt loam, 6 to 12 percent slopes, severely eroded.
 Palsgrove silt loam, 12 to 20 percent slopes.
 Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded.
 Palsgrove silt loam, 12 to 20 percent slopes, severely eroded.
 Rozetta silt loam, benches, 0 to 2 percent slopes.
 Rozetta silt loam, benches, 2 to 6 percent slopes.
 Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded.
 Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded.

The native vegetation on the soils of this group is hardwood timber. Red oak is predominant and in many places grows in nearly pure stands. In other places red oak grows in varying proportions in stands that also contain sugar maple, elm, white ash, basswood, black cherry, white oak, and black walnut.

The site index for red oak ranges from 63 to 75. It is about the same on north-facing and south-facing slopes, but it is generally higher on the middle and lower slopes than on the upper slopes.

Hardwoods on soils of this group generally are tall and are well formed. They are excellent for veneer and saw logs.

Regeneration of oak is difficult on these soils. Production of seed is generally good, but the supply of seed and the number of seedlings are greatly reduced by rodents and insects. In addition, oak seedlings require much light and in many places their growth is hindered by taller trees nearby. Other hardwoods, and particularly sugar maple, soft maple, white ash, and elm, are more tolerant than oak of shade. They generally become established if seed trees are available.

Little of white pine or of Norway pine grows naturally on these soils, but where they are planted, these trees make rapid growth. Norway spruce and European larch also grow well if planted, but they do not live so long as the pines.

Competition to seedlings from brush, grass, and weeds is severe, and practices that control growth of undesirable plants are needed. For satisfactory stocking, remove sod and litter from the site and plant the seedlings in furrows laid on the contour. In some places herbicides can be used effectively for control of undesirable plants.

The use of equipment is limited in places, and the soils are subject to moderate damage from compaction if heavy logging equipment is used. Logging should therefore be done in winter for the most efficient results and the least amount of damage to the soils and to the timber. On slopes of less than 12 percent, the use of equipment is limited only by wetness after a heavy rain or by thawing in spring. The Arenzville and Chaseburg soils, however, also are subject to occasional floods, but the floodwater quickly recedes. On slopes of more than 12 percent, limitations to the use of equipment are more serious than on the less sloping soils. Therefore, roads and skid trails should be placed on the tops of ridges if feasible. In this way moving the logs by truck is made easier. Also, runoff is less likely to concentrate in skid trails and the risk of gullies forming is reduced.

Hardwoods on the soils in this group produce saw timber and veneer logs of high quality if well managed. Red oak should be encouraged on the warmer south- and west-facing sites and on the drier upper slopes. On north- and east-facing slopes, in sheltered coves, and on lower slopes, red oak, black walnut, sugar maple, basswood, white ash, and other hardwoods of high quality are the suitable trees to plant.

In areas where the soil has been considerably altered by tillage, hardwood plantings generally are not successful. Such areas and areas that are eroded should be planted to white pine, Norway pine, white spruce, Norway spruce, or white ash. In addition, redcedar planted in severely eroded areas helps reclaim them and also is a good source of fence posts.

The Arenzville, Chaseburg, and other deep soils of the bottom land and the deeper upland soils are particularly suited to black walnut. White spruce, white pine, and white-cedar are the trees that are best suited as farm windbreaks.

WOODLAND SUITABILITY GROUP 3

The soils in this group are medium textured to coarse textured and are somewhat droughty. Some of the soils

are in the upland and others are on terraces. The following soils are in this group:

Dakota loam, 0 to 2 percent slopes.
 Dakota loam, 2 to 6 percent slopes.
 Hixton loam, 2 to 6 percent slopes, eroded.
 Hixton loam, 6 to 12 percent slopes, eroded.
 Hixton loam, 12 to 20 percent slopes.
 Hixton loam, 12 to 20 percent slopes, moderately eroded.
 Hixton loam, 20 to 30 percent slopes, eroded.
 Hixton sandy loam, 2 to 6 percent slopes, eroded.
 Hixton sandy loam, 6 to 12 percent slopes, eroded.
 Hixton sandy loam, 12 to 20 percent slopes, eroded.
 Hixton sandy loam, 12 to 20 percent slopes, severely eroded.
 Hixton sandy loam, 20 to 30 percent slopes.
 Meridian loam, 0 to 2 percent slopes.
 Meridian loam, 2 to 6 percent slopes.
 Meridian sandy loam, 0 to 2 percent slopes.
 Meridian sandy loam, 2 to 6 percent slopes.

Of the soils in this group, the Hixton are on hills in the upland and are fairly shallow to sandstone, and the Meridian are on terraces and are underlain by sand. The Dakota soils, also on terraces, formed under prairie, and trees generally do not grow on them.

The native trees on these soils were chiefly various kinds of oak, but hickory, black cherry, aspen, and white birch grew in some places. The site index for black oak ranges from 43 to 57, which is low to medium for oak. In this group the soils on north- and east-facing slopes, in coves, and on sheltered valley slopes are better sites for black oak than those on south- and west-facing slopes, on ridgetops, or on broad flats.

The quality of timber on the cool sites is fair to good, but it is only fair on the warm sites. Lumber and ties are the principal products. Plot measurements indicate that the quantity and quality of the trees in natural stands and in plantations of white pine and Norway pine are consistently higher than those of oak on soils of this group.

Regeneration of oak is difficult on these soils. In stands that have been logged, the oak in many places is replaced by sprouts from stumps or roots of trees of poor quality and by blackberry bushes and hazel brush. Factors that limit reproduction of oaks include drought, insects, and rodents. Oak wilt causes fairly severe losses in older stands and is the principal disease hazard.

Equipment can be operated on these soils, even when they are wet, except where the slope is too steep. Soil compaction is not severe, and logging can therefore be done during warm weather. Generally, tree planting machines can be used on slopes up to 10 percent, but special machines are needed on steeper slopes. In sloping areas planting by machine should be on the contour to prevent serious erosion. Planting on the shallow or stony Hixton soils generally must be done by hand.

Natural stands of oak should be managed so that the better quality trees are reproduced. This can be done by removing cull trees and undesirable kinds of trees so that oaks of better quality increase.

Norway pine and white pine are the trees best suited to these soils. Norway pine is preferred because of its resistance to insects and disease. White pine, however, produces higher yields and the lumber is of better quality. Norway pine and white pine are also well suited to use as windbreaks. Jack pine is suited to the soils of this group, but it does not attain so good a form as the Norway and white pines.

WOODLAND SUITABILITY GROUP 4

In this group are sandy and droughty soils that are level or sloping. These soils occupy areas in the upland or on terraces. The following soils are in this group:

Boone fine sand, 6 to 20 percent slopes, eroded.
 Gotham loamy fine sand, 2 to 6 percent slopes, eroded.
 Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded.

The Boone soil in this group is in the upland and is underlain by sand or sandstone bedrock. The Gotham soils are on terraces and are underlain by sand.

The native trees on these soils consist mainly of black oak and northern pin oak, but jack pine grows in a few places. In many places, however, the Gotham soils are treeless or support only a sparse, scrubby growth of trees.

For black oak, the site index ranges from 35 to 47. The gross yield from fully stocked stands of black oak averages 10 cords per acre at 50 years of age, and the timber is of low quality. It is therefore doubtful that oak can be grown profitably on these soils.

Little of either white pine or Norway pine is grown commercially in Lafayette County. Plot measurements of these trees on similar soils indicate that such trees yield up to 50 cords per acre at 50 years of age. The potential yield of white pine and Norway pine should be considered in determining the kind of management that should be used on these soils and in deciding if an area should be converted from oak to pine.

Because the soils in this group are droughty, the mortality of seedlings is severe. Oak is established mainly by sprouts from stumps, rather than from seed. Pines can be established if nursery grown seedlings are planted, but even these seedlings are sometimes lost through lack of moisture. The seedlings planted should be from strong, vigorous stock. Planting in fall if the supply of moisture is favorable helps to get a successful stand, since the risk of frost heaving is slight.

Competition to seedlings from other plants is slight. Planting generally can be done without special preparation of the site. Before planting areas in sod, however, the sod should be removed or the seedlings planted in furrows laid on the contour.

Equipment can be operated throughout the year on slopes of less than 12 percent, but special equipment is required for planting on steeper slopes. Damage from compaction is negligible.

Erosion is a serious hazard only in areas where the vegetation has been removed. Such areas should be mulched with straw, brush, or manure after planting. Soils that are severely eroded generally do not produce enough lumber for commercial use.

No serious diseases are known to affect trees on these soils. White pine, however, is susceptible to damage by pine tip weevils. Also, root-collar weevils damage plantings of Scotch pine, and there is danger of these weevils spreading into plantings of Norway and jack pines.

If feasible, low-grade stands of oak on these soils should be converted to pine. White pine can be established by planting seedlings in existing stands of oak. Norway and jack pines, however, should be planted in open flats or in areas that face to the south.

WOODLAND SUITABILITY GROUP 5

The soils in this group are similar to those of group 1, but their limited depth restricts development of tree roots. They have less capacity for storing moisture, are generally steeper, and are less well suited to farming than the soils of group 1. Depth of the soils ranges from 12 to 24 inches. The following soils are in this group:

- Dunbarton silt loam, 2 to 6 percent slopes.
- Dunbarton silt loam, 6 to 12 percent slopes.
- Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded.
- Dunbarton silt loam, 12 to 20 percent slopes.
- Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded.
- Dunbarton silt loam, 20 to 30 percent slopes.
- Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded.
- Dunbarton silt loam, 30 to 45 percent slopes.
- Northfield loam, 6 to 12 percent slopes.
- Northfield loam, 6 to 12 percent slopes, moderately eroded.
- Northfield loam, 12 to 20 percent slopes.
- Northfield loam, 12 to 20 percent slopes, moderately eroded.
- Northfield loam, 20 to 30 percent slopes.
- Northfield loam, 20 to 30 percent slopes, moderately eroded.
- Northfield sandy loam, 2 to 6 percent slopes, moderately eroded.
- Northfield sandy loam, 6 to 12 percent slopes.
- Northfield sandy loam, 6 to 12 percent slopes, moderately eroded.
- Northfield sandy loam, 12 to 20 percent slopes.
- Northfield sandy loam, 12 to 20 percent slopes, moderately eroded.
- Northfield sandy loam, 20 to 30 percent slopes.
- Northfield sandy loam, 20 to 30 percent slopes, moderately eroded.
- Northfield sandy loam, 30 to 45 percent slopes.

Much of the timber in Lafayette County is on soils of this group. Mixtures of oak or of oak and other hardwoods make up the native cover, and red oak generally predominates.

The site index for oak ranges from 48 to 58. The quality of the trees is good to fair. The length to which trunks of individual trees are free of limbs is less than for trees on more favorable sites. Areas on north- and east-facing slopes, in sheltered coves, and on lower slopes are better sites for oak than other areas of these soils.

Regeneration of oak is difficult on these soils. The supply of seed and the number of seedlings are reduced by insects and rodents and through competition from other plants. Also, on slopes that face south and west, drought and exposure cause moderate loss of seedlings. Stands of hardwood should be managed to maintain a good stock of desirable trees, particularly of red oak. Less desirable trees can be controlled easily by selective cutting, but control of brush that encroaches on the areas requires more skillful management.

Before planting is done, sod and litter should be removed from the sites and furrows should be laid on the contour. Summer fallowing is a desirable practice if erosion can be controlled during the time the site is bare of vegetation. Because of the lack of moisture and the risk of frost heaving, planting should not be done on these droughty soils in fall.

Steep slopes limit the use of equipment in many places. Machines can be used for planting on the gentler slopes, but these areas are generally small and difficult of access. Trucks and wheel tractors can also be used on the gentler slopes if the soils are dry or frozen. Horses are the best source of power, but crawler tractors can be used success-

fully in most places. Indiscriminate use of heavy equipment during frost-free periods causes severe soil compaction and erosion.

Constructing roads for logging is difficult because of the rough terrain and the many rocks. Roads generally are not usable in wet weather and during spring thaws. If feasible, roads should be built along the top of the ridge. In this way, logs are easier to haul and water from runoff is kept from concentrating in skid trails.

The hazard of windthrow is slight on these soils. Even though development of roots is limited, the depth of the soil in crevices between the rocks is sufficient for the trees to establish firm anchorage.

The hazard of erosion is moderate to severe. Runoff from adjacent fields above causes gullies to form in places, and they are difficult to control on these sites. Gullies can be prevented by controlling runoff on the adjacent areas.

Red oak, sugar maple, basswood, white ash, and white oak are the principal trees to encourage if present in stands on these soils. A few black walnut and black cherry trees grow in coves, on lower slopes, and in other favorable sites. These valuable trees should be encouraged where practicable.

White pine and Norway spruce are suitable trees for planting in open areas. On cool, moist sites where the soils have not been altered much by tillage, white ash, basswood, maple, and black walnut can be planted. Stands that are understocked and that have poor natural regeneration can be underplanted with white pine or sugar maple. Trees suitable for planting in windbreaks are white pine, white spruce, Norway spruce, white-cedar, and redcedar.

WOODLAND SUITABILITY GROUP 6

The soils in this group are underlain by limestone at a depth of less than 12 inches. They generally are on the upper part of the slope where runoff is high. Trees on these soils are generally unproductive or yield only small amounts of low-grade timber. It is therefore probably better to keep the areas in trees and thus control runoff and retain the water that falls rather than to manage the soils for production of timber. The following soils are in this group:

- Sogn silt loam, 2 to 12 percent slopes, eroded.
- Sogn silt loam, 12 to 20 percent slopes.
- Sogn silt loam, 12 to 20 percent slopes, moderately eroded.
- Sogn silt loam, 20 to 30 percent slopes.
- Sogn silt loam, 30 to 45 percent slopes.

The native vegetation on soils of this group consists of prairie grasses and shrubs or of open, scrubby stands of bur oak, white oak, black oak, white birch, and redcedar.

Regeneration of trees on these soils is slow and uncertain. Stocking should therefore be kept at the highest level practical. Cutting should be done only to improve the density and composition of the stand. The principal hazard to seedlings is drought and exposure. Competition from other plants is not a hazard to seedlings, but the hazard from insects and rodents is serious in places.

The steep slope and many rocks in these soils prevent the use of machines for planting. Planting of seedlings must therefore be done by hand.

Black locust, wild plum, green ash, white oak, and bur oak are suitable trees to plant on these soils. Planting conifers, except redcedar, is inadvisable because of the underlying limestone.

WOODLAND SUITABILITY GROUP 7

All the soils in this group are somewhat wet. Two sub-groups are recognized; they are 7a and 7b. Soils in group 7a are moderately well drained or somewhat poorly drained, and those in group 7b are poorly drained.

The following soils are in group 7a:

Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes.
 Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded.
 Muscatine silt loam, 2 to 6 percent slopes, moderately eroded.
 Stronghurst silt loam, 0 to 2 percent slopes.
 Stronghurst silt loam, 2 to 6 percent slopes.
 Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded.
 Stronghurst silt loam, benches, 0 to 2 percent slopes.
 Stronghurst silt loam, benches, 2 to 6 percent slopes.

The following soils are in group 7b:

Calamine silt loam, 0 to 2 percent slopes.
 Calamine silt loam, 2 to 6 percent slopes.
 Calamine silt loam, 6 to 12 percent slopes.
 Calamine silt loam, 6 to 12 percent slopes, moderately eroded.
 Marshan silt loam.
 Sable silt loam.
 Sable silt loam, benches.

The Marshan, Sable, and Calamine soils in this group are subject to floods of fairly short duration. The trees on the soils in this group consist of elm, ash, river birch, boxelder, willow, cottonwood, various kinds of oak, and other trees that grow on lowlands. The stands are made up of a single species or of combinations of two or more species.

Because of the difficulty of locating well-stocked stands, individual plot measurements of stands on these soils are not available. Productivity may range from almost nothing in some places to several hundred board feet of timber per acre per year in other places.

The quality of the trees is generally poor on these soils and there are many dead and defective trees in the stand. Parasitic fungi have damaged many. The low quality of the trees is the result of poor soil aeration, which limits root development and subjects the trees to alternate drought and wetness. Saw logs, fuelwood, posts, and ties are the principal products obtained from trees on these soils.

Seedling mortality is severe on these soils because of unseasonable frosts, soil heaving, and damage from insects and diseases. Competition from other plants is also severe and is difficult to control. Regeneration of trees in areas that have been heavily logged is slow and uncertain. In clear-cut areas weeds and brush encroach and sometimes take over the site. Removing only overmature and defective trees helps to maintain existing stands.

Logging equipment can be operated in winter on these soils and during prolonged dry periods. At other times trucks and tractors are likely to be bogged down in mud. The soils in this group are subject to severe compaction, and overgrazing and indiscriminate use of heavy equipment should be avoided. In this way further deterioration of the soil and of the stands of timber can be prevented.

The hazard of windthrow is severe on these soils. The soils are wet and soggy, and consequently, the trees have a shallow, weak root system. When logging is done, care is required to keep from exposing the larger trees to the force of the wind. Openings in the canopy should be no larger than 30 to 40 feet across, and strips of trees should

be kept around exposed areas to provide a barrier to the wind.

Except on streambanks, erosion is not a hazard. When trees are felled, care is needed to keep them from falling into the streams and thus increasing the hazard of streambank erosion. Also, slash should be kept out of streams.

It generally is difficult to get a satisfactory stand of trees on these soils. The areas could be drained and satisfactory sites for planting trees prepared, but the use of the areas for trees does not justify the cost. If planting is done, trees that tolerate wetness should be selected. Cottonwood, willow, white-cedar, and silver maple are suitable trees for planting. American elm should not be planted, because Lafayette County is in the range of the Dutch elm disease.

Trees should never be planted in furrows on these soils. In areas where surface drainage is poor, trees should be planted on hummocks or on ridges formed by furrow slices. Machines can be used to plant trees on sites that have been plowed and disked if the scalpers are removed from the machine.

Trees planted adjacent to areas in brush are likely to be damaged by rabbits. Mice are a serious hazard to trees near areas in sod. Stands of timber near streams are subject to flooding as the result of dams built by beavers, unless the beavers are checked.

WOODLAND SUITABILITY GROUP 9

In this group are somewhat poorly drained to poorly drained alluvial soils that formed under forest. The following soils are in this group:

Alluvial land.
 Boaz silt loam.
 Orion silt loam.
 Orion silt loam, wet variant.

The principal native trees on these soils are bottom-land hardwoods, river birch, cottonwood, and willow. Saw logs and pulpwood are the main products obtained from trees on these soils.

The quality of the site for hardwoods ranges from poor to good on these soils. Cottonwood, for example, grows well on the somewhat poorly drained soils.

Competition to seedlings from weeds and brush that encroach in openings in the stands is severe. The hazards from heat, drought, or frost are slight, but because of frequent flooding, the hazard to seedlings from drowning is severe.

Planting by machine is risky on the somewhat poorly drained soils and impractical on the poorly drained ones. Harvesting of trees should be done only when the soils are dry or are frozen. In any logging operations, the original hardwoods should be maintained. Generally, it is difficult for fire-fighting equipment to gain access to areas of these soils, but fires occur fairly infrequently.

Cottonwood is the only tree suitable for planting on these soils for commercial use. Willows can be planted along streams, however, to protect the banks from erosion.

Except along streambanks where the hazard of erosion is likely to be severe, the hazard of erosion is slight.

Insects generally cause little damage to trees on these soils, but root rot and stem rot cause moderate to severe damage. Damage from flooding because of dams built by beavers causes serious economic losses in places.

WOODLAND SUITABILITY GROUP 10

In this group are organic soils and marshy areas. The organic soils consist of partly decomposed sedges and are in depressions. They are slightly acid to neutral. The following soils are in this group:

Houghton mucky peat.
Marsh.

In places these soils have been altered by overwash from surrounding soils, and willow, soft maple, oak, aspen, and other hardwoods have invaded.

The site index is not available for trees on these soils. Regeneration of existing stands is hindered by flooding, drought, and frosts, and by damping-off caused by soil-borne fungi. Stands on the areas should be maintained as long as feasible. This can be done by cutting so as to salvage trees that are killed or badly injured. In addition, trees injured by fire, insects, fungi, and other harmful agencies, or trees susceptible to such injuries, should be removed to prevent spread of insects or diseases.

Limitations to the use of equipment are severe. The areas are wet, and the soils have low bearing capacity. Logging can be done only when the ground is frozen. The hazard to the soils from compaction is slight, but mechanical equipment causes considerable injury to roots of trees.

The soils in this group are not suitable for trees, and trees should be planted only if the need is great. Willow and poplar can be established on sites that have been drained if the plantings are kept free of weeds until the trees are established. Cuttings of willow can be used instead of seedlings or transplants. If brush is controlled in open areas, tamarack can be established where the soil is acid, and white-cedar and spruce can be established where the soil is nearly neutral. Plantings of these trees, however, are subject to winterkill, unless partial shade is provided until the trees are well established.

The hazard of wind erosion is severe if these soils are drained and cultivated. Therefore, a cover of trees or other vegetation is needed to protect the areas. Windbreaks are also needed in places.

WOODLAND SUITABILITY GROUP 12

The soils in this group are medium textured and are dominantly well drained. Unlike the soils of group 1, these soils formed under prairie and normally do not have a cover of trees. The following soils are in this group:

Ashdale silt loam, 2 to 6 percent slopes.
Ashdale silt loam, 2 to 6 percent slopes, moderately eroded.
Ashdale silt loam, 6 to 12 percent slopes.
Ashdale silt loam, 6 to 12 percent slopes, moderately eroded.
Ashdale silt loam, 6 to 12 percent slopes, severely eroded.
Ashdale silt loam, 12 to 20 percent slopes.
Ashdale silt loam, 12 to 20 percent slopes, moderately eroded.
Ashdale silt loam, 12 to 20 percent slopes, severely eroded.
Dakota loam, mottled subsoil variant, 0 to 3 percent slopes.
Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded.
Dodgeville silt loam, 6 to 12 percent slopes.
Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded.
Dodgeville silt loam, 12 to 20 percent slopes.
Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded.
Dodgeville soils, 6 to 12 percent slopes, severely eroded.
Dodgeville soils, 12 to 20 percent slopes, severely eroded.
Edmund silt loam, 2 to 6 percent slopes, moderately eroded.
Edmund silt loam, 6 to 12 percent slopes, moderately eroded.
Edmund silt loam, 12 to 20 percent slopes.
Huntsville silt loam, 0 to 2 percent slopes.
Huntsville silt loam, 2 to 6 percent slopes.
Keltner silt loam, 2 to 6 percent slopes.

Keltner silt loam, 6 to 12 percent slopes, moderately eroded.
Lawson silt loam.
Lindstrom silt loam, 2 to 6 percent slopes.
Lindstrom silt loam, 6 to 12 percent slopes, eroded.
Lindstrom silt loam, 12 to 20 percent slopes, eroded.
Muscatine silt loam, 0 to 2 percent slopes.
Muscatine silt loam, 2 to 6 percent slopes.
Muscatine silt loam, benches, 0 to 2 percent slopes.
Muscatine silt loam, benches, 2 to 6 percent slopes.
Schapville silt loam, 6 to 12 percent slopes, moderately eroded.
Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes.
Schapville soils, 6 to 12 percent slopes, severely eroded.
Tama silt loam, 0 to 2 percent slopes.
Tama silt loam, 2 to 6 percent slopes.
Tama silt loam, 2 to 6 percent slopes, moderately eroded.
Tama silt loam, 6 to 12 percent slopes, moderately eroded.
Tama silt loam, 6 to 12 percent slopes, severely eroded.
Tama silt loam, benches, 0 to 2 percent slopes.
Tama silt loam, benches, 2 to 6 percent slopes.
Worthen silt loam, 0 to 2 percent slopes.
Worthen silt loam, 2 to 6 percent slopes.

In most areas of these soils trees are lacking, but in a few places there are parklike stands of bur oak, white oak, or redcedar. Most of the acreage is used for farming. Windbreaks, odd-sized areas, wildlife areas, and eroded areas are the only areas that are wooded.

Data that would indicate the potential productivity of these soils are not available. Records of a few plantings of European larch, Norway spruce, white-cedar, and white pine in windbreaks and in plantations on uplands, however, indicate that these conifers make fair to good growth if good nursery stock is used. Deciduous trees that make satisfactory growth are black walnut, green ash, cottonwood, and willow.

Seedlings on these soils are adversely affected by damping-off, drought, rodents, frost heaving, and by competition from other plants. This is probably because the soils lack mycorrhiza, a soil fungus that most forest trees need for good growth. Inoculating the seed or stock to be planted with forest soil that contains mycorrhiza helps correct this deficiency. Most nursery soils contain mycorrhiza, however, and stock obtained from them would most likely be inoculated.

Competition from other plants hinders growth of seedlings in places. Planting the seedlings in spots from which the vegetation has been removed helps control competing plants.

Insects are a hazard in many places, and practices are required for their control.

WOODLAND SUITABILITY GROUP 13

This group consists of miscellaneous land types. Areas of Mine pits and dumps in this group are not suited to trees, but areas of Stony and rocky land support commercial stands of trees. The following soils are in this group:

Fayette and Dubuque soils and Pits, gently sloping, eroded (Mine pits and dumps only).
Fayette and Dubuque soils and Pits, moderately sloping, eroded (Mine pits and dumps only).
Fayette and Dubuque soils and Pits, moderately steep, eroded (Mine pits and dumps only).
Mine pits and dumps.
Stony and rocky land, moderately steep.
Stony and rocky land, steep.

The soil materials that make up Mine pits and dumps consist mostly of recent deposits. These areas have no trees on them or support only a sparse stand of pioneer kinds of trees. Areas of Stony and rocky land support

stands that consist mainly of oak but that include some pine.

On areas of Mine pits and dumps, where there is sufficient soil material to provide anchorage and nourishment for trees, redcedar, black locust, green ash, and cottonwood can be planted to provide ground cover and habitats for wildlife. Planting must be done by hand. The mortality of seedlings is severe, principally because of drought, erosion, and unfavorable soil reaction, or because fresh deposits of material cover the seedlings.

On areas of Stony and rocky land, the stands of oak and pine should be maintained. In these areas the mortality of seedlings on south- and west-facing slopes is severe, mainly because of drought and heat. Access to the areas for control of fire is difficult. Logging also is difficult and generally requires special equipment. Rock outcrops, stones, steep slopes, and the severe hazard of erosion make areas of Stony and rocky land suitable only for woodland and wildlife.

Yield information

The estimated potential annual acre yields of usable timber produced by hardwoods and conifers on the soil types and miscellaneous land types in Lafayette County are given in table 6. The estimates are for well-managed stands that have good tree density. They are based partly on plot measurements taken in the area by foresters and soil scientists from 1957 to 1960 and partly on the experience and judgment of soil scientists, woodland conservationists, foresters, and local owners of woodland.

Yields in table 6 are for hardwoods and conifers in stands that have enough trees in all size classes to utilize the site fully but still allow some space for future growth. No deduction is made for cull or defective material. The yields shown are the best that can be obtained under good management. Wild or unmanaged tracts rarely attain the yields shown in the table because of losses from seedling mortality, culling, and improper stocking.

TABLE 6.—Estimated potential annual yields per acre of usable timber from well-managed stands that have good tree density

[Dashes indicate trees do not grow on a soil of this type or that the soil is not suited to the species indicated; board feet according to Scribner decimal C log rule; yields of 50 board feet or less are generally harvested as cordwood because size and quality precludes use of the trees for saw logs; 1 cord equals about 500 board feet]

Soil	Cool sites ¹		Warm sites ²		Soil	Cool sites ¹		Warm sites ²	
	Hard-woods	Conifers	Hard-woods	Conifers		Hard-woods	Conifers	Hard-woods	Conifers
	<i>Bd. ft.</i>	<i>Bd. ft.</i>	<i>Bd. ft.</i>	<i>Bd. ft.</i>		<i>Bd. ft.</i>	<i>Bd. ft.</i>	<i>Bd. ft.</i>	<i>Bd. ft.</i>
Alluvial land.....	100				Lawson silt loam.....				
Arenzville silt loam.....	275				Lindstrom silt loam.....				
Ashdale silt loam.....					Marsh.....				
Boaz silt loam.....	150				Marshan silt loam.....				
Boone fine sand.....	50	300		200	Meridian loam.....	150	500		
Calamine silt loam.....	100				Meridian sandy loam.....	150	500		
Chaseburg silt loam.....	250				Mifflin soils.....	175		125	
Dakota loam.....		500			Mine pits and dumps.....				
Dakota loam, mottled subsoil variant.....					Muscatine silt loam.....				
Derinda silt loam.....	175		150		Muscatine silt loam, benches.....				
Derinda silt loam, wet sub- soil variant.....	175				Northfield loam.....	100	450		350
Derinda soils.....	150		100		Northfield sandy loam.....	100	450		350
Dodgeville silt loam.....					Orion silt loam.....	150			
Dodgeville soils.....					Orion silt loam, wet vari- ant.....	100			
Downs silt loam.....	200		175		Palsgrove silt loam.....	200	500	150	400
Dubuque silt loam.....	175	500	125	400	Rozetta silt loam, benches.....	250	600		
Dubuque soils.....	175		100		Sable silt loam.....				
Dunbarton silt loam.....	100	350	75	250	Sable silt loam, benches.....				
Edmund silt loam.....					Schapville silt loam.....				
Eleroy silt loam.....	200	500	150	400	Schapville soils.....				
Fayette silt loam, benches.....	250	600		500	Schapville silt loam, wet subsoil variant.....				
Fayette silt loam, uplands.....	250	600	200	500	Sogn silt loam.....	50			
Fayette silt loam, valleys.....	275	600	225	500	Stony and rocky land, moderately steep.....				
Fayette and Dubuque soils and Pits ³					Stony and rocky land, steep.....				
Gale silt loam.....	150	500	100	400	Stronghurst silt loam.....	175			
Gotham loamy fine sand.....	125	575			Stronghurst silt loam, benches.....	175			
Hixton loam.....	100	500	50	400	Tama silt loam.....				
Hixton sandy loam.....	175	500	50	400	Tama silt loam, benches.....				
Houghton mucky peat.....					Worthen silt loam.....				
Huntsville silt loam.....									
Keltner silt loam.....									

¹ Consists of narrow valleys, of north- and east-facing slopes, and of nearly level valley flats and broad ridgetops where the trees are partly protected from heat and from drying winds.

² Consists of exposed, sloping ridgetops or of south- and west-facing slopes where the soils are exposed to high temperatures and drying winds.

³ See soils of the Fayette and Dubuque series and Mine pits and dumps for yields.

Not all sites are capable of producing timber in commercial quantities. This is taken into account in table 6. No yields are shown for Tama silt loam, for example, because no productive stands of hardwoods or conifers grow on it. On the other hand, Arenzville silt loam is shown to be highly productive of hardwoods but not for conifers, since productive stands of conifers do not grow on it.

Engineering Uses of the Soils⁵

Some properties of soils are of special interest to engineers because they affect the construction and maintenance of highways, airports, pipelines, the building of foundations, and the function of facilities for storing water, for controlling erosion, for irrigating and draining soils, and for disposing of sewage. The properties most important to the engineer are permeability, shear strength, compaction characteristics, soil drainage, shrink-swell characteristics, grain size, plasticity, and soil reaction, or pH. Topography and depth to water table, to bedrock, or to sand and gravel are also important.

Some of the properties of soils important to engineering are described in this section. The information can be

⁵ CARL L. GLOCKER, soil scientist, Soil Conservation Service, U.S. Department of Agriculture.

used by engineers along with other information in the report to—

1. Make soil and land use studies that will aid in selecting and developing sites for industrial, business, residential, and recreational use.
2. Make preliminary estimates of the engineering properties of soils for use in the planning of agricultural drainage and irrigation systems, farm ponds, diversion terraces, and other structures for conserving soil and water.
3. Make preliminary surveys of soil and ground conditions that will aid in selecting locations for highways, railroads, airports, pipelines, and cableways and in planning detailed surveys of the soils at selected locations.
4. Locate probable sources of sand and gravel and other material for use in construction.
5. Correlate performance of engineering structures with soil mapping units and thus develop information for overall planning that will be useful in designing and maintaining the structures.
6. Determine the suitability of soils for the cross-country movement of vehicles and construction equipment.

TABLE 7.—*Engineering test data of representative*

[Tests performed by the State Highway Commission of Wisconsin in cooperation with the U.S. Department of Commerce, Bureau of Absence of figures indicates information

Soil type, parent material, and location	Horizon	Depth from surface	Moisture-density data		Mechanical analysis ¹			
			Maximum dry density	Optimum moisture content	Percentage passing sieve—			
					2 in.	1 in.	3/4 in.	3/8 in.
Schapville silt loam (parent material is loess underlain by shale): NE 1/4 sec. 28, T. 1 N., R. 2 E. (modal profile),	B2-----	Inches 22-31	Lb. per cu. ft. 101	Percent 22				
	C1-----	36-50	122	14	100	93	92	89
	B2-----	16-24						
	C1-----	31-48			(*)	95	94	94
	B2-----	20-31						
	C1-----	39-50						
Stronghurst silt loam (parent material is deep silt over shale or limestone): NW 1/4 NE 1/4 sec. 21, T. 1 N., R. 5 E. (modal profile).	B2-----	21-30	106	20				
	C-----	37-50	104	18				
	B2-----	19-30						
	C-----	38-48						
	B2-----	18-30						
	C-----	37-50						
SE 1/4 sec. 23, T. 1 N., R. 2 E.	B2-----							
	C1-----							
SE 1/4 SE 1/4 sec. 33, T. 1 N., R. 5 E.	B2-----							
	C-----							
SE 1/4 NW 1/4 sec. 15, T. 1 N., R. 5 E.	B2-----							
	C-----							

¹ According to Designation: T 88-57, "Mechanical Analysis of Soils," in "Standard Specifications for Highway Materials and Methods of Sampling and Testing," pt. 2, Ed. 8 (1961), published by AASHTO. Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size

fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

7. Supplement the 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. Develop other preliminary estimates for construction purposes pertinent to the particular area.

Used with the soil map to identify the soils, the engineering interpretations in this section can be useful for many purposes. It should be emphasized that the interpretations may not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or where the excavations are deeper than the depths of layers here reported. Nevertheless, even in such situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that can be expected.

Some of the terms used by the soil scientist may be unfamiliar to the engineer, and some words, for example, soil, clay, silt, and sand, may have special meanings in soil science. These and other special terms that are used are defined in the Glossary at the back of the report.

Engineering classification systems

The United States Department of Agriculture system of classifying soil texture is used by agricultural scientists. In this system the textural class of a soil is based on the proportions of sand, silt, and clay in the soil.⁶ In some ways this system of classifying soils is comparable to the

soil samples, Lafayette County, Wis.

Public Roads (BPR) in accordance with standard procedures of the American Association of State Highway Officials (AASHO). was not available or was not obtained]

systems engineers use in classifying soils. The systems used by engineers are explained briefly in the paragraphs that follow.

Most highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials.⁷

In this system soil materials are classified in seven principal groups based on the gradation, liquid limit, and plasticity index of the soils. The groups are designated as A-1 through A-7. The best soils for subgrades, gravelly soils of high bearing capacity, are classified as A-1; the next best, A-2; and so on to the poorest, A-7, which are clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group index numbers range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses after the soil group symbol in table 7.

In the Unified system soils are identified on the basis of texture and plasticity and on their performance as material for engineering construction.⁸ The soil mate-

⁶ UNITED STATES DEPARTMENT OF AGRICULTURE. SOIL SURVEY MANUAL. Agr. Handb. No. 18, 503 pp., illus. 1951.

⁷ AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 pts., illus. 1961.

⁸ U.S. ARMY, CORPS OF ENGINEERS. THE UNIFIED SOIL CLASSIFICATION SYSTEM. Tech. Memo. No. 3-357, v. 1, illus. 1953.

Mechanical analysis ¹ —Continued								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued				Percentage smaller than—						AASHO ²	Unified ³
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
89	89	100 88	98 83	98 75	86 58	57 42	41 32	50 27	27 9	A-7-6(17)----- A-4(8)-----	CL-CH. CL.
93	92	100	99 86	98 79	86 64	56 48	44 38	44 30	21 11	A-7-6(13)----- A-6(8)-----	CL. CL.
		100 100	99 98	96 98	71 87	40 62	31 50	41 43	19 23	A-7-6(12)----- A-7-6(13)-----	CL. CL.
	100 100	99 99	98 98	96 97	79 82	38 47	30 36	48 54	25 32	A-7-6(16)----- A-7-6(19)-----	CL. CH.
	100	99 100	98 99	94 96	69 72	41 39	36 32	46 45	25 25	A-7-6(15)----- A-7-6(15)-----	CL. CL.
	100 100	99 99	98 97	95 94	72 71	41 39	33 33	49 46	26 23	A-7-6(16)----- A-7-6(14)-----	CL. CL.

² The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M 145-49.

³ Based on the Unified Soil Classification System, Tech. Memo. No. 3-357, v. 1, Waterways Experiment Station, March 1953.

⁴ 100 percent passing 3-inch sieve.

rials are identified as coarse grained, eight classes; fine grained, six classes; and highly organic. The last column of table 7 gives the classification of the tested soils according to the Unified system.

Engineering test data

A summary of engineering test data made on some representative soils of Lafayette County is given in table 7. The data furnished in this table are the results of tests made by the State Highway Commission of Wisconsin under a cooperative agreement with the U. S. Department of Commerce, Bureau of Public Roads. Tests were done in accordance with standard procedures of the American Association of Highway Officials.

The soil samples represented in table 7 were taken from major horizons of the soils at representative sites. For some of the soils, not all of the major horizons were sampled, and for these the data are only for the particular horizon sampled.

The engineering classifications in table 7 are based on data obtained by mechanical analyses and by tests to de-

termine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods. Percentages of silt and clay determined by the hydrometer method should not be used in naming textural classes for soil classification. The information, however, is useful in determining general engineering properties of the soils.

The tests to show 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 increases 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 to a liquid state. 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 to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

TABLE 8.—*Brief description of the soils of Lafayette County, Wis.,*

Map symbol	Soil	Brief description of soil and site	Depth from surface
Ad	Alluvial land.	Mixed sandy and silty material on nearly level flood plains of streams; more than 40 inches thick and highly stratified with fines; high water table.	Inches 0-30 30-60
An	Arenzville silt loam.	Moderately well drained to well drained, deep, silty soil formed in alluvium on nearly level flood plains of streams; subject to stream overflow.	0-20 20-40 40-60+
AsB	Ashdale silt loam, 2 to 6 percent slopes.	Well-drained, dark-colored, silty soils formed in wind-laid silt, 30 to 50 inches thick, on unglaciated uplands; underlain by reddish clayey material weathered from limestone; depth to limestone bedrock ranges from 3½ to 5 feet.	0-12
AsB2	Ashdale silt loam, 2 to 6 percent slopes, moderately eroded.		12-40
AsC	Ashdale silt loam, 6 to 12 percent slopes.		40-48
AsC2	Ashdale silt loam, 6 to 12 percent slopes, moderately eroded.		48+
AsC3	Ashdale silt loam, 6 to 12 percent slopes, severely eroded.		
AsD	Ashdale silt loam, 12 to 20 percent slopes.		
AsD2	Ashdale silt loam, 12 to 20 percent slopes, moderately eroded.		
AsD3	Ashdale silt loam, 12 to 20 percent slopes, severely eroded.		
Ba	Boaz silt loam.	Somewhat poorly drained, dark-colored, silty, alluvial soil on low terraces along larger streams in that part of the county in the Driftless Area; underlain by sandy or loamy material at a depth between 44 and 60 inches.	0-12 12-40 40-48 48-60+
BoD2	Boone fine sand, 6 to 20 percent slopes, eroded.	Excessively drained, light-colored, sandy soil over sandstone bedrock on uplands; the surface layer is very friable, single-grained fine sand, and the subsoil is loose, single-grained fine sand.	0-12 12-30 30+
CaA	Calamine silt loam, 0 to 2 percent slopes.	Dark-colored, poorly drained soils on uplands; formed partly in a moderately thick mantle of loess and partly in clayey residuum from shale; depth to shale bedrock ranges from 2 to slightly more than 4 feet.	0-22
CaB	Calamine silt loam, 2 to 6 percent slopes.		
CaC	Calamine silt loam, 6 to 12 percent slopes.		22-35
CaC2	Calamine silt loam, 6 to 12 percent slopes, moderately eroded.		35-48 48-60+

TABLE 8.—*Brief description of the soils of Lafayette County, Wis.,*

Map symbol	Soil	Brief description of soil and site	Depth from surface
ChA ChB	Chaseburg silt loam, 0 to 2 percent slopes. Chaseburg silt loam, 2 to 6 percent slopes.	Moderately well drained to well drained, light-colored, deep, silty soils on alluvial fans and on the bottoms of narrow valleys; subject to stream overflow.	<i>Inches</i> 0-20 20-40 40-60+
DaA DaB	Dakota loam, 0 to 2 percent slopes. Dakota loam, 2 to 6 percent slopes.	Well-drained, dark-colored, moderately deep, loamy soils formed in sandy outwash on benches in stream valleys; in places contain silty clay loam; depth to loose sand ranges from 2 to 3 feet.	0-15 15-30 30-60+
DdB	Dakota loam, mottled subsoil variant, 0 to 3 percent slopes.	Somewhat poorly drained, dark-colored, moderately deep, loamy soil on low benches on outwash plains; depth to loose sand ranges from 2 to 3½ feet.	0-12 12-30 30-60
DdB2	Derinda silt loam, 2 to 6 percent slopes, moderately eroded.	Well-drained soils on uplands; formed in loess, 10 to 30 inches thick, over clayey residuum from shale 10 to 20 inches thick; depth to limestone bedrock ranges from 2 to 4 feet.	0-7
DdC DdC2	Derinda silt loam, 6 to 12 percent slopes. Derinda silt loam, 6 to 12 percent slopes, moderately eroded.		7-20 20-26 26-60+
DdD2 DfD3	Derinda silt loam, 12 to 20 percent slopes, eroded. Derinda soils, 12 to 20 percent slopes, severely eroded.		
DeB DeC2	Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes. Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded.	Somewhat poorly drained soils on uplands; formed in loess, 10 to 30 inches thick, over clayey residuum from shale 2 to 18 inches thick; depth to shale bedrock ranges from 2 to 4 feet.	0-12 12-27 27-34 34-60+
DgB2 DgC DgC2	Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded. Dodgeville silt loam, 6 to 12 percent slopes. Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded.	Well-drained, dark-colored, moderately deep, silty soils on ridges in the unglaciated uplands; formed in silt, 15 to 30 inches thick, over reddish clay weathered from limestone; depth to limestone bedrock ranges from 2 to 3½ feet.	0-12 12-30 30-38 38+
DgD DgD2	Dodgeville silt loam, 12 to 20 percent slopes. Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded.		
DhC3 DhD3	Dodgeville soils, 6 to 12 percent slopes, severely eroded. Dodgeville soils, 12 to 20 percent slopes, severely eroded.		
DoB2 DoC2	Downs silt loam, 2 to 6 percent slopes, moderately eroded. Downs silt loam, 6 to 12 percent slopes, moderately eroded.	Well-drained, deep, silty soils, more than 48 inches thick, on rolling ridges and side slopes in the uplands; depth to limestone bedrock ranges from 4 to 8 feet.	0-12 12-42 42-60 60+
DsB DsB2	Dubuque silt loam, 2 to 6 percent slopes. Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.	Well-drained, light-colored, moderately deep, silty soils on ridges in the unglaciated uplands; formed in silt, 15 to 30 inches thick, over reddish clay weathered from limestone; depth to limestone bedrock ranges from 2 to 3½ feet.	0-12 12-30 30-36 36+
DsC DsC2	Dubuque silt loam, 6 to 12 percent slopes. Dubuque silt loam, 6 to 12 percent slopes, moderately eroded.		
DsD DsD2	Dubuque silt loam, 12 to 20 percent slopes. Dubuque silt loam, 12 to 20 percent slopes, moderately eroded.		
DsE DsE2	Dubuque silt loam, 20 to 30 percent slopes. Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.		
DsF DtC3 DtD3	Dubuque silt loam, 30 to 45 percent slopes. Dubuque soils, 6 to 12 percent slopes, severely eroded. Dubuque soils, 12 to 20 percent slopes, severely eroded.		

TABLE 8.—*Brief description of the soils of Lafayette County, Wis.,*

Map symbol	Soil	Brief description of soil and site	Depth from surface	
DuB	Dunbarton silt loam, 2 to 6 percent slopes.	Well-drained, light-colored, shallow, silty soils on side slopes; formed in wind-laid silt over clayey material underlain by limestone bedrock; depth to bedrock ranges from 1 to 2 feet.	<i>Inches</i> 0-8	
DuC	Dunbarton silt loam, 6 to 12 percent slopes.		8-18	
DuC2	Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded.		18+	
DuD	Dunbarton silt loam, 12 to 20 percent slopes.			
DuD2	Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded.			
DuE	Dunbarton silt loam, 20 to 30 percent slopes.			
DuE2	Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded.			
DuF	Dunbarton silt loam, 30 to 45 percent slopes.			
EdB2	Edmund silt loam, 2 to 6 percent slopes, moderately eroded.		Well-drained, dark-colored, shallow, silty soils on ridges; depth to limestone bedrock ranges from 1 to 2 feet.	0-8
EdC2	Edmund silt loam, 6 to 12 percent slopes, moderately eroded.			8-18
EdD	Edmund silt loam, 12 to 20 percent slopes.	18+		
ErB	Eleroy silt loam, 2 to 6 percent slopes.	Well-drained to moderately well drained, light-colored, deep, gently sloping to steep soils on uplands; formed in silty material over clayey residuum from shale bedrock.	0-8	
ErB2	Eleroy silt loam, 2 to 6 percent slopes, moderately eroded.		8-38	
ErC	Eleroy silt loam, 6 to 12 percent slopes.		38-42	
ErC2	Eleroy silt loam, 6 to 12 percent slopes, moderately eroded.		42-60+	
ErD	Eleroy silt loam, 12 to 20 percent slopes.			
ErD2	Eleroy silt loam, 12 to 20 percent slopes, moderately eroded.			
FaB	Fayette silt loam, benches, 2 to 6 percent slopes.	Well-drained, light-colored, deep, silty soils on benches in stream valleys; formed in silt more than 50 inches thick; underlain by sandy outwash at a depth between 4 and 10 feet.	0-12	
FaB2	Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded.		12-42	
FaC2	Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded.		42-60 60+	
FdB	Fayette silt loam, uplands, 2 to 6 percent slopes.	Well-drained, light-colored, deep, silty soils in the unglaciated uplands; formed in silt more than 50 inches thick; depth to limestone bedrock ranges from 4 to 8 feet.	0-12	
FdB2	Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.		12-42	
FdC	Fayette silt loam, uplands, 6 to 12 percent slopes.		42-60	
FdC2	Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded.		60+	
FdC3	Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded.			
FdD	Fayette silt loam, uplands, 12 to 20 percent slopes.			
FdD2	Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded.			
FdE	Fayette silt loam, uplands, 20 to 30 percent slopes.			
FeB	Fayette silt loam, valleys, 2 to 6 percent slopes.	Well-drained, light-colored, deep, silty soils in narrow areas below steep rocky and stony land and above benches; formed in more than 50 inches of silt; in some places the Unified rating of the surface layer is SM.	0-12	
FeB2	Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded.		12-40	
FeC	Fayette silt loam, valleys, 6 to 12 percent slopes.		40-60+	
FeC2	Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded.			
FeD	Fayette silt loam, valleys, 12 to 20 percent slopes.			
FeD2	Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded.			
GaC2	Gale silt loam, 6 to 12 percent slopes, eroded.	Well-drained, light-colored, moderately deep, silty soils on valley slopes and uplands along major streams; depth to sandstone bedrock ranges from 2 to 3½ feet; in places outcrops of sandstone occur.	0-12	
GaD2	Gale silt loam, 12 to 20 percent slopes, eroded.		12-30	
GaE2	Gale silt loam, 20 to 30 percent slopes, eroded.		30-36 36+	

and their estimated physical and chemical properties—Continued

Classification			Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
USDA texture	Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.07 mm.)				
Silt loam	ML-CL	A-4	100	100	90-100	<i>Inches per hour</i> 0.8-2.5	<i>Inches per inch</i> 0.20	pH 6.6-7.3	Low to moderate. High.
Clay	CH	A-7	100	100	90-100	0.05-0.20	.16	6.6-7.3	
Limestone									
Silt loam	ML-CL	A-6	100	100	90-100	0.8-2.5	.24	6.6-7.3	Moderate. High.
Clay	CH	A-7	100	100	85-95	0.05-0.20	.16	6.6-7.3	
Limestone									
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	6.1-7.3	Low to moderate. Moderate. High.
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	6.1-6.5	
Silty clay	CH	A-7	100	100	90-100	0.2-0.80	.18	6.6-7.8	High. 7.3-8.4
Shale	CL	A-6	90-100	90-100	80-90	<0.05	.12	7.3-8.4	
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	6.1-7.8	Low to moderate. Moderate to high.
Silty clay loam	CL	A-7	100	100	90-100	0.8-2.5	.20	5.6-6.5	
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.6-6.5	Moderate. Very low.
Sand	SP or SP-SM.	A-3 or A-2.	100	100	0-15	5.0-10	.04	6.6-7.3	
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	6.1-7.8	Low to moderate. Moderate. Moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.8-2.5	.20	5.6-6.5	
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.6-6.5	
Limestone									
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	6.1-7.8	Low to moderate. Moderate to high.
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.6-6.5	
Silt loam	CL	A-6	100	100	90-100	0.8-2.5	.18	5.6-6.5	Moderate.
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	6.1-7.3	Low to moderate. Moderate. Moderate to low.
Silty clay loam	CH	A-7	100	100	85-95	0.8-2.5	.18	5.1-6.5	
Loam	ML-CL	A-4	100	80-95	50-60	0.8-2.5	.16	5.1-6.5	
Sandstone	SP	A-3	100	100	0-10	5.0-10	.04		

TABLE 8.—*Brief description of the soils of Lafayette County, Wis.,*

Map symbol	Soil	Brief description of soil and site	Depth from surface
GoB2 GoC2	Gotham loamy fine sand, 2 to 6 percent slopes, eroded. Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded.	Somewhat excessively drained, moderately dark colored, sandy soils on benches in stream valleys; underlain by loose sand; depth to sand ranges from 2 to 3½ feet; soils are droughty; subject to erosion if not protected.	<i>Inches</i> 0-15 15-30 30-60+
HmB2 HmC2 HmD HmD2 HmE2 HtB2 HtC2 HtD2 HtD3 HtE	Hixton loam, 2 to 6 percent slopes, eroded. Hixton loam, 6 to 12 percent slopes, eroded. Hixton loam, 12 to 20 percent slopes. Hixton loam, 12 to 20 percent slopes, moderately eroded. Hixton loam, 20 to 30 percent slopes, eroded. Hixton sandy loam, 2 to 6 percent slopes, eroded. Hixton sandy loam, 6 to 12 percent slopes, eroded. Hixton sandy loam, 12 to 20 percent slopes, eroded. Hixton sandy loam, 12 to 20 percent slopes, severely eroded. Hixton sandy loam, 20 to 30 percent slopes.	Well-drained, light-colored, moderately deep, loamy soils on sandstone uplands; depth to sandstone ranges from 2 to 3½ feet.	0-12 12-30 30-36 36+
Hu	Houghton mucky peat.	Dark-colored, poorly drained, deep, peaty soil in low areas in stream valleys; depth to mineral material is more than 2½ feet.	0-42
HvA HvB	Huntsville silt loam, 0 to 2 percent slopes. Huntsville silt loam, 2 to 6 percent slopes.	Well drained and moderately well drained, dark-colored, deep, silty, alluvial soils on drainageways in stream valleys; underlain by silt and sand at a depth of more than 3½ feet; subject to stream overflow.	0-30 30-80 80+
KeB KeB2	Keltner silt loam, 2 to 6 percent slopes. Keltner silt loam, 6 to 12 percent slopes, moderately eroded.	Well drained to moderately well drained, dark-colored, silty soils on uplands; depth to shale bedrock ranges from 3¼ to 5 feet, but in places it is between 5 and 6 feet.	0-12 12-35 35-39 39-60+
La	Lawson silt loam.	Somewhat poorly drained, dark-colored, deep, silty alluvial soil in drainageways on bottom lands of streams; depth to alluvial silt and sand is more than 3½ feet.	0-30 30-80
LsB LsC2 LsD2	Lindstrom silt loam, 2 to 6 percent slopes. Lindstrom silt loam, 6 to 12 percent slopes, eroded. Lindstrom silt loam, 12 to 20 percent slopes, eroded.	Well-drained, dark-colored, deep, silty soils in concave valley slopes below steep soils.	0-15 15-36 36-60+
Mb	Marshan silt loam.	Poorly drained, dark-colored, moderately deep, loamy soil on low benches in stream valleys; depth to loose sandy outwash ranges from 2 to 3½ feet.	0-15 15-32 32-60
MdA MdB MeA MeB	Meridian loam, 0 to 2 percent slopes. Meridian loam, 2 to 6 percent slopes. Meridian sandy loam, 0 to 2 percent slopes. Meridian sandy loam, 2 to 6 percent slopes.	Well-drained, light-colored, moderately deep, loamy soils on high benches on outwash plains; depth to loose sand ranges from 2 to 3 feet.	0-15 15-30 30-60+
MfB2 MfC2 MfD2 MfE2	Miffin soils, 2 to 6 percent slopes, eroded. Miffin soils, 6 to 12 percent slopes, eroded. Miffin soils, 12 to 20 percent slopes, eroded. Miffin soils, 20 to 30 percent slopes, eroded.	Well-drained, light-colored, loamy soils on ridges in the unglaciated uplands; formed from loamy material weathered from alternate layers of sandstone and limestone bedrock; depth to bedrock ranges from 2 to 3 feet.	0-15 15-30 30-36 36+
MsA MsB MsB2	Muscatine silt loam, 0 to 2 percent slopes. Muscatine silt loam, 2 to 6 percent slopes. Muscatine silt loam, 2 to 6 percent slopes, moderately eroded.	Somewhat poorly drained, dark-colored, deep, silty soils in drainageways on uplands; depth to bedrock ranges from 4 to 8 feet.	0-12 12-40 40-60 60+

TABLE 8.—*Brief description of the soils of Lafayette County, Wis.,*

Map symbol	Soil	Brief description of soil and site	Depth from surface	
MuA MuB	Muscatine silt loam, benches, 0 to 2 percent slopes. Muscatine silt loam, benches, 2 to 6 percent slopes.	Somewhat poorly drained, dark-colored, deep, silty soils on low benches in stream valleys; depth to the substratum of loose sandy outwash generally ranges from 4 to 8 feet.	<i>Inches</i> 0-12 12-40 40-60 60+	
NfC NfC2	Northfield loam, 6 to 12 percent slopes. Northfield loam, 6 to 12 percent slopes, moderately eroded.	Well-drained, light-colored, shallow, loamy soils on sandstone uplands; depth to sandstone bedrock ranges from 1 to 2 feet.	0-12 12-18 18+	
NfD NfD2	Northfield loam, 12 to 20 percent slopes. Northfield loam, 12 to 20 percent slopes, moderately eroded.			
NfE NfE2	Northfield loam, 20 to 30 percent slopes. Northfield loam, 20 to 30 percent slopes, moderately eroded.			
NoB2	Northfield sandy loam, 2 to 6 percent slopes, moderately eroded.			
NoC NoC2	Northfield sandy loam, 6 to 12 percent slopes. Northfield sandy loam, 6 to 12 percent slopes, moderately eroded.			
NoD NoD2	Northfield sandy loam, 12 to 20 percent slopes. Northfield sandy loam, 12 to 20 percent slopes, moderately eroded.			
NoE NoE2	Northfield sandy loam, 20 to 30 percent slopes. Northfield sandy loam, 20 to 30 percent slopes, moderately eroded.			
NoF	Northfield sandy loam, 30 to 45 percent slopes.			
On	Orion silt loam.		Somewhat poorly drained, light-colored, deep, silty alluvial soil in drainageways in stream valleys; depth to alluvial sand and silt is more than 3½ feet.	0-30 30-80 80+
Ow	Orion silt loam, wet variant.		Poorly drained, light-colored, deep, silty, alluvial soil in low areas on bottom lands of streams; depth to alluvial sand and silt is more than 5 feet.	0-30 30-80 80+
PaB PaB2	Palsgrove silt loam, 2 to 6 percent slopes. Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded.	Well-drained, light-colored, silty soils on limestone uplands; depth to limestone bedrock ranges from 3 to 5 feet.	0-12 12-40 40-48 48+	
PaC PaC2	Palsgrove silt loam, 6 to 12 percent slopes. Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded.			
PaC3	Palsgrove silt loam, 6 to 12 percent slopes, severely eroded.			
PaD PaD2	Palsgrove silt loam, 12 to 20 percent slopes. Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded.			
PaD3	Palsgrove silt loam, 12 to 20 percent slopes, severely eroded.			
RzA RzB RzB2	Rozetta silt loam, benches, 0 to 2 percent slopes. Rozetta silt loam, benches, 2 to 6 percent slopes. Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded.		Moderately well drained, light-colored, deep, silty soils on benches in stream valleys; depth to loose sand ranges from 50 to 70 inches or more.	0-12 12-40 40-60 60+
RzC2	Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded.			
Sa	Sable silt loam.		Poorly drained, dark-colored, deep, silty soil, 48 inches or more thick, on uplands; high water table; in places the Unified rating is MH; depth to bedrock ranges from .4 to 12 feet.	0-15 15-36 36-80 80+

and their estimated physical and chemical properties—Continued

Classification			Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
USDA texture	Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.07 mm.)				
Silt loam	ML	A-7	100	100	90-100	<i>Inches per hour</i> 0.8-2.5	<i>Inches per inch</i> 0.24	<i>pH</i> 6.1-7.3	Moderate. Moderate to high.
Silty clay loam	CL	A-7	100	100	90-100	0.8-2.5	.20	5.1-6.5	
Silt loam	CL	A-6	100	100	90-100	0.2-0.80	.18	6.1-6.5	Moderate. Very low.
Sand	SP	A-3	100	100	0-10	5.0-10	.04	6.1-6.5	
Loam	ML	A-4	100	90-100	50-60	0.8-2.5	.16	5.6-6.0	Low. Low.
Loam	ML-CL	A-4	90-100	80-90	55-65	0.8-2.5	.14	5.6-6.0	
Sandstone								5.1-6.0	
Silt loam	ML	A-4	100	100	90-100	0.8-2.5	.20	6.6-7.3	Low to moderate. Low to moderate.
Silt loam	ML	A-6	100	100	90-100	0.2-0.80	.18	6.6-7.3	
Sand	ML	A-4	100	100	90-100	0.8-2.5	.18	6.6-7.3	Low to moderate. Moderate.
Silt loam	ML	A-4	100	100	90-100	0.8-2.5	.20	6.6-7.8	
Silt loam	ML	A-6	100	100	90-100	0.2-0.80	.18	6.6-7.3	Moderate. Moderate.
Sand	SP-SM	A-3	100	95-100	5-10	0.8-2.5	.18	6.6-7.3	
Silt loam	ML-CL	A-6	100	100	90-100	0.8-2.5	.24	6.1-7.3	Moderate. Moderate.
Silty clay loam	CL	A-6	90-100	90-100	90-100	0.2-0.80	.20	5.1-6.5	
Clay	CH	A-7	90-100	90-100	85-95	0.05-0.20	.16	5.6-6.0	High.
Limestone									
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	6.1-7.3	Moderate. Moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.8-2.5	.20	5.6-7.3	
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	6.1-7.5	Moderate. Very low.
Sand	SP	A-3	100	85-95	0-10	5.0-10	.04	6.1-6.5	
Silt loam	ML-CL	A-4	100	100	90-100	2.5-5.0	.24	6.6-7.3	Low to moderate. High.
Silty clay loam	CL	A-7	100	100	90-100	0.2-0.80	.20	6.6-7.8	
Silt loam	CL	A-6	100	100	90-100	0.2-0.80	.18	6.6-7.8	Moderate. Very low.
Sand	SP	A-3	100	75-90	0-10	10+	.04	7.4-8.4	

TABLE 8.—*Brief description of the soils of Lafayette County, Wis.,*

Map symbol	Soil	Brief description of soil and site	Depth from surface
Sb	Sable silt loam, benches.	Poorly drained, dark-colored, deep, silty soil 48 inches or more thick on low benches in stream valleys; depth to underlying sand ranges from 4 to 12 feet; high water table.	<i>Inches</i> 0-15 15-36 36-60 60+
ScC2	Schapville silt loam, 6 to 12 percent slopes, moderately eroded.	Well drained to moderately well drained soils on uplands; formed in silty material, 15 to 30 inches thick, over clayey residuum from shale 10 to 20 inches thick; depth to bedrock ranges from 2 to 4 feet.	0-10
ShC3	Schapville soils, 6 to 12 percent slopes, severely eroded.		10-20 20-30 30-60+
Smb	Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes.	Somewhat poorly drained soil on uplands; formed in silty material, 15 to 30 inches thick, over clayey residuum from shale 10 to 20 inches thick; depth to bedrock ranges from 2 to 4 feet.	0-16 16-32 32-40 40-60+
SoC2	Sogn silt loam, 2 to 12 percent slopes, eroded.	Well-drained, dark-colored, very shallow, silty soils on steep side slopes in the unglaciated limestone uplands; depth to limestone bedrock ranges from 4 to 12 inches; soils are droughty; rock outcrops in many places.	0-9
SoD	Sogn silt loam, 12 to 20 percent slopes.		9+
SoD2	Sogn silt loam, 12 to 20 percent slopes, moderately eroded.		
SoE	Sogn silt loam, 20 to 30 percent slopes.		
SoF	Sogn silt loam, 30 to 45 percent slopes.		
SrE	Stony and rocky land, moderately steep.	Excessively drained, light-colored, very shallow, stony soils on very steep lower side slopes in the uplands; the texture of the surface layer and the depth to bedrock are variable; rock outcrops in many places.	0-10
SrF	Stony and rocky land, steep.		10+
SsA	Stronghurst silt loam, 0 to 2 percent slopes.	Somewhat poorly drained, deep, silty soils in the unglaciated uplands; depth to bedrock ranges from 4 to 6 feet.	0-12
SsB	Stronghurst silt loam, 2 to 6 percent slopes.		12-40
SsB2	Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded.		40-60 60+
StA	Stronghurst silt loam, benches, 0 to 2 percent slopes.	Somewhat poorly drained, light-colored, deep, silty soils on low benches in stream valleys; depth to loose sand ranges from 4 to 10 feet.	0-12
StB	Stronghurst silt loam, benches, 2 to 6 percent slopes.		12-40 40-60 60+
TaA	Tama silt loam, 0 to 2 percent slopes.	Well-drained, dark-colored, deep, silty soils on ridgetops in the unglaciated limestone uplands; depth to limestone bedrock ranges from 4 to 8 feet.	0-12
TaB	Tama silt loam, 2 to 6 percent slopes.		12-40
TaB2	Tama silt loam, 2 to 6 percent slopes, moderately eroded.		40-60
TaC2	Tama silt loam, 6 to 12 percent slopes, moderately eroded.		60+
TaC3	Tama silt loam, 6 to 12 percent slopes, severely eroded.		
TbA	Tama silt loam, benches, 0 to 2 percent slopes.	Well-drained, dark-colored, deep, silty soils on benches in stream valleys; depth to loose sand ranges from 4 to 10 feet.	0-12
TbB	Tama silt loam, benches, 2 to 6 percent slopes.		12-40 40-60 60+
WoA	Worthen silt loam, 0 to 2 percent slopes.	Well drained to moderately well drained, dark-colored soils in drainageways and at the base of steep slopes; formed in silty deposits more than 36 inches thick; subject to stream overflow.	0-20
WoB	Worthen silt loam, 2 to 6 percent slopes.		20-40 40-60+

¹ Variable.

and their estimated physical and chemical properties—Continued

Classification			Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
USDA texture	Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.075 mm.)				
Silt loam	ML-CL	A-4	100	100	90-100	<i>Inches per hour</i> 2.5-5.0	<i>Inches per inch</i> 0.24	<i>pH</i> 7.4-7.8	Low to moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.2-0.80	.20	7.4-7.8	High.
Silt loam	CL	A-6	100	100	90-100	0.2-0.80	.18	7.4-7.8	Moderate.
Sand	SP	A-3	100	75-85	0-10	10+	.04	7.4-7.8	Very low.
Silt loam	ML-CL	A-6	100	100	90-100	0.8-2.5	.24	5.6-7.3	Moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.2-0.8	.20	5.6-6.0	Moderate to high.
Silty clay	CH	A-7	100	100	90-100	0.2-0.8	.18	6.1-6.5	Moderate to high.
Shale	CL	A-7	90-100	85-95	80-90	<0.05	.12	7.4-8.4	
Silt loam	ML-CL	A-6	100	100	90-100	0.8-2.5	.24	5.6-7.3	Moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.2-0.8	.20	5.6-6.0	Moderate to high.
Silty clay	CH	A-7	100	100	90-100	0.2-0.8	.18	7.4-8.4	Moderate to high.
Shale	CL	A-7	85-95	85-95	80-90	<0.05	.12	7.4-8.4	
Silt loam	ML-CL	A-7	100	90-100	90-100	0.8-2.5	.24	7.4-7.8	Moderate.
Limestone						(¹)			
Loam	ML	A-4	90-100	90-100	50-65	0.8-2.5	.16	5.6-7.8	Low.
Sandstone									
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	5.6-7.3	Moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.1-6.0	Moderate to high.
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.6-6.5	Moderate.
Limestone									
Silt loam	ML-CL	A-4	100	100	90-100	0.8-2.5	.20	5.6-7.3	Moderate.
Silty clay loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.1-5.5	Moderate to high.
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	6.1-6.5	Moderate.
Sand	SP	A-3	100	90-100	0-10	5.0-10	.04	6.1-6.5	Very low.
Silt loam	ML	A-7	100	100	90-100	0.8-2.5	.22	6.1-7.3	Moderate.
Silty clay loam	ML-CL	A-7	100	100	90-100	0.8-2.5	.20	6.1-6.5	Moderate.
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.6-6.5	Moderate.
Silt loam	CL	A-7	100	100	90-100	0.8-2.5	.18	5.6-6.5	Moderate.
Limestone									
Silt loam	ML	A-6	100	100	90-100	0.8-2.5	.22	6.1-7.3	Moderate.
Silty clay loam	ML-CL	A-7	100	100	90-100	0.8-2.5	.20	5.1-6.0	Moderate.
Silt loam	CL	A-7	100	90-100	90-100	0.8-2.5	.18	5.1-6.0	Moderate.
Sand	SP	A-3	100	100	0-10	5.0-10	.04	5.1-6.5	Very low.
Silt loam	ML-CL	A-6	100	100	90-100	0.8-2.5	.24	6.6-7.3	Moderate.
Silt loam	ML-CL	A-4	100	90-100	85-95	0.8-2.5	.20	6.1-7.3	Low to moderate.
Silt loam	ML-CL	A-4	100	90-100	85-95	0.8-2.5	.20	5.6-6.0	Low to moderate.

from 6 to 20 feet. Steep soils generally have more than 20 feet of fall per 100 feet of horizontal distance.

In table 8, the percentages of material passing through the various sieves have been rounded to the nearest 5 percent.

In the column showing permeability, the rate at which water moves downward in the soil is estimated. The ratings are given in inches per hour. Permeability is determined largely by texture, structure, and consistence. The permeability rate of a soil profile is generally determined by the least permeable layer in the soil.

The estimated available water capacity in inches per inch of soil is given for the major soil horizons. Available water capacity refers to the amount of water that can be stored for plant use. The estimates are based on the difference in the percentage of moisture retained at

one-third and 15 atmospheres of moisture tension for medium- and fine-textured soils. For sandy soils the estimates are based on the difference between one-tenth and 15 atmospheres of moisture tension.

The column showing reaction indicates the estimated acidity or alkalinity of the soils and is expressed in pH. A pH of 7 indicates a neutral soil, a lower pH value indicates acidity, and a higher value indicates alkalinity. A knowledge of the pH of soil horizons is helpful in determining the need for liming and for determining the hazard of corrosion for metal conduits and the risk of deterioration for cement tile.

The shrink-swell potential refers to the change in volume of the soil material that results from a change in moisture content. It is based on volume-change tests or on observance of other physical properties of the soils.

TABLE 9.—*Suitability, limitations, and characteristics of*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Alluvial land (Ad)-----	Poor; material is sandy, droughty, and subject to wind erosion.	Fair; consists of poorly graded sand that contains layers of fine material in places.	Substratum slight; stable under wheel loads when damp, no volume change, contains layers of silt, in places needs to be confined; on-site investigation needed.	Severe; pervious; high water table; suitable for dug ponds; seal blanket needed for reservoir areas.	Severe; has good stability but is subject to piping.
Arenzville (An)-----	Surface soil good; subsoil fair, thick; soil subject to stream overflow.	Unsuitable-----	Substratum severe; unstable at all moisture contents and very low stability and bearing capacity when wet.	Moderate; pervious to semipervious; bottom should be compacted.	Slight; semipervious to impervious, medium to low stability, and medium volume change.
Ashdale (AsB, AsB2, AsC, AsC2, AsC3, AsD, AsD2, AsD3).	Surface soil good, dark colored, thick; subsoil poor, clayey.	Unsuitable-----	Subsoil and upper substratum severe, have high plasticity and large volume change when wet and are elastic; lower substratum excellent, consists of limestone.	Slight; pervious to semipervious; in places bottom needs to be scarified and compacted; seal blanket needed above limestone bedrock.	Slight; semipervious to impervious; medium stability and volume change in subsoil; low stability and large volume change in underlying clay.
Boaz (Ba)-----	Surface soil good; subsoil fair to poor; soil subject to high water table and flooding.	Unsuitable-----	Severe; subsoil and substratum have high plasticity and large volume change when wet.	Slight; pervious to semipervious, high water table; suitable for dug ponds.	Slight; semipervious to impervious, medium stability and large volume change; substratum is subject to piping in some places.

The amount and kind of clay and the content of organic matter in the soils affect the shrink-swell potential. Soils in which illite clays are predominant, for example, do not have so high a shrink-swell ratio as soils in which montmorillonite clays are predominant.

Engineering interpretations

In table 9 ratings of the suitability and limitations of the soils of Lafayette County for engineering construction are given, and characteristics that affect the selection of a site, the design of a structure, or the application of measures to make the soils suitable for construction are listed. The interpretations reflect the best judgment now available. However, as observations continue to be made, some of the interpretations may need to be modified. The mapping units Fayette and Dubuque soils and Pits, Marsh, and Mine pits and dumps are not listed in the

table, because they are too variable or are otherwise unsuited to engineering uses.

In table 9 interpretations for soils that are stratified or that vary widely in texture are based on observations in the field and on knowledge of the average characteristics or qualities of the soils. Alluvial soils, for example, are likely to vary considerably in arrangement of textural layers from one place to another. Engineering test data on a few such soils provide valuable assistance in making interpretations, but guidance also is derived inductively from what is known to be the average characteristics or qualities of many such soils. The interpretations are also affected by knowledge of the origin of a specific soil material and the changes that it undergoes. For example, the characteristics of soils formed from windblown silt are likely to differ from those of soils formed from water-laid silt.

the soils of Lafayette County, Wis., for engineering construction

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Slight; low compressibility, small volume change when wet, good shear strength; in places becomes quick and flows during excavation when wet; on-site investigation needed.	Severe; because of frequent flooding filter system fills with silt in places.	Very severe; low stability.	Slight; moderate to rapid water intake and low water-holding capacity.	Severe; subject to flooding.	Rapid permeability and subject to flooding; present drainage adequate.	Low for metal and concrete.
Moderate to severe, in places liquefies easily and flows as a viscous fluid; subject to frost heaving and loss of bearing capacity on thawing; fair shear strength and low compressibility.	Severe; in places periodic overflow causes filter fields to become inoperative, and lack of water-stable aggregates permits silt to flow into drain pipes and gravel filter beds.	Slight for diversions; terraces not needed; soil is nearly level.	Slight; moderate water intake and water-holding capacity; needs protection from stream overflow.	Slight; no limiting factor.	Moderate permeability and subject to flooding; needs protection from stream overflow.	Moderate for metal, low for concrete.
Slight if footing rests on limestone bedrock, severe if footing rests on thick clay residuum; clay residuum has high volume change at varying contents of moisture, poor shear strength, and very high compressibility.	Moderate where on-site field tests show that the clay is sufficiently deep and permeable to permit egress of effluents.	Slight; no limiting factor.	Slight; moderate water intake and moderate to high water-holding capacity.	Slight on slopes through 12 percent; moderate on slopes of more than 12 percent; no limiting factor except slope.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Severe; high compressibility, fair shear strength, high water table, and subject to shrinkage on drying.	Very severe; high water table.	Slight for diversions; terraces not needed; soil is nearly level and has poor drainage.	Slight; moderate water intake and high water-holding capacity; needs drainage before irrigating.	Slight; in places wetness hinders construction.	Moderately slow permeability, high water table, and subject to overflow; surface and subsurface drainage needed.	Moderate for metal, low for concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Boone (BoD2) -----	Unsuitable; soil is droughty and subject to wind erosion.	Good for sand; bedrock is weakly cemented.	Upper substratum slight for all pavements when confined; lower substratum excellent, consists of sandstone.	Very severe; very pervious and too porous to hold water.	Severe; pervious, high stability, and small volume change.
Calamine (CaA, CaB, CaC, CaC2).	Surface soil good, dark colored, thick; subsoil poor, clayey.	Unsuitable-----	Subsoil and substratum severe; large volume change and loss of bearing capacity when wet.	Slight; pervious, high water table; suitable for dug ponds.	Slight; semipervious to impervious, medium stability, and large volume change.
Chaseburg (ChA, ChB)--	Surface soil good; subsoil fair, thick; soils are subject to overflow.	Unsuitable-----	Substratum severe; relatively unstable at all moisture contents, very low stability and bearing capacity when wet.	Slight; pervious to semipervious; bottom should be scarified and compacted.	Slight; semipervious to impervious and medium stability and volume change.
Dakota (DaA, DaB)----	Surface soil good, dark colored, thick; subsoil fair, thin over sand.	Good; substratum contains poorly graded sand.	Subsoil slight, small volume change and good stability; substratum slight, no volume change when wet, suitable for all types of pavement when confined.	Moderate to severe; pervious to semipervious subsoil; bottom should be scarified and compacted; seal blanket needed over sandy substratum.	Slight to moderate; semipervious, high stability, and small volume change.
Dakota variant (DbB)--	Surface soil good, dark colored, thick; subsoil fair, thin over sand.	Good; substratum contains poorly graded sand.	Subsoil good, small volume change and good stability; substratum good, no volume change when wet, suitable for all types of pavement when confined.	Moderate; pervious to semipervious subsoil; bottom should be scarified and compacted; seal blanket needed over sandy substratum.	Slight to moderate; semipervious, high stability, and small volume change.
Derinda (DdB2, DdC, DdC2, DdD2, DfD3).	Surface soil good; subsoil poor, clayey.	Unsuitable-----	Subsoil and substratum severe; large volume change, low bearing capacity when wet, and elastic.	Slight; semipervious; surface soil should be compacted or the subsoil removed down to the clayey substratum.	Slight to moderate; semipervious to impervious, medium stability and large volume change; shale bedrock has high shrink-swell potential.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Slight; material is sand or sandstone; sand has good shear strength and no volume change when wet.	Slight where underlain by a thick layer of sandstone residuum; progressively less suitable as the hardness of the sandstone increases.	Severe; low stability, high erosion hazard; difficult to establish vegetation.	Severe; very rapid water intake, very low water-holding capacity, and subject to wind erosion.	Severe; difficult to establish and maintain vegetation.	Very rapid permeability; present drainage is excessive.	Low for metal and concrete.
Severe; expansive on drying, fair to poor shear strength, and moderate compressibility.	Very severe; high water table.	Terraces not needed.	Slight; moderate water intake and water-holding capacity.	Slight where clayey subsoil is not exposed; fair where clayey subsoil is exposed.	Moderately slow permeability; shale bedrock is at a depth between 3 and 5 feet; surface and subsurface drainage needed.	High for metal, low for concrete.
Moderate to severe; in places liquefies easily and flows as a viscous fluid if saturated; subject to frost heaving and loss of bearing capacity on thawing.	Severe; in places periodic overflow causes filter fields to become inoperative and lack of water-stable aggregates permits silt to flow into drain pipes and gravel beds.	Slight for diversions; terraces not needed.	Very slight; moderate water intake and water-holding capacity; needs protection from stream overflow.	Slight; no limiting factor.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Slight; good shear strength, very low compressibility, negligible volume change when wet; in places becomes quick and flows if saturated.	Slight; free flowing at a depth of about 3 feet.	Moderate; sandy substratum; subject to erosion.	Slight; moderate water intake and water-holding capacity.	Slight where sandy substratum is not exposed.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Slight, good shear strength, very low compressibility, negligible volume change when wet; in places becomes quick and flows if saturated.	Severe because of fluctuating high water table; on-site investigation needed.	Moderate; sandy substratum; in places wetness hinders construction.	Slight; moderate water intake and water-holding capacity; needs drainage before irrigating.	Slight where sandy substratum is not exposed; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderate permeability; surface drainage needed.	Low for metal and concrete.
Severe; expansive in places if subjected to wide fluctuations in moisture content, fair shear strength, moderate compressibility, poor bearing capacity.	Severe; soil material is fine textured and large filter fields are needed; on-site investigation needed.	Moderate; in places bedrock hinders construction.	Severe; moderate water intake and water-holding capacity; difficult to obtain adequate drainage.	Slight on slopes through 12 percent and where bedrock is not exposed; fair on slopes of more than 12 percent; seeding difficult because of clayey subsoil.	Slow permeability; present drainage adequate.	High for metal, low for concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Derinda variant (DeB, DeC2).	Surface soil good; subsoil poor, clayey, unstable on slopes.	Unsuitable.....	Subsoil severe, high plasticity and large volume change when wet, and elastic; substratum severe, large volume change and loss of bearing capacity when wet.	Slight; semipervious; surface soil should be compacted or the subsoil removed down to the clayey substratum.	Slight to moderate; semipervious to impervious, medium stability, and large volume change; shale bedrock has high shrink-swell potential.
Dodgeville (DgB2, DgC, DgC2, DgD, DgD2, DhC3, DhD3).	Surface soil good, dark colored, thick; subsoil poor to unsuitable, clayey.	Unsuitable.....	Subsoil and upper substratum severe, high plasticity and large volume change when wet, elastic; lower substratum excellent, consists of limestone.	Slight to moderate; pervious to semipervious and shallow to bedrock; seal blanket needed over limestone.	Slight to moderate; semipervious to impervious, medium to low stability, and large volume change; clay substratum has high shrink-swell potential.
Downs (DoB2, DoC2)---	Surface soil good, thick; subsoil fair to poor depending on proportion of clay, thick.	Unsuitable.....	Subsoil and substratum severe; large volume change and loss of bearing capacity when wet.	Slight to moderate; pervious to semipervious; surface soil should be compacted if bedrock is reached; seal blanket needed.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.
Dubuque (DsB, DsB2, DsC, DsC2, DsD, DsD2, DsE, DsE2, DsF, DtC3, DtD3).	Surface soil good; upper subsoil fair to poor, thin; lower subsoil unsuitable, clayey.	Unsuitable.....	Subsoil and upper substratum severe; high plasticity and large volume change when wet, elastic; lower substratum excellent, consists of limestone.	Moderate; pervious to semipervious; seal blanket needed above limestone bedrock.	Slight to moderate; semipervious to impervious, medium stability, and large volume change; high shrink-swell potential in clayey residuum.
Dunbarton (DuB, DuC, DuC2, DuD, DuD2, DuE, DuE2, DuF).	Surface soil poor, thin; subsoil unsuitable, clayey.	Unsuitable.....	Substratum slight, is limestone bedrock.	Slight; pervious to semipervious, shallow to limestone bedrock; seal blanket needed over bedrock.	Moderate; semipervious to impervious, medium stability, and large volume change; clayey residuum has high shrink-swell potential.
Edmund (EdB2, EdC2, EdD).	Surface soil fair, dark colored; subsoil unsuitable, clayey.	Unsuitable.....	Substratum slight, is limestone bedrock.	Severe; pervious to semipervious and shallow to limestone bedrock; seal blanket needed over bedrock.	Moderate; semipervious to impervious, medium stability, and large volume change; clayey residuum has high shrink-swell potential.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Severe; expansive if subjected to wide fluctuations in moisture content; fair shear strength, moderate compressibility, and poor bearing strength.	Very severe; fluctuating water table; soil material is clayey and slowly permeable.	Moderate to severe; in places bedrock and wetness hinder construction.	Severe; moderate water intake and water-holding capacity; difficult to obtain adequate drainage.	Slight where bedrock is not exposed; seeding difficult because of clayey subsoil.	Slow permeability; sub-surface drainage needed.	High for metal, low for concrete.
Slight if footing rests on limestone bedrock, very poor if footing rests on thick clay residuum; high volume change at varying contents of moisture; poor shear strength and very high compressibility.	Severe; expansive clay in subsoil restricts percolation of effluents in places; on-site investigation needed.	Moderate; bedrock hinders construction in places.	Slight; moderate water intake and water-holding capacity.	Moderate to severe; difficult to establish a satisfactory seedbed because of the clayey subsoil.	Moderate permeability; present drainage adequate.	Low to moderate for metal, low for concrete.
Moderate to severe; subject to frost heaving and loss of strength on thawing; in places saturation causes loss of cohesion and settlement; moderate compressibility and shear strength.	Slight; moderately permeable.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight; no limiting factor.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Slight if footing rests on limestone bedrock, very poor if footing rests on thick clay residuum; clay has large volume change at varying moisture contents, poor shear strength, and very high compressibility.	Severe; expansive clay in the subsoil restricts percolation of effluents in places; on-site investigation needed.	Moderate; bedrock hinders construction in places.	Slight; moderate water intake and water-holding capacity.	Moderate; difficult to establish a satisfactory seedbed because of the clayey subsoil; poor on slopes of more than 12 percent or if soil is shallow to limestone.	Moderate permeability; present drainage adequate.	Low to moderate for metal, low for concrete.
Slight if footing rests on limestone bedrock.	Severe because of nearness of hard limestone bedrock.	Very severe; shallow to bedrock.	Severe; moderate water intake and moderate to low water-holding capacity.	Severe; difficult to prepare an adequate seedbed, particularly on slopes of more than 12 percent and if soil is shallow to limestone.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Slight if footing rests on limestone bedrock.	Severe because of nearness of hard limestone.	Very severe; shallow to bedrock.	Severe; moderate water intake and moderate to low water-holding capacity.	Severe; difficult to prepare an adequate seedbed, particularly on slopes of more than 12 percent and if shallow to limestone.	Moderate permeability; present drainage adequate.	Low for metal and concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Eleroy (ErB, ErB2, ErC, ErC2, ErD, ErD2).	Surface soil good; subsoil not suitable, clayey.	Unsuitable.....	Subsoil and substratum severe; large volume change and low bearing capacity when wet.	Slight; semipervious; in places subsoil needs to be scarified and compacted.	Slight to moderate; impervious, low stability, and large volume change.
Fayette, benches (FaB, FaB2, FaC2).	Surface soil good; subsoil fair, slightly clayey, thick.	Unsuitable because of thick silty deposit over sand.	Subsoil severe, large volume change and loss of bearing capacity when wet; upper substratum severe, moderately large volume change when wet; lower substratum slight, no volume change when wet, suitable for all types of pavement when confined.	Slight; pervious to semipervious; bottom should be compacted; seal blanket needed over sandy substratum if it is reached.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.
Fayette, uplands (FdB, FdB2, FdC, FdC2, FdC3, FdD, FdD2, FdE).	Surface soil good; subsoil poor, clayey.	Unsuitable.....	Subsoil severe, high plasticity and large volume change; substratum poor to very poor, moderately large volume change and loss of bearing capacity when wet.	Slight; pervious to semipervious; bottom should be compacted.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.
Fayette, valleys (FeB, FeB2, FeC, FeC2, FeD, FeD2).	Surface soil good; subsoil fair, slightly clayey, thick.	Unsuitable.....	Subsoil severe, large volume change and loss of bearing capacity when wet; substratum poor, moderately large volume change when wet.	Slight to moderate; pervious to semipervious; bottom should be scarified and compacted.	Slight to moderate; semipervious to impervious and medium stability and volume change; substratum susceptible to piping.
Gale (GaC2, GaD2, GaE2).	Surface soil good; subsoil fair to poor, the lower part sandy in many places.	Fair; substratum is suitable for poorly graded sand where bedrock is poorly cemented.	Subsoil severe, large volume change and low bearing capacity when wet; substratum slight, no volume change when wet, in places needs to be confined if loose.	Moderate; pervious to semipervious; bottom should be sealed and compacted; seal blanket needed over sandstone bedrock.	Slight to moderate; subsoil is semipervious to impervious, has medium stability and large volume change; substratum has high stability and low volume change.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Severe; very expansive if subject to wide fluctuations in moisture content; fair shear strength and moderate compressibility.	Severe; soil material is fine textured and large filter fields are needed; on-site investigation needed.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent; fair on slopes of more than 12 percent; no limiting factor except slope.	Moderately slow permeability; present drainage adequate.	High for metal, low for concrete.
Upper substratum moderate to severe, subject to frost heaving and loss of bearing capacity on thawing, saturation causes loss of cohesion and settlement in places, and moderate compressibility and shear strength; lower substratum good, good shear strength, negligible volume change when wet, and very low compressibility.	Severe; moderately permeable.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight; no limiting factors.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing; saturation causes loss of cohesion and settlement in places; moderate compressibility and shear strength.	Slight; moderately permeable.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent; fair on slopes of more than 12 percent; no limiting factor except slope.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing; saturation causes loss of cohesion and settlement in places; moderate compressibility and shear strength.	Slight; moderately permeable.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent; fair on slopes of more than 12 percent; no limiting factor except slope.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Slight; very low compressibility and negligible volume change when wet; in places becomes quick and flows if excavated when wet.	Slight; permeable; questionable where sandstone residuum gives way to hard rock.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent where sandy substratum is not exposed; fair on slopes of more than 12 percent.	Moderate permeability; present drainage adequate.	Low for metal and concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Gotham (GoB2, GoC2)---	Surface soil poor to unsuitable, droughty, thick, dark colored; subsoil unsuitable; soils are subject to wind erosion.	Good; substratum is poorly graded sand and in places contains fines.	Subsoil slight, good stability and small volume change when wet; substratum slight, stable under wheel loads when damp, and no volume change, but in places needs to be confined under pavements.	Severe; pervious; needs a seal blanket.	Severe; pervious to semipervious, high stability, and small volume change; subject to piping.
Hixton (HmB2, HmC2, HmD, HmD2, HmE2, HtB2, HtC2, HtD2, HtD3, HtE).	Surface soil good; subsoil fair, the lower part droughty in places.	Good; substratum is poorly graded sand; sandstone is weakly cemented.	Subsoil moderate, small volume change, and little pavement distortion; substratum excellent, highly stable under wheel loads at all moisture contents.	Moderate to severe; pervious; bottom should be scarified and compacted; seal blanket needed over sandstone bedrock.	Moderate; semipervious, high stability, small volume change, and susceptible to piping.
Houghton (Hu)-----	Poor, material oxidizes rapidly and is subject to erosion.	Unsuitable-----	Organic material; cannot be used in subgrades; avoid use wherever feasible.	Severe; pervious, high water table; suitable for dug ponds; in places flotation of organic material likely.	Severe; pervious and has low stability; can be used for low embankments.
Huntsville (HvA, HvB)---	Surface soil good, thick, dark colored; subsoil good to fair, thick.	Unsuitable-----	Subsoil and substratum severe; relatively unstable at all moisture contents; low bearing capacity when wet.	Moderate; pervious to semipervious; bottom should be compacted.	Moderate to severe; semipervious, medium to low stability, and medium volume change.
Keltner (KeB, KeB2)---	Surface soil good, dark colored; subsoil unsuitable, clayey.	Unsuitable-----	Subsoil and substratum severe; large volume change and low bearing capacity when wet.	Slight; semipervious; substratum needs to be scarified and compacted in places.	Slight to moderate; impervious, low stability, and large volume change.
Lawson (La)-----	Surface soil good, thick, dark colored; subsoil good to fair, thick.	Unsuitable-----	Subsoil and substratum severe, relatively unstable at all moisture contents; low bearing capacity when wet.	Moderate; pervious to semipervious; bottom should be compacted.	Severe; semipervious, low stability, medium volume change, and high content of organic matter.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Slight; very low compressibility, negligible volume change when wet, and good shear strength if saturated; in places becomes quick and flows during excavation.	Slight; free drainage throughout the profile.	Very severe; sandy throughout; the profile highly susceptible to erosion.	Slight; rapid water intake, low water-holding capacity, and subject to erosion.	Moderate on slopes through 6 percent; poor on slopes of more than 6 percent; difficult to establish and maintain vegetation.	Rapid permeability; present drainage excessive.	Low for metal and concrete.
Slight; very low compressibility, negligible volume change when wet, and good shear strength; flows during excavation in places if saturated.	Slight; free draining at a depth below 36 inches.	Slight; sandy substratum; highly erodible.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent where sandy substratum is not exposed; fair on slopes of more than 12 percent.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Unsuitable-----	Very severe because of high water table.	Very severe; low stability and highly erodible.	Slight; rapid water intake and very high water-holding capacity; needs drainage before irrigating.	Moderate; highly erodible; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderate permeability, high water table; surface and subsurface drainage needed.	Severe for metal and concrete if soil material is very acid, low if pH is more than 5.5.
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing, fair shear strength, and moderate compressibility; subject to liquefaction if saturated.	Severe; in places periodic stream overflow causes filter fields to become inoperative and lack of water-stable aggregates permits silt to infiltrate drain pipes and gravel filter beds.	Slight for diversions, terraces not needed; soils are nearly level and subject to flooding.	Slight; moderate water intake and water-holding capacity; needs protection from stream flooding.	Slight; no limiting factor.	Moderate permeability; subject to stream overflow; present drainage adequate.	Moderate for metal, low for concrete.
Severe; very expansive if subject to wide fluctuations in moisture content; fair shear strength and moderate compressibility.	Severe; material is fine textured and large filter fields are needed; on-site investigation needed.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent; fair on slopes of more than 12 percent; no limiting factor except slope.	Moderately slow permeability; present drainage adequate.	High for metal, low for concrete.
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing, and to liquefaction if saturated; fair shear strength and moderate compressibility.	Severe; periodic stream overflow and lack of water-stable structure permits silt to infiltrate drain pipes and filter beds.	Slight for diversions, and terraces are not needed; soil is nearly level and subject to flooding.	Slight; moderate water intake and high water-holding capacity; needs drainage and protection from flooding before irrigating.	Slight; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderate to moderately slow permeability, subject to stream overflow; surface drainage needed.	Moderate for metal, low for concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Lindstrom (LsB, LsC2, LsD2).	Surface soil good, thick, dark colored; subsoil fair, thick.	Unsuitable-----	Subsoil severe, large volume change and loss of bearing capacity when wet; substratum poor, moderately large volume change when wet.	Slight to moderate; pervious, to semipervious; bottom should be scarified and compacted.	Slight to moderate; semipervious to impervious, medium to large volume change; some layers subject to piping.
Marshan (Mb)-----	Surface soil good, thick, dark colored; subsoil fair to poor, the lower part sandy in many places.	Good; substratum is poorly graded sand that contains fines in places.	Subsoil moderate, moderately small volume change and low bearing capacity when wet; substratum slight, no volume change when wet and suitable for all types of pavement when confined.	Moderate; pervious to semipervious subsoil; seal blanket needed over sandy substratum; high water table; suitable for dug ponds.	Moderate; semipervious subsoil; medium stability and volume change.
Meridian (MdA, MdB, MeA, MeB).	Surface soil good; subsoil fair, thin over stratified sand.	Good; substratum contains poorly graded sand and in places contains thin layers of loam.	Subsoil moderate, good stability and small volume change when wet; substratum slight for all types of pavement when confined, no volume change.	Moderate; pervious to semipervious subsoil; bottom should be scarified and compacted; seal blanket needed over sandy substratum.	Slight to moderate; semipervious to impervious, medium to high stability, and small volume change.
Miffin (MfB2, MfC2, MfD2, MfE2).	Surface soil good; subsoil poor, in places thin to bedrock, clayey.	Unsuitable-----	Subsoil severe, moderate volume change and bearing capacity when wet; substratum slight, consists of limestone bedrock.	Severe; pervious; seal blanket needed over limestone bedrock.	Moderate; semipervious and medium stability and volume change; high shrink-swell potential in clayey residuum.
Muscatine (MsA, MsB, MsB2).	Surface soil good, thick, dark colored; subsoil fair to poor, thick.	Unsuitable-----	Subsoil severe, elastic, large volume change and low bearing capacity when wet; substratum severe, large volume change and low bearing capacity when wet.	Slight; pervious to semipervious; bottom should be compacted.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.
Muscatine, benches (MuA, MuB).	Surface soil good, thick, dark colored; subsoil fair to poor, thick.	Unsuitable because of thickness over sand.	Subsoil severe, elastic, large volume change and low bearing capacity when wet; upper substratum severe, large volume change and low bearing capacity when wet; lower substratum slight, suitable for all pavements when confined.	Slight; pervious to semipervious; bottom should be compacted; seal blanket needed over sandy substratum if it is reached.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing; in places saturation causes loss of cohesion and settlement. Slight; good shear strength, very low compressibility, and negligible volume change when wet; in places becomes quick and flows during excavation if wet.	Slight; moderately permeable. Very severe; high water table.	Slight; no limiting factor. Slight for diversions, and terraces are not needed; soil is nearly level and has poor drainage.	Slight; moderate water intake and water-holding capacity. Slight; moderate water intake and water-holding capacity; drainage needed before irrigating.	Slight on slopes through 12 percent, fair on slopes of more than 12 percent; no limiting factor except slope. Slight where sandy substratum is not exposed; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderate permeability; present drainage adequate. Moderate permeability; surface drainage needed.	Low for metal and concrete. Moderate for metal, low for concrete.
Slight; good shear strength, low compressibility, negligible volume change when wet, and good bearing capacity; in places becomes quick and flows if saturated. Slight if footing rests on limestone bedrock.	Slight; free draining at a depth below about 30 inches. Moderate; moderately permeable soil material; fissured limestone bedrock.	Moderate; sandy substratum; subject to erosion. Moderate; bedrock hinders construction in places.	Slight; moderate water intake and water-holding capacity. Slight; moderate to rapid water intake and moderately low water-holding capacity.	Slight where sandy substratum is not exposed. Slight on slopes through 12 percent; moderate on slopes of more than 12 percent.	Moderate permeability; present drainage adequate. Moderately rapid permeability; present drainage adequate.	Low for metal and concrete. Low to moderate for metal; low for concrete.
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing, and moderate compressibility and shear strength; in places saturation causes loss of cohesion and settlement. Upper substratum moderate to severe; subject to frost heaving and loss of bearing capacity on thawing, moderate shear strength; in places saturation causes loss of cohesion and settlement; lower substratum slight; very low compressibility, negligible volume change when wet.	Severe; fluctuating water table; on-site investigation needed. Severe; fluctuating high water table; on-site investigation needed.	Slight; wetness hinders construction in places. Slight; wetness hinders construction in places.	Slight; moderate water intake and moderate to high water-holding capacity; in places requires drainage before irrigating. Slight; moderate water intake and moderate to high water-holding capacity; in places needs drainage before irrigating.	Slight; no limiting factor; seed grasses that tolerate wetness. Slight; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderately slow permeability; surface drainage needed. Moderately slow permeability; subsurface drainage needed.	Low to moderate for metal; low for concrete. Low to moderate for metal; low for concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Northfield (NfC, NfC2, NfD, NfD2, NfE, NfE2, NoB2, NoC, NoC2, NoD, NoD2, NoE, NoE2, NoF).	Surface soil good; subsoil fair, thin over sandstone bedrock.	Fair; substratum is sandstone that is moderately to strongly cemented.	Subsoil moderate, moderate stability and small volume change when wet; substratum excellent, consists of sandstone bedrock.	Severe; pervious; seal blanket needed over sandstone bedrock.	Moderate to severe; subsoil pervious to impervious, and has medium stability and small volume change; substratum has high stability and small volume change and is stony in places.
Orion (On)-----	Surface soil good; subsoil fair, thick.	Unsuitable-----	Subsoil and substratum severe; relatively unstable at all moisture contents, very low stability and bearing capacity when wet.	Moderate; pervious to semipervious; bottom needs to be compacted; suitable for dug ponds.	Moderate; semipervious to impervious, medium stability and volume change; in places subject to piping.
Orion variant (Ow)-----	Surface soil good; subsoil fair, thick.	Unsuitable-----	Subsoil and upper substratum severe; relatively unstable at all moisture contents, very low stability and bearing capacity when wet.	Moderate; pervious to semipervious; bottom needs to be scarified and compacted; suitable for dug ponds.	Moderate; semipervious to impervious and medium stability and volume change; in places subject to piping.
Palsgrove (PaB, PaB2, PaC, PaC2, PaC3, PaD, PaD2, PaD3).	Surface soil good; subsoil fair to poor, clayey.	Unsuitable-----	Subsoil and upper substratum severe; high plasticity and large volume change when wet, elastic.	Slight to moderate; pervious to semipervious; in places needs to be scarified and compacted; seal blanket needed over limestone bedrock.	Slight to moderate; semipervious to impervious, medium stability, and large volume change; clay subsoil has high shrink-swell potential.
Rozetta, benches (RzA, RzB, RzB2, RzC2).	Surface soil good; subsoil fair to poor.	Poor to fair; in places substratum is poorly graded sand with layers of silt.	Subsoil and upper substratum severe, large volume change, and low bearing capacity when wet; lower substratum slight, no volume change when wet, and suitable for all types of pavement when confined.	Slight to moderate; pervious to semipervious; in places bottom needs to be compacted.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Slight if footing rests on sandstone bedrock.	Severe because of shallowness over sandstone and degree of hardness of the sandstone; on-site investigation needed.	Very severe; shallow to bedrock.	Slight; moderate water intake and moderate to low water-holding capacity.	Severe; shallow to bedrock.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Moderate to severe; in places liquefies easily and flows as a viscous fluid if excavated when saturated, subject to frost heaving and loss of bearing capacity on thawing, moderate compressibility.	Severe; periodic stream overflow and low water-stable aggregates permit silt to enter drain pipes and gravel filter beds.	Slight for diversions, and terraces are not needed; soil is nearly level and subject to flooding.	Slight; moderate water intake and water-holding capacity; needs drainage and protection from stream overflow.	Slight; wetness hinders construction in places.	Moderate permeability; subject to stream overflow; surface drainage needed.	Low for metal and concrete.
Moderate to severe; in places liquefies easily and flows as a viscous fluid if excavated when saturated, subject to frost heaving and loss of bearing capacity on thawing, moderate compressibility.	Slight; high water table.	Slight for diversions, and terraces not needed; soil is nearly level and subject to flooding.	Severe; moderate water intake and water-holding capacity; difficult to drain and to protect from flooding.	Moderate; wetness hinders construction; subject to frequent flooding; seed grasses that tolerate wetness.	Moderate permeability, high water table, subject to stream overflow; surface drainage needed.	Low for metal and concrete.
Slight if footing rests on limestone bedrock, very severe if footing rests on thick clay residuum; clay has large volume change at varying moisture contents; poor shear strength and very high compressibility.	Slight if on-site field tests show clay is sufficiently deep and permeable to permit egress of effluents.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight on slopes through 12 percent; fair on slopes of more than 12 percent; no limiting factor except slope.	Moderate permeability; present drainage adequate.	Low to moderate for metal, low for concrete.
Upper substratum moderate to severe, subject to frost heaving and loss of strength on thawing, fair in shear strength, subject to liquefaction; in places saturation causes loss of cohesion and settlement; lower substratum slight, good shear strength, very low compressibility, and negligible volume change when wet.	Slight, but severe in places where drainage approaches somewhat poor; care needed to prevent silt from infiltrating drain pipes in filter beds.	Slight; no limiting factor.	Slight; moderate water intake and water-holding capacity.	Slight; no limiting factor.	Moderate permeability; present drainage adequate.	Low for metal and concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Sable (Sa, Sb)-----	Surface soil good, thick, dark colored; subsoil poor, clayey, subject to high water table.	Unsuitable-----	Subsoil and substratum very severe, highly plastic and subject to large volume change, elastic.	Slight; pervious to semipervious, high water table; suitable for dug ponds.	Slight to moderate; semipervious to impervious, medium stability, high volume change, susceptible to piping.
Schapville (ScC2, ShC3).	Surface soil good; subsoil fair to poor, clayey.	Unsuitable-----	Subsoil and substratum severe, large volume change and low bearing capacity when wet.	Slight; semipervious subsoil; bottom should be compacted.	Moderate; impervious, low stability, and large volume change.
Schapville variant (SmB).	Surface soil good; subsoil fair to poor, the lower part unstable on slopes.	Unsuitable-----	Subsoil severe, low stability and bearing capacity when wet; substratum severe, unstable at high moisture content.	Slight; subsoil semipervious; substratum pervious to semipervious.	Moderate; subsoil and substratum semipervious to impervious; substratum has low stability and large volume change.
Sogn (SoC2, SoD, SoD2, SoE, SoF).	Surface soil poor, dark colored, thin over rock.	Unsuitable-----	Substratum slight, consists of limestone bedrock.	Severe; pervious to semipervious over bedrock; seal blanket needed over limestone.	Severe; semipervious to impervious over bedrock, medium stability and volume change; depth to bedrock less than 12 inches.
Stony and rocky land (SrE, SrF).	Poor-----	Variable-----	Substratum slight---	Very severe; rock outcrops common; seal blanket needed over limestone.	Very severe; pervious and rock outcrops common.
Stronghurst (SsA, SsB, SsB2).	Surface soil good; subsoil fair to poor, thick, somewhat clayey.	Unsuitable-----	Subsoil severe, high elasticity, large volume change; substratum severe, large volume change and loss of bearing capacity when wet.	Slight; pervious to semipervious; bottom needs to be compacted.	Slight to moderate; semipervious, medium stability, large volume change.
Stronghurst, benches (StA, StB).	Surface soil good; subsoil fair to poor, thick, somewhat clayey.	Unsuitable-----	Subsoil severe, high elasticity, large volume change; upper substratum severe, large volume change and loss of bearing capacity when wet; lower substratum slight, no volume change when wet, and suitable for all types of pavement.	Slight; pervious to semipervious; in places bottom needs to be compacted; seal blanket needed above sandy substratum if it is reached.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Moderate to severe; in places liquefies easily and flows as a viscous fluid; drainage may cause settlement; fair shear strength and moderate compressibility; high water table.	Severe; high water table.	Slight for diversions, but terraces are not needed; soils are nearly level and have poor drainage.	Slight; moderate water intake and moderate to high water-holding capacity; drainage needed before irrigating.	Slight; wetness hinders construction in places; seed grasses that tolerate wetness.	Moderately slow permeability and high water table; surface drainage needed for both soils and the bench soil also needs subsurface drainage.	Severe for metal, low for concrete.
Severe; subject to shrinking on drying, fair shear strength, moderate compressibility.	Severe; material is fine textured and large filter fields are needed; on-site investigation needed.	Slight; no limiting factor.	Slight; moderate to slow water intake and water-holding capacity.	Moderate; seeding difficult because of clayey subsoil.	Moderately slow permeability; present drainage adequate.	Moderate for metal, low for concrete.
Severe; expansive if subject to changes in moisture content, poor shear strength, high compressibility.	Very severe; fluctuating water table and clayey, slowly permeable substratum.	Slight; in places wetness hinders construction.	Slight; moderate water intake and water-holding capacity; needs drainage before irrigating.	Slight; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderately slow to slow permeability; subsurface drainage needed.	High for metal, low for concrete.
Slight if footing rests on limestone bedrock.	Severe to very severe because of nearness of hard limestone to the surface.	Very severe; very shallow over bedrock.	Severe; moderate water intake, low water-holding capacity, and very shallow to bedrock.	Severe; very shallow to bedrock.	Moderate permeability; present drainage adequate.	Moderate for metal, low for concrete.
Variable; requires on-site investigation.	Very severe; steep slopes and little to no soil material.	Very severe; shallow to bedrock.	Very severe; low water-holding capacity and steep slope.	Severe; shallow to bedrock.	Moderate to rapid permeability; present drainage adequate.	Low for metal and concrete.
Poor; expansive when wet, fair shear strength, moderate compressibility.	Severe because of fluctuating water table; on-site investigation needed.	Slight; in places wetness hinders construction.	Slight; moderate water intake and water-holding capacity; needs drainage before irrigating.	Slight; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderately slow permeability; depth to bedrock between 4 and 6 feet; subsurface drainage needed.	Low for metal, low to moderate for concrete.
Upper substratum severe, expansive when wet, fair shear strength, and moderate compressibility; lower substratum slight, good shear strength, very low compressibility, and negligible volume change when wet.	Severe because of fluctuating water table; on-site investigation needed.	Slight; in places wetness hinders construction.	Slight; moderate water intake and water-holding capacity; needs drainage before irrigating.	Slight; in places wetness hinders construction; seed grasses that tolerate wetness.	Moderately slow permeability; depth to sand between 4 and 6 feet; subsurface drainage needed.	Low for metal, low to moderate for concrete.

TABLE 9.—*Suitability, limitations, and characteristics of the soils*

Soil series, miscellaneous land types, and soil symbols	Suitability as a source of—		Limitations for—		
	Topsoil	Sand and gravel	Subgrade material for pavements	Farm ponds	
				Reservoir area	Embankment
Tama (TaA, TaB, TaB2, TaC2, TaC3).	Surface soil good, thick, dark colored; subsoil fair to poor, in places clayey.	Unsuitable.....	Subsoil severe, elastic, large volume change and loss of bearing capacity when wet; substratum very severe, large volume change and loss of bearing capacity when wet.	Slight; pervious to semipervious; in places bottom needs to be compacted.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.
Tama, benches (TbA, TbB).	Surface soil good, thick; subsoil fair to poor, in places clayey.	Unsuitable.....	Subsoil severe, elastic, large volume change and loss of bearing capacity when wet; upper substratum very poor, large volume change and loss of bearing capacity when wet; lower substratum slight, no volume change when wet, and good for all types of pavement when confined.	Slight; pervious to impervious; in places bottom needs to be compacted; seal blanket needed over sandy substratum if it is reached.	Slight to moderate; semipervious to impervious, medium stability, and large volume change.
Worthen (WoA, WoB).	Surface soil good, thick, dark colored; subsoil good to fair, thick.	Unsuitable.....	Subsoil and substratum severe; relatively unstable at all moisture contents and low bearing capacity when wet.	Moderate; pervious to impervious; bottom should be compacted.	Moderate to severe; semipervious, low stability, and small volume change.

The suitability of the soils as a source for topsoil refers specifically to the use of soil material, preferably rich in organic matter, as a topdressing for road banks, parks, gardens, and lawns. The ratings are based mainly on the texture of the soil and its content of organic matter. For example, a soil that is unsuitable for use as topsoil is sandy and low in organic matter. A dark-colored soil is generally high in organic matter. Horizons described as thin lack sufficient topsoil to warrant large scale removal, but those described as thick are generally worth removing. The appraisal of subsoil material for use as topsoil meets a need in some parts of the county. Loamy subsoil material serves adequately as topsoil if properly treated with fertilizer and additions of organic matter.

The suitability of the soils as a source of sand and gravel refers to sources of such material that is within a depth of 5 feet from the surface. The suitability as a source of coarse-grained material is determined for the subsoil or substratum, whichever is applicable. Some of

the coarse-textured material contains appreciable amounts of finer material. Individual test pits and laboratory analyses will be needed to make these determinations. Many of the soils in this county are underlain by limestone, which when crushed is suitable for constructing and surfacing roads (fig 12). The soil maps help to locate areas where limestone is near the surface.

In table 9 ratings of the limitations of the soils for various engineering uses are also given. A rating of *slight* means that the soil has no more than slight limitations that are easy to overcome. *Moderate* means that there are limitations that can be overcome by good management and soil manipulation. *Severe* means that suitability for use is questionable and the limitations are difficult to overcome. *Very severe* means that use is generally unsound.

Ratings of the limitations of the soils as a source of subgrade material for pavements are based on the qualities of the soil that enable it to support base courses,

of Lafayette County, Wis., for engineering construction—Continued

Limitations for—Continued					Factors that influence agriculture drainage	Corrosion potential for conduits
Foundations for low buildings	Septic tank filter fields	Terraces and diversions	Irrigation	Grassed waterways		
Severe; expansive when wet, fair shear strength, moderate compressibility.	Slight; moderately permeable.	Slight; no limiting factor.	Slight; moderate water intake and high water-holding capacity.	Slight; no limiting factor.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Upper substratum severe; expansive when wet, fair shear strength, moderate compressibility, and negligible volume change when wet.	Slight; moderately permeable.	Slight; no limiting factor.	Slight; moderate water intake and high water-holding capacity.	Slight; no limiting factor.	Moderate permeability; present drainage adequate.	Low for metal and concrete.
Moderate to severe; subject to frost heaving and loss of bearing capacity on thawing, liquefies if saturated, fair shear strength, and moderate compressibility.	Severe; in places periodic overflow causes filter fields to become inoperative and lack of water-stable aggregates permits silt to flow into drain pipes and gravel filter beds.	Slight for diversions, and terraces are not needed; flooding is a hazard.	Slight; moderate water intake and moderate to high water-holding capacity; in places protection from flooding needed.	Slight; no limiting factor.	Moderate permeability and subject to overflow; present drainage adequate.	Moderate for metal, low for concrete.

including curbs and gutters, for highways, airports, tennis courts, and the like.

In table 9 both the subsoil and substratum are rated as to their limitations for highway subgrade. The ratings are based mainly on soil test data. The degree to which subgrade materials are influenced by surface drainage, depth of frost penetration, and other such factors should be determined locally for each site. The surface soil generally has very severe limitations for subgrade material because of its high content of organic matter.

In determining the limitations of a soil for a farm pond, the entire soil profile is considered for the reservoir area and for the embankment material, unless otherwise specified. The ratings for reservoir areas in table 9 are for undisturbed soils, but characteristics of soils that have been disturbed were considered in making the ratings for embankments. Controlled compaction of embankments commonly results in increased density and lowered permeability. The terms "subsoil" and "substratum," as

used in the column headed "Embankment," refer to soil material that has been removed from these horizons. Features that affect the suitability of the soils for reservoirs and embankments are the ground water level, stoniness, depth to bedrock, strength and stability, shrink-swell potential, the content of organic matter, and the permeability.

The limitations of the soils for foundations for buildings that are no higher than three stories, and features that affect the limitations for that use are given. The limitations of the undisturbed soil as a base for low buildings depends primarily on the bearing capacity and expansion potential of the particular soil. Slope and erosion are local factors and are not taken into account in determining the ratings. The base of every part of the foundation should be placed, if possible, below the depth to which the soil is subject to seasonal volume change caused by alternate wetting and drying. It should also be below the depth to which the soil structure would be

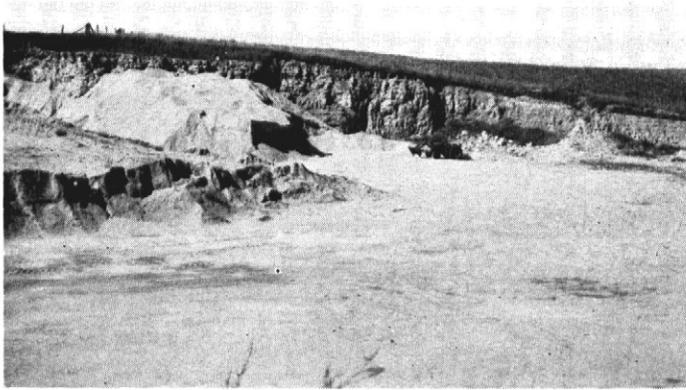


Figure 12.—Limestone bedrock, when crushed, provides material suitable for constructing and surfacing roads, and the soil maps help to locate areas where limestone is near the surface.

weakened by root holes and animal burrows. The depth to which the foundation is affected by frost heaving, which may be as much as 5 feet, is also considered. Therefore, the substratum provides the base for building foundations in most places and is the material rated in the column headed "Foundations for low buildings."

Limitations of the soils for domestic sewage disposal systems and characteristics and qualities that affect their use for these systems are given in table 9. Filter fields and seepage beds are the main considerations in these ratings. Limitations for seepage pits, however, is also considered. For example, if the soil is coarse textured, deep, and free draining, a shallow pit may prove satisfactory. However, in soils that have slow permeability in the upper few feet but that have a rapidly permeable substratum, a deep pit may be needed.

How well a sewerage disposal system functions depends largely on the rate at which effluent from the tank moves into and through the soil. The permeability of the soil should be moderate to rapid, and the soil should have a percolation rate of 1 inch in 60 minutes or faster. The percolation rate is influenced by such factors as the relative amounts of gravel, sand, silt, and clay in the soil, the kind of clay, the degree of structural development, and the bulk density.

Other characteristics that affect the limitation of a soil for a sewage disposal system are structural stability, ground water level, depth of the soil to a restricting layer, the kind of underlying material, the susceptibility of the soil to stream overflow, the slope of the soil, and the proximity of the site to wells, streams, and lakes.

A well-developed soil structure that is stable when wet greatly enhances the value of a soil for sewage disposal. If the structure of the soil is unstable, the soil slakes down when wet. As a result, permeability and infiltration are slowed and silt filters into the tile pipes or gravel bed of the filter field.

A water table that rises to the height of the subsurface tile forces the sewage effluent upward to the surface of the soil and makes an ill-smelling, unhealthy bog in the

filter field. There should be 4 feet of soil material between the ground-water level or hard rock formation and the bottom of the trench or filter bed for the filtration and purification of septic-tank effluent. If cracked or creviced bedrock is near the surface, effluent is likely to seep into the cracks and contaminate the water supply. Local regulations should be followed when installing a sewage system.

Slopes of less than 10 percent generally are suited to the construction and maintenance of filter fields. On steeper slopes, however, filter fields are difficult to construct and seepage beds are impractical.

Also given in table 9 are ratings for the limitations of the soils for terraces and diversions. They are based mainly on the stability, texture, and thickness of the soil material; on the stones and rocks in the soil; on the ease of establishing vegetation; and on the topography. If terraces are properly installed and maintained, they are effective in controlling erosion and are also effective in draining some soils. Limitations for construction of terraces on slopes of more than 12 percent are very severe because of the difficulty of constructing, farming, and maintaining them. Diversions can be used effectively on steeper slopes. Diversions are also used to protect gullied areas and divert runoff from low-lying areas, buildings, and roads.

The limitations of soil material for irrigation is based mainly on the depth of the soil, its available water holding capacity, permeability, natural drainage, rate of water intake, and slope. Because of the variability among different areas of soil types the availability, quality, and source of water for use in irrigation are not considered. Where sprinkler irrigation is used, the slope is not so critical a factor as it would be in a gravitational system. Wet soils are assumed to have been drained and are rated on that basis.

Ratings of the characteristics of the soils that affect their limitations for grassed waterways are for wide, shallow, grassed channels designed to carry peak runoff following a rainstorm of a 10-year frequency. The ratings are based on the stability, texture, and thickness of the soil material. They are also based on the slope and on the ease of establishing and maintaining suitable vegetation on the soils.

Some of the factors that affect agricultural drainage are the rate of water movement into and through the soil, depth to a restricting layer or to bedrock, depth to the water table, and position of the soil on the landscape.

The need for both surface and subsurface drainage was considered. Surface drainage can be provided by using ditches less than 30 inches deep on most mineral soils, ditches that are 36 inches deep on organic soils, and ditches that are 48 inches deep on sandy soils. Subsurface drainage is provided by deep ditches, tile drains, or a combination of the two. Such drainage removes excess water from the surface and subsoil and intercepts seepage or lowers the ground water level.

Estimates of the corrosion potential of the soils in reference to metal pipe and cement conduits laid underground are also provided in table 9. Only the underlying material, or substratum, was considered. If the surface soil and subsoil do not differ much from the substratum in texture, drainage, acidity, content of salt, or electrical

conductivity, the same rating applies. Generally, soils that have poor aeration, a high pH value, and are high in electrical conductivity and in content of salt have a high corrosion potential for metal conduits. On the other hand, soils that have a low pH value have a high corrosion potential for concrete conduits. All soils are more corrosive when they are wet.

Descriptions of the Soils

This section provides detailed information about the soils of Lafayette County. It describes each soil series. Then each mapping unit, or soil, is described. The soils are described approximately in alphabetical order. The capability unit and woodland suitability group in which

the soil has been placed is given at the end of each description for easy reference concerning management.

All of the soils of one series that have the same kind of texture in the surface layer are grouped together, and a profile that is representative of the soils is described. The descriptions of the other soils tell how their profile differs from the one described, or differences are indicated in the soil name.

For more general information about the soils, the reader can refer to the section "General Soil Map" in which the broad patterns of soils are described. The approximate acreage and proportionate extent of the mapping units are given in table 10. Terms used to describe the soils are given in the Glossary. Technical descriptions of each series are provided in the section "Detailed Descriptions of Soil Series."

TABLE 10.—Approximate acreage and proportionate extent of the soils

Soil	Area	Extent	Soil	Area	Extent
	<i>Acres</i>	<i>Percent</i>		<i>Acres</i>	<i>Percent</i>
Alluvial land.....	155	(1)	Dodgeville soils, 12 to 20 percent slopes, severely eroded.....	649	.2
Arenzville silt loam.....	9,240	2.2	Downs silt loam, 2 to 6 percent slopes, moderately eroded.....	554	.1
Ashdale silt loam, 2 to 6 percent slopes.....	634	.2	Downs silt loam, 6 to 12 percent slopes, moderately eroded.....	327	.1
Ashdale silt loam, 2 to 6 percent slopes, moderately eroded.....	15,045	3.7	Dubuque silt loam, 2 to 6 percent slopes.....	232	.1
Ashdale silt loam, 6 to 12 percent slopes.....	664	.2	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.....	2,207	.5
Ashdale silt loam, 6 to 12 percent slopes, moderately eroded.....	15,894	3.9	Dubuque silt loam, 6 to 12 percent slopes.....	1,329	.3
Ashdale silt loam, 6 to 12 percent slopes, severely eroded.....	1,835	.5	Dubuque silt loam, 6 to 12 percent slopes, moderately eroded.....	34,845	8.5
Ashdale silt loam, 12 to 20 percent slopes.....	253	.1	Dubuque silt loam, 12 to 20 percent slopes.....	11,466	2.8
Ashdale silt loam, 12 to 20 percent slopes, moderately eroded.....	1,032	.3	Dubuque silt loam, 12 to 20 percent slopes, moderately eroded.....	38,230	9.3
Ashdale silt loam, 12 to 20 percent slopes, severely eroded.....	491	.1	Dubuque silt loam, 20 to 30 percent slopes.....	4,404	1.1
Boaz silt loam.....	494	.1	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.....	1,373	.3
Boone fine sand, 6 to 20 percent slopes, eroded.....	68	(1)	Dubuque silt loam, 30 to 45 percent slopes.....	321	.1
Calamine silt loam, 0 to 2 percent slopes.....	440	.1	Dubuque soils, 6 to 12 percent slopes, severely eroded.....	1,000	.2
Calamine silt loam, 2 to 6 percent slopes.....	201	(1)	Dubuque soils, 12 to 20 percent slopes, severely eroded.....	2,872	.7
Calamine silt loam, 6 to 12 percent slopes.....	92	(1)	Dunbarton silt loam, 2 to 6 percent slopes.....	61	(1)
Calamine silt loam, 6 to 12 percent slopes, moderately eroded.....	121	(1)	Dunbarton silt loam, 6 to 12 percent slopes.....	87	(1)
Chaseburg silt loam, 0 to 2 percent slopes.....	1,334	.3	Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded.....	775	.2
Chaseburg silt loam, 2 to 6 percent slopes.....	5,091	1.3	Dunbarton silt loam, 12 to 20 percent slopes.....	907	.2
Dakota loam, 0 to 2 percent slopes.....	41	(1)	Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded.....	237	.1
Dakota loam, 2 to 6 percent slopes.....	113	(1)	Dunbarton silt loam, 20 to 30 percent slopes.....	860	.2
Dakota loam, mottled subsoil variant, 0 to 3 percent slopes.....	170	(1)	Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded.....	127	(1)
Derinda silt loam, 2 to 6 percent slopes, moderately eroded.....	27	(1)	Dunbarton silt loam, 30 to 45 percent slopes.....	925	.2
Derinda silt loam, 6 to 12 percent slopes.....	72	(1)	Edmund silt loam, 2 to 6 percent slopes, moderately eroded.....	234	.1
Derinda silt loam, 6 to 12 percent slopes, moderately eroded.....	213	.1	Edmund silt loam, 6 to 12 percent slopes, moderately eroded.....	558	.1
Derinda silt loam, 12 to 20 percent slopes, eroded.....	237	.1	Edmund silt loam, 12 to 20 percent slopes.....	200	(1)
Derinda soils, 12 to 20 percent slopes, severely eroded.....	98	(1)	Eleroy silt loam, 2 to 6 percent slopes.....	175	(1)
Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes.....	74	(1)	Eleroy silt loam, 2 to 6 percent slopes, moderately eroded.....	321	.1
Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded.....	54	(1)	Eleroy silt loam, 6 to 12 percent slopes.....	249	.1
Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded.....	912	.2	Eleroy silt loam, 6 to 12 percent slopes, moderately eroded.....	454	.1
Dodgeville silt loam, 6 to 12 percent slopes.....	261	.1	Eleroy silt loam, 12 to 20 percent slopes.....	100	(1)
Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded.....	10,935	2.7	Eleroy silt loam, 12 to 20 percent slopes, moderately eroded.....	104	(1)
Dodgeville silt loam, 12 to 20 percent slopes.....	254	.1	Fayette silt loam, benches, 2 to 6 percent slopes.....	481	.1
Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded.....	7,851	1.9	Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded.....	98	(1)
Dodgeville soils, 6 to 12 percent slopes, severely eroded.....	1,145	.3			

See footnote at end of table.

TABLE 10.—Approximate acreage and proportionate extent of the soils—Continued

Soil	Area		Soil	Area	
	Acres	Percent		Acres	Percent
Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded	61	(¹)	Marshan silt loam	131	(¹)
Fayette silt loam, uplands, 2 to 6 percent slopes	1,417	.4	Meridian loam, 0 to 2 percent slopes	101	(¹)
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	9,639	2.3	Meridian loam, 2 to 6 percent slopes	147	(¹)
Fayette silt loam, uplands, 6 to 12 percent slopes	665	.2	Meridian sandy loam, 0 to 2 percent slopes	39	(¹)
Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded	9,645	2.3	Meridian sandy loam, 2 to 6 percent slopes	128	(¹)
Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded	224	.1	Mifflin soils, 2 to 6 percent slopes, eroded	123	(¹)
Fayette silt loam, uplands, 12 to 20 percent slopes	127	(¹)	Mifflin soils, 6 to 12 percent slopes, eroded	779	.2
Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded	772	.2	Mifflin soils, 12 to 20 percent slopes, eroded	490	.1
Fayette silt loam, uplands, 20 to 30 percent slopes	47	(¹)	Mifflin soils, 20 to 30 percent slopes, eroded	99	(¹)
Fayette silt loam, valleys, 2 to 6 percent slopes	85	(¹)	Mine pits and dumps	539	.1
Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded	85	(¹)	Muscatine silt loam, 0 to 2 percent slopes	2,186	.5
Fayette silt loam, valleys, 6 to 12 percent slopes	164	(¹)	Muscatine silt loam, 2 to 6 percent slopes	1,105	.3
Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded	241	1	Muscatine silt loam, 2 to 6 percent slopes, moderately eroded	697	.2
Fayette silt loam, valleys, 12 to 20 percent slopes	182	(¹)	Muscatine silt loam, benches, 0 to 2 percent slopes	237	.1
Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded	192	(¹)	Muscatine silt loam, benches, 2 to 6 percent slopes	187	(¹)
Fayette and Dubuque soils and Pits, gently sloping, eroded	148	(¹)	Northfield loam, 6 to 12 percent slopes	310	.1
Fayette and Dubuque soils and Pits, moderately sloping, eroded	192	(¹)	Northfield loam, 6 to 12 percent slopes, moderately eroded	371	.1
Fayette and Dubuque soils and Pits, moderately steep, eroded	159	(¹)	Northfield loam, 12 to 20 percent slopes	814	.2
Gale silt loam, 6 to 12 percent slopes, eroded	283	.1	Northfield loam, 12 to 20 percent slopes, moderately eroded	420	.1
Gale silt loam, 12 to 20 percent slopes, eroded	241	.1	Northfield loam, 20 to 30 percent slopes	512	.1
Gale silt loam, 20 to 30 percent slopes, eroded	70	(¹)	Northfield loam, 20 to 30 percent slopes, moderately eroded	150	(¹)
Gotham loamy fine sand, 2 to 6 percent slopes, eroded	122	(¹)	Northfield sandy loam, 2 to 6 percent slopes, moderately eroded	88	(¹)
Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded	72	(¹)	Northfield sandy loam, 6 to 12 percent slopes	231	.1
Hixton loam, 2 to 6 percent slopes, eroded	185	(¹)	Northfield sandy loam, 6 to 12 percent slopes, moderately eroded	600	.1
Hixton loam, 6 to 12 percent slopes, eroded	289	.1	Northfield sandy loam, 12 to 20 percent slopes	566	.1
Hixton loam, 12 to 20 percent slopes	720	.2	Northfield sandy loam, 12 to 20 percent slopes, moderately eroded	739	.2
Hixton loam, 12 to 20 percent slopes, moderately eroded	750	.2	Northfield sandy loam, 20 to 30 percent slopes	715	.2
Hixton loam, 20 to 30 percent slopes, eroded	130	(¹)	Northfield sandy loam, 20 to 30 percent slopes, moderately eroded	122	(¹)
Hixton sandy loam, 2 to 6 percent slopes, eroded	213	.1	Northfield sandy loam, 30 to 45 percent slopes	637	.2
Hixton sandy loam, 6 to 12 percent slopes, eroded	357	.1	Orion silt loam	8,666	2.1
Hixton sandy loam, 12 to 20 percent slopes, eroded	495	.1	Orion silt loam, wet variant	404	.1
Hixton sandy loam, 12 to 20 percent slopes, severely eroded	56	(¹)	Palsgrove silt loam, 2 to 6 percent slopes	380	.1
Hixton sandy loam, 20 to 30 percent slopes	115	(¹)	Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded	20,682	5.0
Houghton mucky peat	47	(¹)	Palsgrove silt loam, 6 to 12 percent slopes	1,657	.4
Huntsville silt loam, 0 to 2 percent slopes	7,380	1.8	Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded	32,043	7.8
Huntsville silt loam, 2 to 6 percent slopes	264	.1	Palsgrove silt loam, 6 to 12 percent slopes, severely eroded	1,884	.5
Keltner silt loam, 2 to 6 percent slopes	508	.1	Palsgrove silt loam, 12 to 20 percent slopes	1,508	.4
Keltner silt loam, 6 to 12 percent slopes, moderately eroded	2,147	.5	Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded	7,705	1.9
Lawson silt loam	6,055	1.5	Palsgrove silt loam, 12 to 20 percent slopes, severely eroded	256	.1
Lindstrom silt loam, 2 to 6 percent slopes	59	(¹)	Rozetta silt loam, benches, 0 to 2 percent slopes	504	.1
Lindstrom silt loam, 6 to 12 percent slopes, eroded	86	(¹)	Rozetta silt loam, benches, 2 to 6 percent slopes	731	.2
Lindstrom silt loam, 12 to 20 percent slopes, eroded	85	(¹)	Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded	103	(¹)
Marsh	222	.1	Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded	30	(¹)
			Sable silt loam	179	(¹)
			Sable silt loam, benches	1,790	.4
			Schapville silt loam, 6 to 12 percent slopes, moderately eroded	161	(¹)
			Schapville soils, 6 to 12 percent slopes, severely eroded	59	(¹)
			Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes	277	.1
			Sogn silt loam, 2 to 12 percent slopes, eroded	1,099	.3

See footnote at end of table.

TABLE 10.—*Approximate acreage and proportionate extent of the soils—Continued*

Soil	Area	Extent	Soil	Area	Extent
	<i>Acres</i>	<i>Percent</i>		<i>Acres</i>	<i>Percent</i>
Sogn silt loam, 12 to 20 percent slopes.....	5,628	1.4	Tama silt loam, 0 to 2 percent slopes.....	738	.2
Sogn silt loam, 12 to 20 percent slopes, moderately eroded.....	4,571	1.1	Tama silt loam, 2 to 6 percent slopes.....	2,756	.7
Sogn silt loam, 20 to 30 percent slopes.....	1,264	.3	Tama silt loam, 2 to 6 percent slopes, moderately eroded.....	42,672	10.4
Sogn silt loam, 30 to 45 percent slopes.....	448	.1	Tama silt loam, 6 to 12 percent slopes, moderately eroded.....	16,645	4.0
Stony and rocky land, moderately steep.....	2,990	.7	Tama silt loam, 6 to 12 percent slopes, severely eroded.....	439	.1
Stony and rocky land, steep.....	3,680	.9	Tama silt loam, benches, 0 to 2 percent slopes.....	198	(¹)
Stronghurst silt loam, 0 to 2 percent slopes.....	157	(¹)	Tama silt loam, benches, 2 to 6 percent slopes.....	225	.1
Stronghurst silt loam, 2 to 6 percent slopes.....	134	(¹)	Worthen silt loam, 0 to 2 percent slopes.....	1,139	.3
Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded.....	104	(¹)	Worthen silt loam, 2 to 6 percent slopes.....	5,730	1.4
Stronghurst silt loam, benches, 0 to 2 percent slopes.....	748	.2			
Stronghurst silt loam, benches, 2 to 6 percent slopes.....	574	.1	Total.....	411,520	100.0

¹ Less than 0.05 percent.

Alluvial Land (Ad)

Alluvial land is a miscellaneous land type made up of sandy and loamy sediments deposited by streams. It is nearly level and is on the lower parts of flood plains along the major streams in the county (fig. 13).



Figure 13.—Alluvial land on bottom land along a stream. The alluvial material that makes up this land type was deposited recently by stream overflow.

The surface layer is grayish-brown to dark grayish-brown silt loam or loam about 8 inches thick. It overlies a nearly structureless mixture of grayish-brown or gray stratified silt, sand, and gravel.

The surface layer ranges from gravelly mine wash to loamy sand and loam. The parent material is stratified, and the sequence of the strata differ from place to place. The soil material is moderately high in fertility and is nearly neutral. It generally has high moisture-supplying capacity. The water table is generally at a depth of less than 2 feet, and the areas are flooded frequently.

Included with this land type in mapping are areas of gravelly alluvium and of Marsh. Also included are such poorly drained soils as Boaz silt loam and Sable silt

loam, benches. These areas are all less than 1 acre in size and are too small to be mapped separately.

Alluvial land is not suited to cultivated crops; it has a high water table and is subject to flooding. Most areas are in pasture or trees. The areas are best suited to pasture, to trees, or to wildlife. Capability unit Vw-14; woodland suitability group 9.

Arenzville Series

The Arenzville series consists of light-colored, deep, silty alluvial soils that are well drained to moderately well drained. These soils are on natural levees along nearly all of the perennial and intermittent streams in the county, where they formed in silty materials. The materials were washed from silt-covered uplands and were deposited over the darker original soil of the bottom lands by stream overflow (fig. 14).

Representative profile of Arenzville silt loam in a cultivated field:

- 0 to 9 inches, very dark gray to dark grayish-brown, friable silt loam.
- 9 to 20 inches, grayish-brown to dark grayish-brown, friable silt loam.
- 20 to 34 inches, light grayish-brown to brown, very friable silt loam.
- 34 inches +, very dark brown to very dark gray, friable silt loam.

In areas where the deposit of sediments is deepest, the light-colored material reaches to a depth of more than 42 inches. Thin layers of very fine sand occur in the profile. Depth to yellow and gray mottling ranges from 18 to 36 inches. In some mined areas, chert and mine tailings are on the surface of the soils.

These soils are lighter colored than the Huntsville soils and better drained than the somewhat poorly drained Orion soils.

Arenzville soils have high moisture-supplying capacity. They are high in fertility and are neutral throughout the profile. In some places they are subject to occasional flooding and to streambank erosion. The water table is generally at a depth of more than 4 feet and does not hinder growth of roots.



Figure 14.—Profile of Arenzville silt loam showing light-colored soil material over a darker, buried soil.

If Arenzville soils are protected from flooding, they are well suited to corn, small grains, grasses, and legumes. Areas that are inaccessible or that are flooded frequently are better suited to permanent pasture, to woodland, or to wildlife habitats than to cultivated crops.

Arenzville silt loam (An).—This is the only Arenzville soil mapped in the county. Its profile is like that described for the series. Capability unit IIw-11; woodland suitability group 1.

Ashdale Series

In the Ashdale series are dark-colored, silty, well-drained soils in the uplands, on ridges above stream valleys. They formed under prairie in a moderately thick mantle of wind-laid silt, or loess, which is underlain by reddish clay weathered from limestone.

Representative profile of an Ashdale silt loam in an undisturbed area:

- 0 to 10 inches, black, friable silt loam.
- 10 to 16 inches, very dark brown, friable silt loam.
- 16 to 24 inches, dark yellowish-brown, firm silt loam.
- 24 to 33 inches, dark yellowish-brown, firm silty clay loam.
- 33 to 38 inches, dark-brown silty clay; plastic when wet.
- 38 inches +, dark-brown clay; plastic when wet.

The mantle of silt in which the soils formed ranges from 30 to 50 inches in thickness. Depth to limestone bedrock ranges from 42 to 92 inches. The clayey residuum from limestone varies considerably in thickness within a short distance. In most places it is between 8 and 42 inches thick, but in a few places it is less than 8

inches thick. The plow layer in eroded areas ranges from very dark brown to dark yellowish brown.

Ashdale soils have moderate permeability and moderate to high moisture-supplying capacity. They are moderately high in natural fertility. Unless they have been limed, these soils are slightly acid to medium acid.

These soils are suited to all crops commonly grown in the county. Except where the slope is steep, the soils are fairly easy to manage and cultivate. Crops on these soils respond well if manure and fertilizer are applied.

Ashdale silt loam, 2 to 6 percent slopes (AsB).—The profile of this soil is similar to that described for the series. Nearly all of this soil is in crops. If it is well managed, yields are good.

This soil is subject to erosion if it is cultivated. Contour stripcropping, terracing, and other practices that help control erosion are needed. Crops respond well if fertilizer and lime are added. Capability unit IIe-1; woodland suitability group 12.

Ashdale silt loam, 2 to 6 percent slopes, moderately eroded (AsB2).—This soil has lost all but about 4 inches of its original surface layer through water erosion, and material from the subsoil has been mixed with the remaining surface soil by plowing. As a result, the present surface layer is lower in organic matter and fertility than that of the profile described for the series.

Practices that prevent further erosion are needed. If this soil is protected, however, it is suited to row crops, small grains, and hay. A cropping system that supplies organic matter and maintains good tilth is also needed. Capability unit IIe-1; woodland suitability group 12.

Ashdale silt loam, 6 to 12 percent slopes (AsC).—The surface layer of this soil is slightly thinner than that of the profile described for the series.

If cultivated, this soil is subject to moderate erosion. Therefore, practices that provide protection from runoff and thus reduce erosion are needed. Growing crops in alternate strips and on the contour slows runoff. Properly installed terraces divert runoff from fields. Capability unit IIIe-1; woodland suitability group 12.

Ashdale silt loam, 6 to 12 percent slopes, moderately eroded (AsC2).—The surface layer of this soil is thinner than that of the profile described for the series. Also, depth to clayey material is less. This soil has lost all but 3 to 6 inches of its original surface layer through water erosion, and material from the upper part of the subsoil has been mixed with the remaining surface soil by plowing. The present surface layer is lighter colored, is lower in organic matter and fertility, and crusts more readily than the original one. Depth to clayey material ranges from 35 to 45 inches.

If this soil is cultivated, management that prevents further erosion is required. The soil is not suited to intensive tillage; nevertheless, yields of row crops, small grain, and hay are good if adequate amounts of lime and fertilizer are applied. Capability unit IIIe-1; woodland suitability group 12.

Ashdale silt loam, 6 to 12 percent slopes, severely eroded (AsC3).—All, or in places nearly all, of the original surface layer of this soil has been removed through erosion. The present surface layer consists mainly of material from the subsoil. It is therefore lower in organic matter and fertility and crusts more readily than the

surface layer of the profile described for the series. Also, depth to clayey material is less.

Because this soil is sloping and is severely eroded, it is poorly suited to intensive tillage. Management that increases fertility and the content of organic matter and that improves the tilth of the surface soil is needed. Lime and fertilizer should be applied to hold the fertility needed for good crop growth. Capability unit IVe-1; woodland suitability group 12.

Ashdale silt loam, 12 to 20 percent slopes (AsD).—Because of the slope, the mantle of silt is thinner, the subsoil is thinner, and the depth to the clayey substratum is slightly less than in the profile described for the series. Typically the reddish clayey residuum lies at a depth between 35 and 40 inches. Runoff is rapid, and erosion is active in cultivated areas.

This soil is too steep for intensive use for crops. Many areas remain in pasture. Row crops can be grown if this soil is protected from erosion and if other good management is used. Capability unit IVe-1; woodland suitability group 12.

Ashdale silt loam, 12 to 20 percent slopes, moderately eroded (AsD2).—The mantle of silt is slightly thinner, the subsoil is slightly thinner, and the depth to the clayey substratum is slightly less than in the profile described for the series. Generally, the reddish clayey residuum is 30 to 40 inches from the surface.

This soil has lost all but about 4 to 6 inches of its original surface layer through water erosion, and material from the upper part of the subsoil has been mixed with the remaining surface soil by plowing. As a result, the present surface layer is lower in organic matter and fertility than the original one. Some small areas are severely eroded. In these areas all of the original surface layer is gone, and the present surface soil is browner and crusts more readily than the one that erosion removed.

This soil is not suited to intensive cultivation. Nevertheless, yields of row crops, small grains, and hay are moderately high if the soil is protected from erosion and is otherwise well managed. The cropping system should consist mainly of small grains and of hay crops. Capability unit IVe-1; woodland suitability group 12.

Ashdale silt loam, 12 to 20 percent slopes, severely eroded (AsD3).—The mantle of silt is thinner, the subsoil is thinner, and the depth to the clayey substratum is slightly less than in the profile described for the series. Generally, the reddish clayey residuum lies at a depth between 30 and 35 inches. The present surface layer consists mainly of material that was originally subsoil. It therefore is lower in organic matter and fertility and crusts more readily than the surface layer of the moderately eroded Ashdale soils. It is browner and less friable than that of the representative profile described.

The slope and severe erosion make this soil unsuited to row crops. The cropping system should consist mainly of hay crops. Capability unit VIe-1; woodland suitability group 12.

Boaz Series

The Boaz series consists of moderately dark colored, silty, alluvial soils that are somewhat poorly drained. These soils are on low terraces along larger streams in the county, where they formed in silty materials. The materials were washed from silt-covered uplands and

were deposited on the bottom lands over the original soil by stream overflow.

Representative profile of Boaz silt loam in a cultivated field:

- 0 to 7 inches, very dark gray, friable silt loam.
- 7 to 23 inches, grayish-brown, friable silt loam.
- 23 to 30 inches, grayish-brown, firm clay loam.
- 30 to 43 inches, gray, slightly hard and firm light silty clay loam.
- 43 inches +, gray, friable silt loam.

In a few places there are thin layers of very fine sand in the profile and the underlying material at a depth of 3 feet or more consists of layers of silt or sand or of clayey material. In places silty material, 8 to 18 inches thick, has been deposited recently over the original surface layer.

Boaz soils formed in materials similar to those in which the Sable soils on benches formed, but they are better drained than those soils and have a lighter colored, thinner surface layer. Their surface layer is darker colored than that of the Stronghurst soils, and their subsoil is not so well developed.

These soils have high moisture-supplying capacity. They are high in fertility and are neutral throughout the profile. Movement of water through these soils is moderately slow, and the water table is generally at a depth of about 5 feet or less. Flooding is common during periods of high water and after a prolonged rain. Small depressions retain water long enough to interfere with tillage and may require drainage. In some places tile drains are needed for good yields of crops.

If Boaz soils are protected from flooding and drainage is provided, they are suited to the crops commonly grown in the county. If drainage is not feasible, the areas can be used for pasture, for woodland, or for wildlife.

Boaz silt loam (Ba).—This is the only Boaz soil mapped in the county. Its profile is similar to that described for the series. Capability unit IIw-13; woodland suitability group 9.

Boone Series

The Boone series is made up of light-colored, sandy soils that are excessively drained. These soils are mainly on valley slopes along the East Branch of the Pecatonica River, generally below outcrops of sandstone. They formed in place in material weathered from sandstone. The original vegetation was various kinds of hardwood trees.

Representative profile of Boone fine sand in an undisturbed area:

- 0 to 4 inches, very dark grayish-brown, very friable fine sand.
- 4 to 5 inches, brown, loose fine sand.
- 5 to 36 inches, yellowish-brown, loose fine sand.
- 36 inches +, light yellowish-brown, loose fine sand.

These soils have very rapid permeability and low moisture-supplying capacity. Their fertility is low. They are medium acid to strongly acid, unless they have been limed.

Boone soils are not suited to cultivated crops. They are droughty and are probably best suited to limited grazing or to trees. If the cover of vegetation is removed, the soils are likely to be seriously eroded. A few small areas were once cultivated, but they are now being returned to pasture or trees.

Boone fine sand, 6 to 20 percent slopes, eroded (BoD2).—This is the only Boone soil mapped in the county. It has lost from one-third to two-thirds of its original surface layer, but its profile is otherwise similar to the profile described for the series. The present surface layer is lower in organic matter and fertility than the original one. However, in uneroded areas the surface layer is similar to that in the profile described. Nearly all of this soil was once cultivated, but because yields were low, many areas were returned to pasture or planted to pines.

Low moisture-supplying capacity, erosion, and susceptibility to further wind and water erosion make this soil unsuited to row crops. Yields of hay crops are low. The soil is well suited to conifers and to plants that provide food and cover for wildlife. Capability unit VIIIs-9; woodland suitability group 4.

Calamine Series

The Calamine series consists of dark-colored, silty, nearly level to sloping soils that are poorly drained. Most areas of these soils are on the higher parts of the uplands southeast of Shullsburg, but a few areas are near the Platte Mounds. The upper part of these soils formed in silt laid down by wind, and the lower part, in clayey materials weathered from Maquoketa shale. The original vegetation consisted mainly of grasses, sedges, and hardwood trees that tolerated wetness.

Representative profile of a Calamine silt loam in a cultivated field:

0 to 8 inches, black, friable silt loam.
8 to 22 inches, black to very dark gray, firm heavy silt loam.
22 to 35 inches, dark-gray to olive-gray, firm silty clay loam.
35 to 48 inches, light olive-gray, very firm and hard silty clay.
48 inches +, weakly calcareous shale.

The mantle of silt on these soils ranges from 15 to 30 inches in thickness, and the surface layer ranges from 8 to 24 inches in thickness. In some places the soils have a thin layer of lighter colored silt loam on the surface.

The Calamine soils formed in a thinner silt mantle than the Sable soils. Unlike those soils, they are clayey, rather than silty, at a depth of more than 4 feet. They have poorer drainage than the wet subsoil variant from the Schapville series and therefore have a darker and thicker surface layer and a grayer subsoil.

These soils have high moisture-supplying capacity. They are moderately high in fertility and are slightly acid to neutral. As a result of poor drainage, the surface layer is very high in organic matter. Movement of water through these soils is moderately slow to slow. Unless the soils have been drained, the water table is at or near the surface. Flooding occurs periodically, particularly after a heavy rain. Water remains in small depressions long enough to interfere with tillage, and here yields are lower than in other areas of these soils. Where depth to shale is less than 36 inches, the soils may not be suitable for tile drainage. Open ditches can be used to provide drainage if outlets are available.

If drainage is provided, the Calamine soils are suited to the crops commonly grown in the county. Undrained areas are best suited to pasture or woodland.

Calamine silt loam, 0 to 2 percent slopes (CaA).—The profile of this soil is similar to that described for the series.

Included with this soil in mapping are about 18 acres of Calamine soil in which depth to bedrock is less than 2 feet. In these areas it is not feasible to use tile to provide drainage, and the soil is less suited to crops than Calamine silt loam, 0 to 2 percent slopes.

Because of poor drainage and the hazard of flooding, Calamine silt loam, 0 to 2 percent slopes, is poorly suited to row crops. In some places tile drains and open ditches are needed to provide drainage. In small depressions water from runoff remains long enough to interfere with tillage. If this soil is drained, row crops, small grains, grasses, and legumes can be grown. Undrained areas are best suited to pasture. Drainage can be provided by tile drains if depth to shale is sufficient and if outlets are available. Capability unit IVw-3; woodland suitability group 7b.

Calamine silt loam, 2 to 6 percent slopes (CaB).—The surface layer of this soil is slightly thinner and lighter colored than that of the soil described for the series. Runoff generally is better than on Calamine silt loam, 0 to 2 percent slopes. Although the slope is long and gentle, this soil is subject to erosion, particularly if poor management is used.

Included with this soil in mapping are about 10 acres of Calamine soil in which bedrock is at a depth of less than 2 feet. Here the soil is less suited to drainage, and therefore to crops, than soils that are deeper over bedrock.

If Calamine silt loam, 2 to 6 percent slopes, is drained and protected from erosion, it is suited to row crops, small grain, and hay. Undrained areas are best suited to pasture. Capability unit IVw-3; woodland suitability group 7b.

Calamine silt loam, 6 to 12 percent slopes (CaC).—This soil has a thinner, lighter colored surface soil and a thinner subsoil than the soil described for the series. As the underlying shale is slowly permeable, runoff is rapid. Also, the soil is subject to moderate erosion. Most areas are on lower slopes where seepage collects.

Included with this soil in mapping are some areas, less than 2 acres in size, where seepage interferes with tillage. Tile drains can be used to drain these areas if depth to shale is sufficient.

If Calamine silt loam, 6 to 12 percent slopes, is protected from erosion and if it is drained, it is suited to corn, small grain, grasses, and legumes. Diversion terraces are needed in places to remove excess surface water and to reduce erosion. If contour stripcropping is used for control of erosion, the guidelines should be set on a slight grade toward waterways. Capability unit IVw-3; woodland suitability group 7b.

Calamine silt loam, 6 to 12 percent slopes, moderately eroded (CaC2).—This soil is on seepage slopes above areas of Calamine silt loam, 2 to 6 percent slopes. Part of the original surface soil has been removed through water erosion. Consequently, the present surface layer is lower in organic matter and fertility than the original one. It is about 8 inches thick. Runoff is rapid, and careful management is therefore needed to prevent further erosion.

If this soil is protected from erosion and if seepage areas are drained, it is suited to row crops, small grains, grasses, and legumes. Tile drains can be used to drain seepage areas if depth to bedrock is sufficient for the tile to be laid. Diversions are needed in places to remove excess surface

water and to help reduce erosion. If contour stripcropping is used for control of erosion, the guidelines should be set on a slight grade toward waterways. Capability unit IVw-3; woodland suitability group 7b.

Chaseburg Series

In the Chaseburg series are light-colored, deep, silty soils that are well drained to moderately well drained. These soils occupy small areas throughout the county in narrow drainageways, on bottom lands of intermittent streams, and on the lower slopes of steep hills. They formed under deciduous hardwoods in local silty material, more than 40 inches thick, that was washed from light-colored, silty soils on uplands. Fresh silt is continually deposited on the Chaseburg soils by overflow. The soils therefore consist only of layers of materials as they were originally deposited and lack well developed horizons.

Representative profile of a Chaseburg silt loam in an undisturbed area:

- 0 to 16 inches, dark grayish-brown, friable silt loam.
- 16 to 24 inches, dark-gray, friable silt loam.
- 24 to 27 inches, layers of yellowish-brown, friable silt loam and fine sandy loam.
- 27 inches +, dark-gray, friable silt loam.

In most places there are thin layers of very fine sand and pebbles throughout the profile, and in many places there also are alternate layers of light- and dark-colored silt. Thin deposits of sandy material are on a few areas, and here the texture of the surface layer is sandy loam.

Chaseburg soils occupy positions similar to those of the Worthen soils, but they are lighter colored. They are less stratified than the Arenzville soils and lack the buried, dark-colored soil that is typical of those soils.

These soils have high moisture-supplying capacity and fertility and are medium acid to neutral. They are subject to occasional flooding. In places they are subject to streambank erosion.

If Chaseburg soils are protected from flooding, they are well suited to corn, small grains, grasses, and legumes. Areas that are inaccessible or that are too dissected by meandering streams are better suited to permanent pasture, woodland, or to wildlife habitats than to cultivated crops.

Chaseburg silt loam, 0 to 2 percent slopes (ChA).—This nearly level soil is along intermittent drainageways. Its profile is like that described for the series. This soil is subject to flooding. As a result, a few areas have an overwash of sandy loam or loam on the surface.

This soil is suited to all crops commonly grown in the county. If a good supply of plant nutrients is maintained and a suitable cropping system is used, this soil can be cropped intensively. The crops respond well to good management. There is only a slight risk of erosion. No special practices are required to protect the soil, except where flooding occurs. Here dikes can be used to prevent overflow by floodwater. Otherwise, the areas should be kept in pasture or trees.

Crops on this soil respond well if a commercial fertilizer is applied. In most places yields of corn are low because the soil needs nitrogen. In many places lime is needed for high yields of legumes. Capability unit I-1; woodland suitability group 1.

Chaseburg silt loam, 2 to 6 percent slopes (ChB).—This soil is in gently sloping drainageways, on bottoms along intermittent streams, and in alluvial fans on terraces and high bottoms. Its surface layer is slightly thinner than that of the profile described for the series. In places the layer of recently deposited silty material is less than 40 inches thick, and here the soil is underlain by a buried, light-colored, silty soil that has a subsoil of silty clay loam. Also, in places, especially at the heads of draws, there are a few pebbles or cobblestones on the surface or throughout the profile.

Included with this soil in mapping are a few acres of Chaseburg silt loam that has slopes from 6 to 12 percent. These areas are more subject to erosion than those of less sloping Chaseburg soils and are less suited to row crops.

Chaseburg silt loam, 2 to 6 percent slopes, is generally suited to corn, small grains, grasses, and legumes. It is slightly more subject to erosion than Chaseburg silt loam, 0 to 2 percent slopes. Consequently, more careful management is required for the control of erosion. Practices are also needed that prevent further damage from soil material washed onto this soil from higher lying areas. Capability unit IIe-5; woodland suitability group 1.

Dakota Series

The Dakota series consists of moderately deep, dark-colored, loamy soils that are nearly level to gently sloping and are well drained. These soils are on terraces of the Pecatonica River in the eastern part of the county. They formed under prairie grasses, mainly in water-laid sand.

Representative profile of a Dakota loam in a cultivated field:

- 0 to 15 inches, black to very dark grayish brown, friable loam.
- 15 to 26 inches, dark-brown, friable loam.
- 26 to 32 inches, dark yellowish-brown, very friable sandy loam.
- 32 to 60 inches, yellowish-brown, loose, medium sand.

The thickness of the surface layer ranges from 9 to 24 inches. The combined thickness of the surface and subsoil layers ranges from 24 to 42 inches. Although the content of pebbles in the underlying sandy material varies, it generally is less than 20 percent of the total material.

The Dakota soils formed in material similar to that of the Meridian soils, but they have a thicker, darker colored surface layer and a darker colored subsoil. They have a browner, less mottled subsoil than that of the Dakota series, mottled subsoil variant, and generally are in higher, better drained areas.

Movement of water through the Dakota soils is moderate to moderately rapid. The moisture-supplying capacity is moderate. Lack of moisture late in summer may lower yields somewhat. These soils are moderate in fertility and high in organic matter. Unless limed, these soils are medium acid to slightly acid.

Dakota soils are well suited to all crops commonly grown in the county, and most areas are cultivated. Except for the gently sloping soils that are subject to slight water erosion, erosion is generally not a problem.

Dakota loam, 0 to 2 percent slopes (DaA).—The profile of this soil is similar to that described for the series. Because the soil is nearly level and has a thick, friable surface layer, it is easy to till. Erosion is not a problem, but the soil is slightly droughty.

This soil is well suited to row crops, small grains, and hay, and all of it is used for crops. Yields are high if the soil is well managed. The content of organic matter should be kept high and lime and fertilizer applied in amounts indicated by soil tests. Capability unit IIs-1; woodland suitability group 3.

Dakota loam, 2 to 6 percent slopes (DaB).—The surface layer of this soil is slightly thinner than that of the profile described for the series. Also, the risk of erosion is greater because the slope is steeper and runoff is greater.

Included with this soil in mapping are a few acres of Dakota loam, on similar slopes, that are moderately eroded and a few areas of Dakota loam that have slopes from 6 to 12 percent. These areas are not so well suited to row crops as Dakota loam, 2 to 6 percent slopes, nor are they as productive.

If fairly simple practices are used to control erosion and if sufficient plant nutrients and lime are added, Dakota loam, 2 to 6 percent slopes, can be cropped fairly intensively. Capability unit IIe-2; woodland suitability group 3.

Dakota Series, Mottled Subsoil Variant

The variants from the normal Dakota soils are moderately deep, dark-colored, loamy soils that are nearly level to gently sloping and are somewhat poorly drained. These soils are on the lower terraces of the Pecatonica River in the eastern part of the county. They formed under prairie grasses, mostly in water-laid sand.

Representative profile of Dakota loam, mottled subsoil variant, in a cultivated field:

- 0 to 9 inches, very dark brown, friable loam.
- 9 to 14 inches, dark-brown, friable loam; mottles of yellowish brown.
- 14 to 29 inches, dark-brown, slightly hard and firm loam; mottles of strong brown.
- 29 to 36 inches, strong-brown, very friable sandy loam; mottles of light brownish gray.
- 36 inches +, yellowish-brown, loose, medium and fine sand.

The surface layer ranges from 9 to 18 inches in thickness. The content of pebbles in the underlying sandy material varies, but it generally is less than 20 percent of the total material.

These variants formed in material similar to that of the normal Dakota soils, but they have a grayer, more mottled subsoil and a higher water table. They have a thinner surface layer than the Marshan soils and a brown-er subsoil.

Movement of water through these soils is moderate. The water table, however, fluctuates between a depth of 2 and 5 feet. Consequently, the root zone for plants is restricted in places. During periods of prolonged rainfall, flooding occurs in places and water stands in the depressions long enough that yields of crops are lowered. The soils are high in moisture-supplying capacity and organic matter and medium in fertility. They are medium acid to slightly acid.

If these soils are protected from flooding and adequate drainage is provided, they are suited to the crops commonly grown in the county. If drainage is not feasible, the areas can be used for pasture, woodland, or wildlife. Surface drains and open ditches can be used to remove excess water from these soils if outlets are available.

Dakota loam, mottled subsoil variant, 0 to 3 percent slopes (DbB)—This is the only variant from the normal Dakota series mapped in the county. Its profile is similar to that described for the Dakota series, mottled subsoil variant.

Water retained in small depressed areas of this soil following heavy or prolonged rains interferes with tillage. The high water table slows internal drainage and also delays tillage in spring. In some places there is a slight hazard of erosion.

If this soil is drained and otherwise well managed, yields of corn, small grains, and hay crops are high. Alfalfa is hard to establish unless adequate drainage is provided. Capability unit IIw-5; woodland suitability group 12.

Derinda Series

The Derinda series consists of light-colored, silty soils that are well drained to moderately well drained. These soils are gently sloping to moderately steep and are shallow to moderately deep to shale bedrock. They are mainly on high uplands south of Shullsburg, but a few areas are near the Platte Mounds. The upper part of the Derinda soils formed in wind-laid silt, 10 to 30 inches thick, and the lower part in material from yellowish-brown clay.

Representative profile of a Derinda silt loam in an undisturbed area:

- 0 to 3 inches, very dark grayish brown, friable silt loam.
- 3 to 7 inches, brown, friable silt loam.
- 7 to 12 inches, yellowish-brown, firm silty clay loam.
- 12 to 26 inches, yellowish-brown to light olive-brown, firm silty clay loam that grades to hard silty clay in the lower part of this layer.
- 26 inches +, light yellowish-brown partly disintegrated shale bedrock.

The thickness of the mantle of silt ranges from 10 to 30 inches. Depth to bedrock is 12 to 48 inches. The thickness of the clayey material weathered from shale ranges from a few inches to several feet. In cultivated areas the surface layer is lighter colored than described. In areas that are moderately or severely eroded, the surface layer is heavy silt loam or light silty clay loam.

Derinda soils have a lighter colored, thinner surface layer than the Schapville soils. They are better drained than soils of the Derinda series, wet subsoil variant, and have less yellow and gray mottling in the subsoil.

These soils are moderately high to high in moisture-supplying capacity and medium in fertility. Unless limed, they are slightly acid to medium acid. Water moves slowly through these soils because permeability of the underlying clay and shale bedrock is moderately slow to slow. In places in areas less than 2 acres in size, seepage hinders tillage.

The less sloping areas of the Derinda soils are suited to all crops commonly grown in the county, and all of them are cultivated. The steeper areas are best suited to permanent pasture, forage crops, timber, or wildlife habitats.

Derinda silt loam, 2 to 6 percent slopes, moderately eroded (DdB2).—This soil has lost all but 3 to 6 inches of its original surface layer through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The mantle of wind-laid silt is less than 30 inches thick. Depth to shale bedrock ranges from 18 to

36 inches. In a few small areas the soil is only slightly eroded.

Included with this soil in mapping are small areas of soils of the Derinda series, wet subsoil variant. These areas are slow to dry in spring or following a prolonged rain, and they are therefore difficult to cultivate.

Derinda silt loam, 2 to 6 percent slopes, moderately eroded, is shallow to bedrock, susceptible to further erosion, and slowly permeable. If protected from further erosion and otherwise well managed, this soil is suited to the crops commonly grown in the county. Capability unit IIe-6; woodland suitability group 1.

Derinda silt loam, 6 to 12 percent slopes (DdC).—This soil has a subsoil that is about 10 inches thick. Depth to bedrock is less than 36 inches. Runoff is rapid, and water erosion is active in cultivated areas.

Included with this soil in mapping are a few small areas of soils of the Derinda series, wet subsoil variant.

Because of nearness of bedrock to the surface, Derinda silt loam, 6 to 12 percent slopes, has severe limitations for crops. It is well suited to pasture, forage crops, or trees. Capability unit IIIe-6; woodland suitability group 1.

Derinda silt loam, 6 to 12 percent slopes, moderately eroded (DdC2).—This soil has lost all but 3 to 5 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present plow layer is likely to crust, which makes tillage difficult and increases runoff.

Included with this soil in mapping are a few small areas of soils of the Derinda series, wet subsoil variant.

Because of nearness of bedrock to the surface and susceptibility to further erosion, Derinda silt loam, 6 to 12 percent slopes, moderately eroded, has severe limitations for crops. It is well suited to pasture, forage crops, or trees. Capability unit IIIe-6; woodland suitability group 1.

Derinda silt loam, 12 to 20 percent slopes, eroded (DdD2).—This soil has lost all but 3 to 5 inches of its original surface layer, and plowing has mixed material from the subsoil with the remaining surface soil. The present plow layer is likely to crust, which makes tillage difficult and increases runoff. The subsoil generally is less than 14 inches thick. Depth to bedrock is less than 30 inches. In areas of this soil that are not eroded, the profile is similar to that described for the series.

Included with this soil in mapping is 5 acres of Derinda silt loam that has slopes from 20 to 30 percent and is moderately eroded.

The moderately steep slope and nearness of bedrock to the surface make Derinda silt loam, 12 to 20 percent slopes, eroded, better suited to pasture or forage crops than to cultivated crops. Capability unit IVe-6; woodland suitability group 1.

Derinda soils, 12 to 20 percent slopes, severely eroded (DfD3).—These soils have lost most of their original silt loam surface layer through erosion. The present plow layer consists mainly of material that is silty clay loam in texture. It is lighter colored, finer textured, lower in organic matter and fertility, and crusts more readily than the surface layer of the profile described for the series. The subsoil is about 10 inches thick, and depth to bedrock generally is less than 30 inches.

These soils are severely eroded and are shallow to bedrock. They are not suited to cultivated crops and are best used for pasture or for forage crops. Capability unit VIe-6; woodland suitability group 1.

Derinda Series, Wet Subsoil Variant

The variants from the normal Derinda soils are moderately dark colored, silty soils that are gently sloping to sloping and somewhat poorly drained. These soils are dominantly moderately deep to shale bedrock. They are mostly on high uplands near Shullsburg, but a few areas are near the Platte Mounds. These variants formed in wind-laid silt over shale bedrock. The natural vegetation was prairie grasses and scattered hardwood trees.

Representative profile of a Derinda silt loam, wet subsoil variant, in a cultivated field:

- 0 to 8 inches, very dark brown, friable silt loam.
- 8 to 12 inches, grayish-brown, friable silt loam; yellowish-brown mottles.
- 12 to 17 inches, brown, friable silt loam; yellowish-brown and dark-brown mottles.
- 17 to 27 inches, brown, firm silty clay loam; yellowish-brown and dark-brown mottles.
- 27 to 34 inches, grayish-brown and light olive-brown, hard and firm silty clay; yellowish-brown and dark-brown mottles.
- 34 inches +, light olive-brown shale bedrock.

The surface layer ranges from 3 to 12 inches in thickness, depending on the amount of erosion. Depth to shale bedrock is between 18 and 42 inches. In areas that are moderately eroded, the surface layer is heavy silt loam or silty clay loam. In some places the surface layer is mottled with yellowish brown and gray.

These variants are near soils of the Schapville series, wet subsoil variant, but they have a thinner and lighter colored surface layer. They differ from the normal Derinda soils in having poorer drainage and more yellow and gray mottling in the upper part of the subsoil.

The moisture-supplying capacity of these soils is moderate, and fertility is medium. Unless limed, these soils are slightly acid to medium acid. Water moves slowly through these soils because permeability of the underlying clay and shale bedrock is moderately slow to slow. Seepage in areas less than 2 acres in size interferes with tillage in places.

These variants generally are suited to cultivated crops, to pasture, and to hay.

Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes (DeB).—The profile of this soil is similar to that described for the Derinda series, wet subsoil variant. Slopes are gentle, and runoff is moderately slow.

Mapped with this soil are areas of the poorly drained Calamine soils that are less than 2 acres in size. In these areas the soil dries slowly in spring, or following a heavy or prolonged rain, and they are therefore difficult to till.

Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes, is subject to erosion. Excess water is also a problem. In places in areas above this soil, diversions are needed that turn excess runoff away from this soil and thus reduce water erosion. Tile drains can be used to drain seepage areas if the depth to shale bedrock is sufficient.

If protected from erosion, this soil is suited to corn, small grains, grasses, and legumes. Some small areas are too wet for crops. These areas are better suited to

pasture, woodland, or wildlife areas than to cultivated crops. Capability unit IIw-3; woodland suitability group 7a.

Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded (DeC2).—The surface layer is thinner and lighter colored and the depth to bedrock is less, but the profile of this soil is otherwise like that described for Derinda series, wet subsoil variant. It has lost all but about 4 inches of its original surface layer through water erosion. The present surface layer is therefore lower in organic matter and fertility than the original one.

In a few places depth to bedrock is less than 2 feet. Here the soil is more subject to erosion and less well suited to crops than the deeper variants. In areas that are not eroded, the soil profile is similar to that described for soils of the Derinda series, wet subsoil variant.

Because of the sloping and permeability of the underlying shale bedrock is slow, runoff is rapid on Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes. As a result, the soil is subject to moderate erosion if not protected. Diversions placed in areas above these soils help to turn excess runoff away from this soil and thus prevent further erosion. If contour stripcropping is used for the control of erosion, setting the guidelines on a slight grade toward waterways prevents runoff from saturating the soil.

If this soil is protected from further erosion and if seepage areas are adequately drained, it is suited to corn, small grains, and forage crops. Small areas that are too wet are better suited to pasture, woodland, or wildlife than to crops. Capability unit IIIe-8; woodland suitability group 7a.

Dodgeville Series

In the Dodgeville series are dark-colored, silty, gently sloping to moderately steep soils that are well drained. Typically, these soils have long slopes (fig. 15). Dodgeville soils are on upland ridges above the stream valleys. They formed under prairie grasses in wind-laid silt, or loess, that overlies reddish clay weathered from limestone.

Representative profile of Dodgeville silt loam in a cultivated field:

- 0 to 10 inches, very dark brown, friable silt loam.
- 10 to 15 inches, very dark grayish-brown, firm silty clay loam.
- 15 to 20 inches, dark yellowish-brown, firm silty clay loam.
- 20 to 29 inches, dark reddish-brown, hard and firm silty clay.
- 29 to 33 inches, reddish-brown, hard and firm clay.
- 33 inches +, partly disintegrated dolomite bedrock that grades to more consolidated bedrock with increasing depth.

The silt in which the Dodgeville soils formed ranges from 15 to 30 inches in thickness. Depth to limestone bedrock ranges from 24 to 42 inches. The clayey residuum from limestone ranges from 8 to 27 inches in thickness, but in a few places it is absent.

The severely eroded Dodgeville soils have lost all or part of their original silty surface layer. As a result, the present surface layer is silt loam, silty clay loam, clay loam, silty clay, or a mixture of these, and the mapping unit is called Dodgeville soils. The soils of the Dodgeville series are moderate in permeability, moisture-supplying capacity, and fertility. Unless limed, these soils are slightly acid to medium acid. They are fairly easy to manage and to cultivate.



Figure 15.—Typical view of Dodgeville soils. Contour stripcropping has been used on soils in the background for control of erosion.

Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded (DgB2).—This soil has lost all but 3 to 6 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. Consequently, the present surface layer is lower in organic matter and fertility than the surface layer of the profile described for the series. It also is lighter colored and crusts more readily.

In a few small places the soil is only slightly eroded. In these places the surface layer is thicker and darker colored than that of the moderately eroded one. It also is higher in organic matter and has better tilth.

If Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded, is cultivated, practices that control erosion are required. Where the slope is long, terraces or diversions should be used to shorten the slope and to reduce erosion. Use of cropping systems that supply organic matter improves tilth and increases the capacity of the soil to absorb water. Capability unit IIe-2; woodland suitability group 12.

Dodgeville silt loam, 6 to 12 percent slopes (DgC).—The mantle of silt on this soil is slightly thinner, the subsoil is slightly thinner, and the depth to limestone bedrock is less than in the profile described for the series. Generally, bedrock is at a depth of about 30 inches.

If contour stripcropping or terracing and other intensive conservation practices are used, this soil is suited to row crops. Capability unit IIIe-2; woodland suitability group 12.

Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded (DgC2).—The mantle of silt on this soil is thinner, the subsoil is thinner, and the depth to limestone bedrock is slightly less than in the profile described for the series. All but 3 to 6 inches of the original surface layer has been lost through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lighter colored and lower in organic matter and fertility than the original one, and it crusts more readily.

This soil is moderately deep to bedrock. Consequently, if row crops are grown, practices that prevent further erosion are needed. Capability unit IIIe-2; woodland suitability group 12.

Dodgeville silt loam, 12 to 20 percent slopes (DgD).—This soil is on narrow ridgetops and adjoining side slopes. The mantle of silt is slightly thinner, the subsoil is slightly thinner, and the depth to limestone bedrock is less than in the profile described for the series. Generally, limestone bedrock is at a depth between 24 and 30 inches.

Much of this soil is used for crops. The steep slope and moderate depth to bedrock, however, make many areas better suited to pasture or forage crops. Runoff is rapid and erosion is active if the soil is cropped intensively. Practices that increase fertility and maintain good tilth are needed for good yields. Capability unit IVe-2; woodland suitability group 12.

Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded (DgD2).—Except that the surface layer and the subsoil of this soil are thinner and depth to limestone bedrock is less, the profile of this soil is like that described for the series. All but about 4 inches of the original surface layer has been lost through water erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one. In small severely eroded areas, all of the original surface soil is gone. In these areas the surface layer is lighter colored than that of the moderately eroded soil and its texture is silty clay loam in places. Unless intensive practices are used to prevent further erosion, this soil should be used only for pasture or for forage crops. Capability unit IVe-2; woodland suitability group 12.

Dodgeville soils, 6 to 12 percent slopes, severely eroded (DhC3)—The surface layer of this mapping unit consists mainly of material from the subsoil. It is lower in organic matter and fertility and crusts more readily than that of the profile described for the Dodgeville series. In some places chert fragments are in the surface layer.

Because it is sloping and severely eroded, this soil is suited to only occasional cultivation. Capability unit IVe-2; woodland suitability group 12.

Dodgeville soils, 12 to 20 percent slopes, severely eroded (DhD3).—This mapping unit has lost nearly all of its original surface layer through erosion. In many places part of the subsoil is gone. The present surface layer is brown or yellowish-brown and crusts when dry. In places chert fragments are in the surface layer.

Because of the moderately steep slope and severe erosion, this soil is not suited to cultivated crops. Capability unit VIe-2; woodland suitability group 12.

Downs Series

In the Downs series are deep, moderately dark colored, gently sloping to sloping, silty soils that are well drained. These soils formed in silt that was blown onto the uplands from the flood plains of the Mississippi River.

Representative profile of a Downs silt loam in a cultivated field follows:

- 0 to 9 inches, very dark gray, friable silt loam.
- 9 to 12 inches, dark grayish-brown, friable silt loam.
- 12 to 18 inches, brown, friable silt loam.
- 18 to 36 inches, dark yellowish-brown, friable silty clay loam.
- 36 to 41 inches, brown, friable silt loam.
- 41 inches +, yellowish-brown, friable silt loam; dark reddish-brown mottles.

The mantle of silt generally is 4 to 8 feet thick. In most places the underlying bedrock is limestone, but in a few places it is Maquoketa shale.

The surface layer of the Downs soils is lighter colored and thinner than that of the Tama soils and slightly darker and thicker than that of the Fayette soils. Their silt mantle is thicker than that of the Palsgrove soils, and they lack the clayey subsoil that is typical of those soils.

Water moves at a moderate rate through the Downs soils, and depth to the water table is more than 5 feet. Downs soils have high moisture-supplying capacity and a high natural fertility. Unless limed, these soils are medium acid to slightly acid. Lime generally is required for good yields of legumes.

These soils are well suited to all crops commonly grown in the county, and most areas are cultivated. If properly managed, these soils are among the most productive in the county.

Downs silt loam, 2 to 6 percent slopes, moderately eroded (DoE2).—This soil is on broad ridgetops above areas of steeper soils. Its profile is like that described for the series. All but 4 to 7 inches of the original surface layer has been removed through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is lower in organic matter and fertility than the original one.

This soil is well suited to row crops, small grains, and hay. It is subject to moderate erosion, however, and practices that control erosion and maintain good tilth are needed. Capability unit IIe-1; woodland suitability group 1.

Downs silt loam, 6 to 12 percent slopes, moderately eroded (DoC2).—The surface layer of this soil is thinner and lower in organic matter and fertility than that of the soil described for the series. All but about 5 inches of the original surface soil has been lost through water erosion. The present surface layer is a mixture of the remaining surface soil and of material from the subsoil and is lower in organic matter and fertility than the original one.

In most places this soil occupies positions just below areas of Downs silt loam, 2 to 6 percent slopes, moderately eroded. It therefore collects runoff water from the higher lying soils and is subject to moderate erosion if cultivated.

If this soil is well managed, it is well suited to row crops, small grains, and hay, and nearly all areas are in crops. Practices that control erosion are needed. If cropping systems are used in which crops are grown that keep the content of organic matter high, the tilth and the ability of the soil to absorb water are improved. This soil is highly productive if adequate supplies of plant nutrients and lime are provided. Capability unit IIIe-1; woodland suitability group 1.

Dubuque Series

The Dubuque series consists of light-colored, silty, well-drained soils. These soils are in uplands on ridges above stream valleys. They formed under a deciduous forest in wind-laid silt (loess) that overlies reddish clay weathered from limestone.

Representative profile of a Dubuque silt loam in a cultivated field:

- 0 to 7 inches, dark-gray, friable silt loam.
- 7 to 14 inches, dark grayish-brown, friable silt loam.
- 14 to 19 inches, dark-brown, friable silty clay loam.
- 19 to 32 inches, reddish-brown, gm silty clay that grades to dark reddish brown.
- 32 inches +, partly shattered limestone bedrock.

The thickness of silt in which the Dubuque soils formed ranges from 15 to 30 inches, and that of the clayey residuum from limestone from 8 to 27 inches. In a few places the clayey residuum is lacking. Depth to limestone bedrock ranges from 24 to 42 inches.

The severely eroded Dubuque soils have lost all or part of their original surface layer. As a result, the present surface layer is silt loam, silty clay loam, clay loam, silty clay, or a mixture of these, and the mapping unit is called Dubuque soils.

All of the soils in the Dubuque series are moderate in permeability, in moisture-supplying capacity, and in fertility. Unless limed, these soils are slightly acid to medium acid.

If the slope is not too steep, these soils are fairly easy to cultivate and manage. The soils are suited to all crops commonly grown in the county. Crops on them respond well if manure and fertilizer are added.

Dubuque silt loam, 2 to 6 percent slopes (DsB).—The profile of this soil is similar to that described for the series. Limestone bedrock generally is at a depth of about 33 inches.

Gentle slopes make this soil well suited to cultivated crops, and nearly all of it is in crops. Generally, this soil is on ridgetops, and it therefore does not receive so much runoff as soils in lower areas. If fairly simple conservation practices are used and if the soil is otherwise well managed, corn, oats, alfalfa, and other crops commonly grown make good yields. Capability unit IIe-2; woodland suitability group 1.

Dubuque silt loam, 2 to 6 percent slopes, moderately eroded (DsB2).—This soil has lost all but from 3 to 6 inches of its original surface layer through water erosion. Plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is lower in organic matter and fertility than that of the profile described. It also is lighter colored and crusts more readily.

If these soils are cultivated, practices that control erosion are needed. The tilth is improved if a cropping system is used in which crops are grown that supply organic matter. The capacity of the soil to absorb water is also improved. Terraces or diversions should be used where the slope is long, to shorten the slope and to help control erosion. Capability unit IIe-2; woodland suitability group 1.

Dubuque silt loam, 6 to 12 percent slopes (DsC).—The mantle of silt is slightly thinner, the subsoil is slightly thinner, and the depth to limestone bedrock is slightly less than in the profile described for the series. Depth to bedrock generally is about 30 inches.

If intensive practices are used for control of erosion, these soils are suited to row crops. Capability unit IIIe-2; woodland suitability group 1.

Dubuque silt loam, 6 to 12 percent slopes, moderately eroded (DsC2).—The mantle of silt on this soil is thinner,

the subsoil is thinner, and depth to limestone bedrock is slightly less than in the profile described for the series. All but 3 to 6 inches of the original surface layer has been removed through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is lighter colored, lower in organic matter and fertility, and crusts more readily than the original one.

Because of the moderate depth to bedrock, row crops can be grown on this soil only if practices that prevent further erosion are used. Capability unit IIIe-2; woodland suitability group 1.

Dubuque silt loam, 12 to 20 percent slopes (DsD).—Because of the steep slope, the mantle of silt is thinner, the subsoil is thinner, and the depth to limestone bedrock is slightly less than in the profile described for the series. Typically, depth to limestone bedrock is between 24 and 30 inches.

If this soil is cultivated, runoff is rapid and erosion is active. This soil can be cultivated occasionally, however, if it is protected from erosion. Capability unit IVe-2; woodland suitability group 1.

Dubuque silt loam, 12 to 20 percent slopes, moderately eroded (DsD2).—The mantle of silt on this soil is thinner and the subsoil is slightly thinner than those in the profile described for the series. All but about 4 inches of the original surface layer has been lost through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one. In small areas the soil is severely eroded and all of the original surface soil is gone. In these areas the present surface layer is brown silty clay loam.

If practices that prevent further erosion are used, this soil can be cultivated occasionally. Capability unit IVe-2; woodland suitability group 1.

Dubuque silt loam, 20 to 30 percent slopes (DsE).—The mantle of silt is thinner, the subsoil is thinner, and depth to limestone bedrock is slightly less than in the profile described for the series. Generally, depth to limestone bedrock is between 24 and 30 inches. Runoff is rapid and erosion is active in cultivated areas.

Because of the steep slope, this soil is not suited to cultivated crops and should be kept in grass or trees. Capability unit VIe-2; woodland suitability group 1.

Dubuque silt loam, 20 to 30 percent slopes, moderately eroded (DsE2).—This soil has lost all but about 4 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one. In small severely eroded areas, all of the surface soil is gone.

This soil should be kept in grass or trees. The slope is steep, and the soil erodes rapidly if it is cultivated. Capability unit VIe-2; woodland suitability group 1.

Dubuque silt loam, 30 to 45 percent slopes (DsF).—The individual layers and the entire solum are thinner than in the profile described for the series. Runoff is very rapid, and the soil is subject to severe erosion in cultivated areas. In some areas gullies are forming, and locally a few outcrops of bedrock occur.

Because the slope is very steep, this soil is not suited to cultivated crops and is poorly suited to pasture. Capability unit VIIe-2; woodland suitability group 1.

Dubuque soils, 6 to 12 percent slopes, severely eroded (DtC3).—The surface layer of this mapping unit consists mainly of material from the subsoil. It is lower in organic matter and fertility and crusts more readily than the corresponding layer in the soil described for the series. In some places chert fragments are in the surface layer.

Because this soil is sloping and severely eroded, it is suited to only occasional cultivation. Capability unit IVe-2; woodland suitability group 1.

Dubuque soils, 12 to 20 percent slopes, severely eroded (DtD3).—This mapping unit has lost nearly all of its original surface layer through erosion. In many places part of the subsoil is gone. The present surface layer is brown or yellowish brown and crusts when dry. In places chert fragments are in the surface layer.

Because of its moderately steep slope and severe erosion, this soil is not suited to cultivated crops. Capability unit VIe-2; woodland suitability group 1.

Dunbarton Series

The Dunbarton series consists of shallow, light-colored, well-drained soils on uplands above stream valleys. These soils formed partly in a thin blanket of wind-laid silt, or loess, and partly in clayey residuum from limestone. The natural vegetation was a deciduous forest.

Representative profile of a Dunbarton silt loam in a cultivated field:

- 0 to 7 inches, dark grayish-brown, friable silt loam.
- 7 to 9 inches, brown, friable heavy silt loam.
- 9 to 13 inches, dark-brown, hard and firm heavy silty clay loam.
- 13 to 21 inches, reddish-brown, hard and firm silty clay that grades to clay with increasing depth; organic stains on the faces of the soil aggregates.
- 21 inches +, partly shattered limestone bedrock with reddish-brown clay in the cracks between the rock.

The mantle of silt ranges from 0 to 15 inches in thickness, and the clayey residuum from limestone, from 4 to 24 inches. Depth to limestone bedrock ranges from 12 to 24 inches. The surface layer ranges from 4 to 9 inches in thickness and from dark grayish brown to brown in color.

Dunbarton soils have moderate permeability and natural fertility and moderately low water-supplying capacity. Unless limed, these soils are slightly acid to medium acid.

Dunbarton silt loam, 2 to 6 percent slopes (DuB).—In this soil depth to limestone bedrock is between 12 and 24 inches. The layer of wind-laid silt is generally more than 10 inches thick.

Nearness of bedrock to the surface limits the use of this soil. Nevertheless, if protected from erosion and otherwise well managed, this soil is suited to the crops commonly grown in the county. Capability unit IIIe-3; woodland suitability group 5.

Dunbarton silt loam, 6 to 12 percent slopes (DuC).—In this soil the mantle of silt is about 10 inches thick, and depth to limestone bedrock is less than 24 inches. In some places depth to bedrock is less than 16 inches. Locally there are small, moderately eroded areas where only 3 to 6 inches of the original surface soil remains.

Because of the slope and nearness of bedrock to the surface, this soil is suited to only occasional cultivation. Capability unit IVe-3; woodland suitability group 5.

Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded (DuC2).—This soil has lost all but from 3 to 5

inches of its original surface layer through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. As a result, the present surface layer is higher in clay content and less friable than that of the soil described for the series. The silt mantle is less than 10 inches thick, and depth to limestone bedrock is less than 24 inches. In many places bedrock is at a depth of less than 16 inches. Chert fragments are common in the surface layer, and a few small areas are severely eroded. In the severely eroded areas, brown material from the subsoil is exposed and the surface of the soil crusts readily.

The strong slope, moderate erosion, and nearness of bedrock to the surface, make this soil suited to only occasional cultivation. Capability unit IVe-3; woodland suitability group 5.

Dunbarton silt loam, 12 to 20 percent slopes (DuD).—The profile of this soil is similar to that described for the series. Depth to bedrock generally is 15 to 20 inches. Runoff is very rapid, and erosion is active in cultivated areas.

Because of the moderately steep slope and nearness of bedrock to the surface, this soil is not suited to row crops. It is best suited to pasture, forage crops, or trees. Capability unit VIe-3; woodland suitability group 5.

Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded (DuD2).—This soil has lost all but from 3 to 5 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface layer. The present surface layer is brown to yellowish brown and crusts more readily than the surface layer of the soil described for the series. Depth to bedrock is between 12 and 16 inches. In many places chert fragments are in the surface layer, and in a few places there are small areas that are severely eroded.

Because of the moderately steep slope, nearness of bedrock to the surface, and moderate erosion, this soil is not suited to cultivated crops. Capability unit VIe-3; woodland suitability group 5.

Dunbarton silt loam, 20 to 30 percent slopes (DuE).—The mantle of silt is thinner, the subsoil is thinner, and depth to limestone bedrock is slightly less than in the profile described for the series. Limestone bedrock generally is at a depth of less than 20 inches. Runoff is very rapid, and erosion is active in cultivated areas.

Because of the steep slope and nearness of bedrock to the surface, this soil is not suited to cultivated crops. It should be kept under a protective cover of grass or trees. Grazing should be controlled in pastured areas. Capability unit VIIe-3; woodland suitability group 5.

Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded (DuE2).—The mantle of silt is thinner, the subsoil is thinner, and depth to limestone bedrock is slightly less than in the profile described for the series. All but about 4 inches of the original surface layer has been lost through water erosion. Limestone bedrock generally is at a depth of less than 18 inches. Locally chert fragments are in the surface layer.

Because of the steep slope, nearness of bedrock to the surface, and moderate erosion, this soil is not suited to cultivated crops. It should be kept under a protective cover of grass or trees. Grazing should be controlled in pastured areas to prevent further erosion. Capability unit VIIe-3; woodland suitability group 5.

Dunbarton silt loam, 30 to 45 percent slopes (DuF).—This soil has thinner soil layers than those of the profile described for the series, and its solum is not so well developed. A few small areas are moderately eroded, and here the surface layer is thinner and lighter colored and the soil is less permeable and slightly thinner over limestone bedrock. In some places gullies are forming, and locally there are a few outcrops of bedrock. Runoff is very rapid, and the risk of erosion is severe in cultivated areas.

Because of the very steep slope and nearness of bedrock to the surface, this soil is not suited to cultivated crops and has only limited use for pasture. Capability unit VIIe-3; woodland suitability group 5.

Edmund Series

In the Edmund series are dark-colored, shallow, well-drained soils on uplands above stream valleys. These soils formed partly in a thin blanket of wind-laid silt, or loess, and partly in clayey residuum from limestone. The native vegetation was prairie grasses.

Representative profile of an Edmund silt loam in a cultivated field:

- 0 to 7 inches, black, friable silt loam.
- 7 to 10 inches, very dark brown and very dark grayish-brown, firm silty clay loam.
- 10 to 14 inches, dark-brown, hard and firm silty clay.
- 14 to 18 inches, dark reddish-brown, hard and firm silty clay.
- 18 inches +, partly shattered dolomite bedrock.

The mantle of silt on the Edmund soils ranges from 0 to 15 inches in thickness, and the clayey residuum from limestone from 4 to 24 inches. The depth to limestone bedrock ranges from 12 to 24 inches. The surface layer ranges from 6 to 12 inches in thickness and from black to dark yellowish-brown in color.

Edmund soils are moderate in permeability and in fertility and moderately low in water-supplying capacity. They are slightly acid to medium acid, unless they have been limed.

Edmund silt loam, 2 to 6 percent slopes, moderately eroded (EdB2).—This soil has lost all but 3 to 6 inches of its original surface layer through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is lighter colored and crusts more readily than that of the soil described for the series.

Nearness of bedrock to the surface and susceptibility to further erosion limit the use of this soil for crops. If row crops are grown, practices are needed that prevent further erosion and further decrease in the root zone. Terracing generally is not practical, because of the nearness of bedrock to the surface. Capability unit IIIe-3; woodland suitability group 12.

Edmund silt loam, 6 to 12 percent slopes, moderately eroded (EdC2).—This soil has lost all but from 3 to 5 inches of its original surface layer through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is higher in clay and is less friable than the surface layer of the soil described for the series. The mantle of silt is less than 10 inches thick. Depth to bedrock is generally less than 24 inches, and in many places it is less than 16 inches. In many places chert fragments are in the surface

layer. Within areas of this soil are some small severely eroded areas where the brown subsoil is exposed. In these places the surface layer crusts readily.

The strong slope, nearness of bedrock to the surface, and moderate erosion make this soil suited to only occasional cultivation. Row crops can be grown if practices that prevent further erosion are used. Terracing is poorly suited because of nearness of bedrock to the surface, but diversions can be used to shorten the slope. Capability unit IVe-3; woodland suitability group 12.

Edmund silt loam, 12 to 20 percent slopes (EdD).—The profile of this soil is similar to that described for the series. Depth to limestone bedrock generally is 15 to 20 inches. In small moderately eroded places within areas of this soil, the surface layer is only 4 to 5 inches thick and many chert fragments are on the surface.

This soil is too steep, too shallow, and too susceptible to erosion to be used for row crops. Most areas are in pasture, and the soil is best suited to that use or to use as wildlife areas. Capability unit VIe-3; woodland suitability group 12.

Eleroy Series

The Eleroy series consists of light-colored, gently sloping to steep, silty soils that are well drained to moderately well drained. These soils are moderately deep to deep over the shale bedrock. They are mostly on the higher uplands south of Shullsburg, but a few areas are near the Platte Mounds. The upper part of the Eleroy soils formed in wind-laid silt, 30 to 50 inches thick, and the lower part, in material from yellowish-brown clay.

Representative profile of an Eleroy silt loam in a cultivated field:

- 0 to 3 inches, very dark grayish-brown, friable silt loam.
- 3 to 7 inches, brown, friable silt loam.
- 7 to 38 inches, yellowish-brown, firm silty clay loam; yellowish-brown mottles in the lower part of this horizon.
- 38 to 42 inches, light olive-brown, hard, silty clay; yellowish-brown mottles.
- 42 inches +, light yellowish-brown shale bedrock.

The mantle of silt ranges from 30 to 50 inches in thickness, and the clayey shale residuum, from a few inches to several feet. Depth to bedrock ranges from 36 to 54 inches. In wooded areas the uppermost 4 inches is black to very dark brown in color. In eroded areas the surface layer is lighter colored than that in the profile described for the series.

Eleroy soils have a lighter colored, thinner surface layer than the Keltner soils. They are better drained than the Derinda series, wet subsoil variant, and their subsoil has less yellow and gray mottling.

These soils are moderately high to high in moisture-supplying capacity and medium in fertility. Unless limed, these soils are slightly acid to medium acid. Water moves slowly through the Eleroy soils because the permeability of the underlying clay and shale bedrock is moderately slow to slow. In some areas less than 2 acres in size, seepage interferes with tillage.

The less sloping Eleroy soils are suited to all crops commonly grown in the county, and they are in crops. The steeper ones are best suited to permanent pasture, forage crops, timber, or to wildlife areas.

Eleroy silt loam, 2 to 6 percent slopes (ErB).—The profile of this soil is like that described for the series. Because of the gentle slope, runoff is moderately slow.

Included with this soil in mapping are small areas of the Derinda series, wet subsoil variant. In these areas the soil dries slowly in spring or following a heavy rain and is therefore difficult to cultivate.

If Eleroy silt loam, 2 to 6 percent slopes, is protected from erosion and otherwise well managed, it is suited to all crops commonly grown in the county. Capability unit IIe-6; woodland suitability group 1.

Eleroy silt loam, 2 to 6 percent slopes, moderately eroded (ErB2).—This soil has lost all but from 3 to 6 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the surface layer of the soil described for the series.

Included with this soil in mapping are small areas of soils of the Derinda series, wet subsoil variant. In these areas the soil dries slowly in spring or following a prolonged rain and is consequently difficult to cultivate. Also included are a few small areas of Eleroy silt loam, 2 to 6 percent slopes, severely eroded.

If Eleroy silt loam, 2 to 6 percent slopes, moderately eroded, is protected from further erosion and otherwise well managed, it is suited to the crops commonly grown in the county. A cropping system that adds organic matter will improve tilth. It also improves the capacity of the soil to absorb rainfall. Crops on this soil respond well if fertilizer and lime are added as needed. Capability unit IIe-6; woodland suitability group 1.

Eleroy silt loam, 6 to 12 percent slopes (ErC).—The mantle of wind-laid silt on this soil is thinner than that in the profile described for the series and the subsoil is slightly thinner. Depth to shale bedrock ranges from 36 to 48 inches. In some small areas seepage interferes with tillage. Runoff is rapid, and water erosion is active in cultivated areas.

If this soil is protected from erosion, it is suited to the crops commonly grown in the county. Capability unit IIIe-6; woodland suitability group 1.

Eleroy silt loam, 6 to 12 percent slopes, moderately eroded (ErC2).—The mantle of wind-laid silt is thinner and the subsoil is slightly thinner than those of the soil described for the series. All but about 4 inches of the original surface layer has been removed by water erosion, and material from the subsoil has been mixed with the remaining surface soil. As a result, the present surface layer is lower in organic-matter content and fertility than the original one. In a few small areas the soil is severely eroded and material from the subsoil is exposed.

If protected from erosion and otherwise well managed, this soil is suited to the crops commonly grown in the county. Capability unit IIIe-6; woodland suitability group 1.

Eleroy silt loam, 12 to 20 percent slopes (ErD).—Because of the steep slopes, the mantle of silt on this soil is thinner; the subsoil is thinner, and depth to the underlying clayey material is less than in the profile described for the series. Runoff is very rapid, and erosion is active in cultivated areas.

This soil is better suited to pasture, forage crops, or trees than to cultivated crops. Nevertheless, if it is

protected from erosion, it can be cultivated occasionally. Capability unit IVe-6; woodland suitability group 1.

Eleroy silt loam, 12 to 20 percent slopes, moderately eroded (ErD2).—The mantle of wind-laid silt on this soil is thinner and the subsoil is slightly thinner than are corresponding parts of the soil described for the series. All but about 4 inches of the original surface layer has been removed through water erosion, and material from the subsoil has been mixed with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one. A few small areas are severely eroded.

This soil is suited to row crops if practices that prevent further erosion are applied. Where practices are not used to protect the soil, it can be used for grain and hay, or pasture, or woodland. Capability unit IVe-6; woodland suitability group 1.

Fayette Series

In the Fayette series are light-colored, deep, silty soils on rolling upland ridges and benches and valley slopes. These soils are well drained. They formed in silt that was 42 or more inches thick. The silt was probably blown into the county about the time of the last glaciation from the flood plains of the Mississippi River. The original vegetation consisted of various kinds of hardwoods.

Three topographic phases of Fayette silt loams—uplands, benches, and valleys—have been recognized. The Fayette silt loams, uplands, are on rolling ridges above areas of stony and rocky land. The Fayette silt loams, valleys, are on lower slopes below areas of stony and rocky land. The Fayette silt loams, benches, which are on high benches in stream valleys, have a profile similar to that of the Fayette silt loams, uplands, except that loose, acid sand is in the substratum.

Representative profile of a Fayette silt loam, uplands, in a cultivated field:

0 to 6 inches, dark-gray, friable silt loam.
6 to 10 inches, brown, friable silt loam.
10 to 16 inches, dark yellowish-brown, friable silt loam.
16 to 37 inches, dark-brown, friable silty clay loam with light-colored coatings on the faces of the peds.
37 to 47 inches, dark-brown, friable silt loam.
47 inches +, yellowish-brown, massive silt loam.

Representative profile of a Fayette silt loam, valleys, in an undisturbed area:

0 to 4 inches, very dark grayish-brown, friable silt loam or fine sandy loam.
4 to 10 inches, dark grayish-brown, friable silt loam or fine sandy loam.
10 to 16 inches, dark yellowish-brown, friable, gritty silt loam.
16 to 35 inches, brown, firm, heavy silt loam to light silty clay loam.
35 to 43 inches, dark yellowish-brown, firm silt loam.
43 inches +, layers of yellowish-brown, massive silt loam and fine sandy loam.

The mantle of wind-laid silt on the Fayette soils is 4 to 8 feet thick in most places, but in places on the broad, nearly level ridgetops it is 20 feet or more thick. Fayette soils on valley slopes formed partly in local alluvium washed from the soils on slopes above. In some places, where the soils lie below sandstone escarpments, they are covered by a thin layer of fine sand. Fayette soils on valley slopes have a less distinct B horizon than the

Fayette soils on upland ridges or benches. Also, they have grit throughout the profile.

Fayette soils have a lighter colored, thinner surface layer than the Tama or Downs soils. They have a thicker mantle of silt than the Palsgrove soils and lack the clayey subsoil that is in those soils.

These soils are high in moisture-supplying capacity and natural fertility. They are medium acid to slightly acid. Movement of water through these soils is moderate. Depth to the water table is more than 5 feet. Fayette soils are highly productive, but lime is required in most places for good yields of legumes. These soils are subject to erosion. If they are cropped intensively, practices that control erosion are needed.

Fayette soils are suited to all crops commonly grown in the county, and they are used mainly for crops. If the slope is favorable, these soils are fairly easy to cultivate and manage.

Fayette silt loam, benches, 2 to 6 percent slopes (FaB).—This soil is on broad, gently sloping parts of stream terraces. Its profile is similar to that described for the Fayette silt loam, uplands. This soil retains nearly all of its original surface layer and absorbs water readily. Runoff is therefore not a serious hazard.

Most of this soil is in crops. A few areas, inaccessible to tillage, remain in woodland. The soil is well suited to corn, oats, and hay crops. If practices that control erosion and maintain a high level of organic matter and fertility are used, the soil can be used intensively and yields are high. Capability unit IIe-1; woodland suitability group 1.

Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded (FaB2).—The surface layer is lighter colored, but the profile of this soil is otherwise like that described in the series for Fayette silt loam, uplands. All but 3 to 6 inches of the original surface layer has been lost through erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one.

This soil is deficient in organic matter and nitrogen. If practices that prevent further erosion are applied, and if a suitable cropping system is used and a good supply of plant nutrients is maintained, the soil can be used intensively. Crops on this soil respond well if manure is added and a complete fertilizer is applied. Lime is needed. Capability unit IIe-1; woodland suitability group 1.

Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded (FaC2).—The surface layer is thinner and lighter colored, but the profile of this soil is otherwise like that described in the series for Fayette silt loam, uplands. All but 3 to 6 inches of the original surface layer has been removed through water erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one. If the soil is plowed, brown material from the subsoil is exposed in about half of the area.

A few small areas are slightly eroded, and others are severely eroded. In several small areas slopes range from 12 to 15 percent.

Fayette silt loam, benches, 6 to 12 percent slopes, moderately eroded, requires careful management that will prevent further erosion. Consequently, row crops can be

grown less frequently than on less sloping soils. If this soil is used for crops, the supply of plant nutrients needs to be maintained. Turning under green-manure crops and adding barnyard manure supplies organic matter and nitrogen. Crops on this soil respond well if a complete fertilizer is added. Lime is needed. Capability unit IIIe-1; woodland suitability group 1.

Fayette silt loam, uplands, 2 to 6 percent slopes (FdB)—The profile of this soil is similar to that described for the Fayette silt loam, uplands.

This soil is subject to erosion if it is cultivated. Nevertheless, nearly all of this soil is in crops. Yields are good if the soil is well managed. Practices are needed that protect the soil from erosion and that maintain the supplies of plant nutrients and organic matter. Crops on this soil respond well if fertilizer and lime are added as needed. Capability unit IIe-1; woodland suitability group 1.

Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded (FdB2).—The surface layer is slightly thinner, but the profile of this soil is otherwise like that described in the series for Fayette silt loam, uplands. All but about 4 inches of the original surface layer has been removed through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one.

If this soil is protected from further erosion, it is suited to row crops, small grains, and hay. A cropping system that supplies organic matter and maintains good tilth should be used. Capability unit IIe-1; woodland suitability group 1.

Fayette silt loam, uplands, 6 to 12 percent slopes (FdC).—The surface layer is slightly thinner, but the profile of this soil is otherwise like that described in the series for Fayette silt loam, uplands. Runoff is moderately rapid on this soil, and erosion is a problem unless practices that control erosion are used. Growing crops in alternate strips on the contour slows runoff and helps reduce erosion. Terraces, properly installed, divert runoff away from fields. Capability unit IIIe-1; woodland suitability group 1.

Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded (FdC2).—The surface layer is slightly thinner, but the profile of this soil is otherwise like that described in the series for Fayette silt loam, uplands. All but 3 to 6 inches of the original surface layer has been removed through water erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. The present surface soil is lighter colored, lower in organic matter and fertility, and crusts more readily than that described.

This soil is not suited to intensive tillage. Nevertheless, yields of row crops, small grains, and hay are good if the soil is protected from further erosion and if adequate amounts of lime and fertilizer are applied. Capability unit IIIe-1; woodland suitability group 1.

Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded (FdC3).—This soil has lost all, or in places nearly all, of its original surface layer through erosion. The present surface layer consists mainly of material from the subsoil. It is therefore lower in organic matter and fertility and crusts more readily than that of the soil described in the series for Fayette silt loam, uplands.

Because this soil is sloping and severely eroded, it is poorly suited to intensive tillage. Management that increases fertility and the content of organic matter and that improves the tilth of the surface soil is needed. Lime and fertilizer should be applied to build the fertility needed for good crop growth. Capability unit IVE-1; woodland suitability group 1.

Fayette silt loam, uplands, 12 to 20 percent slopes (FdD).—Because of the moderately steep slope, the mantle of silt is slightly thinner, and the subsoil is slightly thinner than in the profile described in the series for Fayette silt loam, uplands. Runoff is rapid and erosion is active in cultivated areas.

This soil is too steep for intensive use for crops, and many areas are in pasture or woodland. Row crops can be grown only if practices that control erosion are used. The cropping system should consist mostly of small grain and hay. Crops on this soil respond well if fertilizer and lime are applied. Wooded areas should be managed according to information in the section about woodland management. Capability unit IVE-1; woodland suitability group 1.

Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded (FdD2).—The mantle of silt is slightly thinner and the subsoil is slightly thinner, but the profile of this soil is otherwise like that described in the series for Fayette silt loam, uplands. This soil has lost all but about 4 to 6 inches of its original surface layer through water erosion, and material from the upper part of the subsoil has been mixed with the remaining surface soil by plowing. As a result, the present surface layer is lower in organic matter and fertility than the original one. Some small areas are severely eroded. In these areas all of the original surface layer is gone and the present surface soil is browner and crusts more readily than the one that erosion removed.

This soil is not suited to intensive cultivation. Nevertheless, yields of row crops, small grains, and hay are moderately high if the soil is protected from erosion and is otherwise well managed. The cropping system should consist largely of small grains and of hay crops. Capability unit IVE-1; woodland suitability group 1.

Fayette silt loam, uplands, 20 to 30 percent slopes (FdE).—The surface layer and subsoil are slightly thinner than those in the profile described for Fayette silt loam, uplands. Runoff is rapid, and the hazard of erosion is severe in cultivated areas. Because of the steep slope, this soil should be kept in pasture or in woodland. Areas now wooded should be managed according to information in the section about woodland. Capability unit VIe-1; woodland suitability group 1.

Fayette silt loam, valleys, 2 to 6 percent slopes (FeB).—The profile of this soil is similar to that described for the Fayette silt loam, valleys.

This soil is subject to erosion if cultivated. Nevertheless, nearly all of this soil is in crops, and if the soil is well managed, yields are good. Practices are needed that protect the soil from erosion and that maintain the supplies of plant nutrients and organic matter. Crops on this soil respond well if fertilizer and lime are added as needed. Capability unit IIe-1; woodland suitability group 1.

Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded (FeB2).—The surface layer of this soil is slightly thinner than that in the profile described in the series for Fayette silt loam, valleys. All but about 4 inches

of the original surface layer has been lost through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original one.

If practices that prevent further erosion are used, this soil is suited to row crops, small grains, and hay. Also, a cropping system is needed that supplies organic matter and maintains good tilth. Capability unit IIe-1; woodland suitability group 1.

Fayette silt loam, valleys, 6 to 12 percent slopes (FeC).—The surface layer of this soil is slightly thinner than that in the profile described in the series for Fayette silt loam, valleys. Runoff is moderately rapid, and erosion is a problem unless practices that control erosion are used. Growing crops in alternate strips and on the contour slows runoff and reduces erosion. Properly installed terraces divert runoff from fields. Capability unit IIIe-1; woodland suitability group 1.

Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded (FeC2).—This soil has lost all but 3 to 6 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. As a result, the present surface layer is thinner and lighter colored than that in the profile described in the series for Fayette silt loam, valleys. It also is lower in organic matter and fertility and crusts more readily than the soil described.

This soil is not suited to intensive tillage. Nevertheless, if adequate amounts of lime and fertilizer are added, yields of row crops, small grains, and hay are good. Contour stripcropping, terracing, and other practices that protect the soil from further erosion are also needed. Capability unit IIIe-1; woodland suitability group 1.

Fayette silt loam, valleys, 12 to 20 percent slopes (FeD).—Because of its moderately steep slope, the mantle of silt and the subsoil are thinner than in the profile described in the series for Fayette silt loam, valleys. Runoff is rapid and erosion is active in cultivated areas.

This soil is too steep for intensive use for crops, and many areas are in pasture or in woodland. Row crops can be grown only if practices are used that control erosion. The cropping system should consist mostly of small grain and hay. Crops on this soil respond well if fertilizer and lime are applied. Wooded areas should be managed according to information in the section about woodland. Capability unit IVE-1; woodland suitability group 1.

Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded (FeD2).—The mantle of silt and the subsoil are slightly thinner than in the profile described in the series for Fayette silt loam, valleys. All but about 4 to 6 inches of the original surface layer has been lost through water erosion. The present surface layer is therefore lower in organic matter and fertility than the original one. Some small areas are severely eroded. In these areas all of the original surface layer is gone and the present surface layer is browner and crusts more readily than the one erosion removed. In a few small areas the slope ranges from 20 to 30 percent.

Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded, is not suited to intensive cultivation. Nevertheless, if it is protected from erosion and is otherwise well managed, yields of row crops, small grains, and hay are moderately high. The cropping system should

consist mainly of small grains and hay. Capability unit IVe-1; woodland suitability group 1.

Fayette and Dubuque soils and Pits, gently sloping, eroded (FpB2).—This undifferentiated group is on broad ridgetops. It is made up of areas of Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded; Dubuque silt loam, 2 to 6 percent slopes, moderately eroded; and Mine pits and dumps. The Fayette and Dubuque soils are described in detail under their representative series.

Small pits from lead and zinc mining, surrounded by piles of waste, occupy from 30 to 50 percent of the area of this undifferentiated group. The pits range from 6 to 10 feet in diameter, and the piles of waste range from 2 to 10 feet in width. The pits and the material from them make the areas unsuitable for crops. At considerable expense, a few of the pits have been filled in and the waste piles leveled. In these reclaimed areas the surface layer of the soils ranges from silt loam to silty clay in texture and from dark gray to reddish brown in color. Large chert fragments on the surface damage the tires of farm machinery.

Most areas of this unit are in permanent pasture, but some areas have been reclaimed and are in corn, small grains, and hay. Yields are only moderate. The soils in reclaimed areas are deficient in plant nutrients and require large amounts of fertilizer. Also, large amounts of barnyard manure are needed to improve tilth of the soils and increase their content of organic matter. Fayette part in capability unit IIe-1, woodland suitability group 1; Dubuque part in capability unit IIe-2, woodland suitability group 1; Mine pits and dumps in capability unit VIIIs-10, woodland suitability group 13.

Fayette and Dubuque soils and Pits, moderately sloping, eroded (FpC2).—This undifferentiated group is on the sides of hills below ridgetops. It consists of Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded; Dubuque silt loam, 6 to 12 percent slopes, moderately eroded; and Mine pits and dumps. The areas are in permanent pasture and are best suited to this use; they are subject to moderate erosion if cultivated.

Included with this unit in mapping are several small pitted areas of a Tama silt loam. This included soil has a thicker, darker colored surface layer than that of the gently sloping Fayette and Dubuque soils and Pits.

Most areas of Fayette and Dubuque soils and Pits, moderately sloping, eroded, are not suited to crops because of their slope and many mine pits and waste piles. Reclaiming the areas generally is not economically feasible. Reclaimed areas require large amounts of fertilizer. Also, the tires of farm machinery are likely to be damaged, and replacement is costly. Fayette part in capability unit IIIe-1, woodland suitability group 1; Dubuque part in capability unit IIIe-2, woodland suitability group 1; Mine pits and dumps in capability unit VIIIs-10, woodland suitability group 13.

Fayette and Dubuque soils and Pits, moderately steep, eroded (FpD2).—This undifferentiated group is on moderately steep hillsides. It consists of Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded; Dubuque silt loam, 12 to 20 percent slopes, moderately eroded; and Mine pits and dumps. The areas are in permanent pasture and are best suited to this use; they are subject to severe erosion if cultivated.

Most areas of this unit are not suited to crops, because of their slope and many mine pits and waste piles. Reclaiming the areas is not feasible. This unit is suited to woodland. Wooded areas should be managed according to information in the section about woodland. Fayette part in capability unit IVe-1, woodland suitability group 1; Dubuque part in capability unit IVe-2, woodland suitability group 1; Mine pits and dumps in capability unit VIIIs-10, woodland suitability group 13.

Gale Series

The Gale series is made up of light-colored, moderately deep, silty soils that are well drained. These soils are on uplands and valley slopes bordering the major rivers, but they are mainly along the East Branch of the Pecatonica River. The upper part of these soils formed in wind-laid silt, and the lower part in sandy material weathered from sandstone.

Representative profile of a Gale silt loam in an undisturbed site:

- 0 to 4 inches, very dark grayish-brown, friable silt loam.
- 4 to 7 inches, dark grayish-brown, friable silt loam.
- 7 to 12 inches, dark yellowish-brown, friable silt loam.
- 12 to 21 inches, dark-brown, firm silty clay loam.
- 21 to 25 inches, dark yellowish-brown, firm gritty silty clay loam.
- 25 to 31 inches, dark yellowish-brown, friable loam.
- 31 inches +, partly weathered, white to yellow sandstone that breaks to single grain.

The surface layer ranges from 3 to 9 inches in thickness, depending on the amount of erosion. In places the lower part of the subsoil is loam or sandy loam 2 to 9 inches thick. In some places there are outcrops of sandstone.

The Gale soils are near the Hixton and Northfield soils, but their surface layer and subsoil are silty rather than loamy. Also, they are deeper to sandstone than the Northfield soils.

These soils are moderate in moisture-supplying capacity and fertility. Movement of water through the soils is moderate. In places lack of moisture late in summer reduces yields somewhat, especially where the depth to sandstone is between 24 and 30 inches. Unless limed, these soils are slightly acid to medium acid.

Gale soils are used for cultivated crops and for pasture. Practices that prevent erosion are needed, but if the slope is favorable, the soils are suited to all crops commonly grown in the county.

Gale silt loam, 6 to 12 percent slopes, eroded (GaC2).—This soil is on side slopes of uplands underlain by sandstone, and it is the most extensive soil in the Gale series. From one-third to two-thirds of its original surface layer has been lost through water erosion, and material from the subsoil has been mixed with the remaining surface layer. The present surface layer is therefore lower in organic matter and fertility and crusts more readily than the surface layer of the soil described for the series. In a few small areas the slope ranges from 2 to 6 percent and the soil is slightly deeper to sandstone bedrock.

Gale silt loam, 6 to 12 percent slopes, eroded, is not suited to intensive tillage. It can be used for row crops, small grains, and hay if it is protected from further erosion. Many areas are in woodland. These areas should be

managed according to information in the section about woodland. Capability unit IIIe-2; woodland suitability group 1.

Gale silt loam, 12 to 20 percent slopes, eroded (GaD2).—This soil has lost all but about 4 inches of its original surface layer through water erosion, and material from the subsoil has been mixed with the remaining surface soil. The present surface layer is lighter colored, less friable, and lower in organic matter and fertility than that of the soil described for the series. Depth to sandstone is between 24 and 30 inches in most places.

In areas that are not eroded, the surface layer is slightly thicker and darker than that described for the series. A few areas are severely eroded. In these areas the surface layer consists mainly of material from the subsoil, and it is browner and less friable than that of the less eroded soils.

Moderately steep slope, moderate depth, and erosion make Gale silt loam, 12 to 20 percent slopes, eroded, poorly suited to intensive tillage. If practices that control further erosion are used, row crops can be grown occasionally. In most places the soil is better suited to pasture, forage crops, or trees than to row crops. Wooded areas should be managed according to information in the section about woodland. Capability unit IVe-2; woodland suitability group 1.

Gale silt loam, 20 to 30 percent slopes, eroded (GaE2).—The surface layer and subsoil are thinner, and depth to sandstone bedrock is slightly less than in the profile described for the series. All but from 3 to 6 inches of the original surface layer has been removed through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. In places runoff is rapid and gullies are common. In areas that are not eroded, the surface layer is slightly darker colored and thicker than that described.

Because of the steep slope and severe hazard of erosion, Gale silt loam, 20 to 30 percent slopes, eroded, should be kept in permanent pasture or in woodland. Hay can be harvested from some areas, but yields are only moderately high. Wooded areas should be managed according to information in the section about woodland. Capability unit VIe-2; woodland suitability group 1.

Gotham Series

In the Gotham series are moderately dark colored, sandy, nearly level to moderately steep soils that are somewhat excessively drained. These soils are in small areas widely distributed along terraces of the Pecatonica River between Blanchardville and South Wayne. They formed in water-laid sand under prairie grasses and scattered hardwood trees.

Representative profile of a Gotham loamy fine sand in a cultivated field:

- 0 to 8 inches, very dark grayish-brown, very friable loamy fine sand.
- 8 to 12 inches, dark-brown, very friable loamy fine sand.
- 12 to 16 inches, dark yellowish-brown, very friable loamy sand.
- 16 to 24 inches, dark-brown, very friable heavy loamy sand.
- 24 to 29 inches, dark-brown, loose, medium sand.
- 29 inches +, strong-brown, loose, medium sand that grades to brownish-yellow, loose, medium sand with increasing depth.

The surface layer ranges from 6 to 16 inches in thickness, depending on the amount of wind erosion, and from very dark gray to black in color. In places a layer of

light sandy loam, generally less than 10 inches thick, is in the subsoil.

Gotham soils have a darker colored, sandier, and thicker surface layer than the Meridian soils, and a sandier subsoil. They are similar to the Dakota soils, but their surface layer is slightly lighter colored and their subsoil is sandier.

These soils are low in moisture-supplying capacity and moderately low in fertility. They are medium acid to slightly acid. Water moves rapidly through these soils, and that held in the root zone of plants is lost fairly quickly through evapotranspiration. If cultivated, these soils are subject to wind erosion. Supplemental irrigation is necessary for good yields.

Most areas of these soils are used for corn, small grains, hay, and pasture. These crops respond well if fertilizer is added and if sufficient moisture is available.

Gotham loamy fine sand, 2 to 6 percent slopes, eroded (GoB2).—The profile of this soil is similar to that described for the series.

Mapped with this soil are a few small areas of Gotham soils that have slopes from 0 to 2 percent or from 2 to 6 percent and that are only slightly eroded. These included soils have a thicker surface layer than Gotham loamy fine sand, 2 to 6 percent slopes, eroded. Also included are a few small areas of loamy fine sands, which have a slightly thicker and darker surface layer than that described for the Gotham series.

Gotham loamy fine sand, 2 to 6 percent slopes, eroded, is used mostly for corn, small grains, hay, and pasture. Capability unit IVs-3; woodland suitability group 4.

Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded (GoC2).—This soil has lost from one-third to two-thirds of its original surface layer through wind and water erosion, and as a result the organic matter and fertility are lower than in the profile described for the series.

Nearly all of this soil was once cultivated, but because yields were generally low, many were returned to pasture or planted to pines.

Because of its low moisture-supplying capacity and susceptibility to further wind and water erosion, this soil is not suited to row crops. Yields of forage crops, however, are moderate if the soil is well managed. The soil is well suited to conifers. If conifers are planted, the areas should be managed according to information given in the section on woodland. Capability unit VIe-9; woodland suitability group 4.

Hixton Series

The Hixton series consists of light-colored, moderately deep, to shallow, well-drained loamy soils on uplands and valley slopes. The areas are mainly along the East Branch of the Pecatonica River. These soils formed in sandy material weathered from fine-grained sandstone that contains a small amount of silty material.

Representative profile of a Hixton loam in a cultivated field:

- 0 to 8 inches, dark-brown, friable loam.
- 8 to 12 inches, dark grayish-brown, friable loam.
- 12 to 14 inches, dark yellowish-brown, friable loam.
- 14 to 21 inches, dark yellowish-brown, friable heavy loam to sandy clay loam.

21 to 27 inches, yellowish-brown, very friable sandy loam.
27 to 33 inches, yellowish-brown, loose, medium sand.
33 inches +, yellowish-brown, sandstone bedrock.

Representative profile of a Hixton sandy loam in a cultivated field:

0 to 7 inches, grayish-brown, friable sandy loam.
7 to 10 inches, light brownish-gray, friable sandy loam.
10 to 18 inches, yellowish-brown, friable heavy sandy loam.
18 to 28 inches, yellowish-brown, firm loam to sandy clay loam.
28 to 34 inches, yellowish-brown, friable sandy loam.
34 inches +, yellowish-brown, loose sand that grades to sandstone bedrock with increasing depth.

The surface layer ranges from grayish brown to very dark grayish brown. It is 2 to 12 inches thick, depending somewhat on the slope and erosion. The Hixton soils formed in material similar to that of the Northfield soils, but their subsoil is better developed and depth to sand and sandstone bedrock is greater.

These soils are moderate in permeability and fertility. The moisture-supplying capacity for Hixton loam is moderate, but for Hixton sandy loam it is moderately low. Their content of organic matter is fairly low. In places lack of moisture late in summer lowers yields somewhat, especially on the steeper slopes and on the sandy loams. Unless limed, these soils are medium acid to slightly acid. Sloping areas are subject to water erosion, and intensive management is required to prevent erosion.

The gently sloping Hixton soils are suited to cultivated crops. The steeper ones are best suited to pasture or trees.

Hixton loam, 2 to 6 percent slopes, eroded (HmB2).—This soil has lost all but from 3 to 6 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than that of the profile described in the series for Hixton loam. In uneroded areas, however, the surface layer is slightly thicker and darker colored.

This soil is somewhat droughty and is subject to slight erosion. Therefore, practices that control erosion are needed for maintaining the present soil depth and preventing further erosion.

Row crops can be grown on this soil if it is adequately protected from erosion and if other good management is used. Capability unit IIe-2; woodland suitability group 3.

Hixton loam, 6 to 12 percent slopes, eroded (HmC2).—This soil is on side slopes below areas of less sloping Hixton soils. It has lost from one-third to two-thirds of its original surface layer through erosion. The present surface layer is a mixture of the remaining surface soil and of material from the upper part of the subsoil. It is therefore lower in organic matter and fertility and crusts more readily than the surface layer of the profile described in the series for Hixton loam. In uneroded areas the surface layer is slightly thicker and darker colored than the one described.

This soil is not suited to intensive cultivation, but it can be used for row crops occasionally if practices that control erosion are used. Many areas are in woodland. These areas should be managed according to information in the section about woodland. Capability unit IIIe-2; woodland suitability group 3.

Hixton loam, 12 to 20 percent slopes (HmD).—This soil is on moderately steep side slopes below areas of less sloping Hixton soils. Its slope is steeper than that of the

profile described in the series for Hixton loam, and it therefore has a slightly thinner surface layer and subsoil.

This soil has a severe hazard of erosion. The effective depth for plants is slightly limited and would be further limited if the soil were eroded.

Part of the acreage of this soil is used for crops, but the soil is only moderately well suited to such use. Contour stripcropping and other practices that control erosion are needed. Diversions can be used to shorten the slope and reduce runoff. Because of the moderately steep slope, some areas are in pasture and woodland; others should be planted to trees. The wooded areas should be managed according to information in the section about woodland. Capability unit IVe-2; woodland suitability group 3.

Hixton loam, 12 to 20 percent slopes, moderately eroded (HmD2).—This soil has lost all but about 4 inches of its original surface layer through water erosion. The present surface layer is lower in organic matter and fertility than that of the profile described in the series for Hixton loam, and it is lighter colored and less friable. Depth to sandstone bedrock is between 24 and 30 inches in most places.

The moderately steep slope, moderate depth, and severe hazard of erosion make this soil poorly suited to intensive tillage. Row crops can be grown occasionally if practices that control erosion are used, but most areas are better suited to pasture, forage crops, or woodland. Wooded areas should be managed according to information in the section about woodland. Capability unit IVe-2; woodland suitability group 3.

Hixton loam, 20 to 30 percent slopes, eroded (HmE2).—The slope is steeper and depth to bedrock is less than in the profile described in the series for Hixton loam. Also, the surface layer and subsoil are slightly thinner. All but 3 to 6 inches of the original surface layer has been lost through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The surface layer is slightly thicker and darker colored in uneroded areas.

Because of the steep slope and severe hazard of erosion, this soil should be kept in permanent pasture or in woodland. Hay can be harvested from some areas, but yields are only moderately high. Wooded areas should be managed according to information in the section about woodland. Capability unit VIe-2; woodland suitability group 3.

Hixton sandy loam, 2 to 6 percent slopes, eroded (HtB2).—This soil has lost all but about 4 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is lower in organic matter and fertility than that of the profile described in the series for Hixton sandy loam. In uneroded areas, the surface layer is slightly darker colored.

This soil is somewhat droughty, and its use for crops is therefore limited. It is further limited by moderate erosion. Practices that maintain soil depth and prevent further erosion are needed. If the soil is adequately protected from erosion and if other good management is used, row crops can be grown. Capability unit IIIe-4; woodland suitability group 3.

Hixton sandy loam, 6 to 12 percent slopes, eroded (HtC2).—This soil is on side slopes below areas of less sloping Hixton and Gale soils. It has lost from one-third to two-thirds of its original surface layer through erosion. The present surface layer is a mixture of the remaining

surface soil and of material from the upper part of the subsoil. It is therefore lower in organic matter and fertility and crusts more readily than that of the soil described in the series for Hixton sandy loam. In uneroded areas, however, the surface layer is slightly darker colored.

This soil is not suited to intensive cultivation, but it can be used for row crops occasionally if practices that control erosion are used. Many areas are in woodland. The wooded areas should be managed according to information in the section on woodland. Capability unit IVe-4; woodland suitability group 3.

Hixton sandy loam, 12 to 20 percent slopes, eroded (HtD2).—This soil is the most extensive of the Hixton sandy loams in the county. Because of moderate erosion, the surface layer is thinner and lighter colored and crusts more readily than that of the soil described in the series for Hixton sandy loam. In addition, depth to sandstone bedrock is less. In uneroded areas the surface layer is slightly darker colored than in eroded areas.

Because of its moderately steep slope, moderate depth, and susceptibility to drought, this soil has very severe limitations for crops. It is better suited to pasture or to woodland. Wooded areas should be managed according to information in the section on woodland. Capability unit VIe-4; woodland suitability group 3.

Hixton sandy loam, 12 to 20 percent slopes, severely eroded (HtD3).—This soil has lost most, and in places all, of its original surface layer through erosion. In some places even the subsoil is eroded. The present surface layer consists mainly of material from the subsoil. It is lighter colored, is lower in organic matter and fertility than that of the soil described in the series for Hixton sandy loam.

Because of the moderately steep slope and severe erosion, this soil should be kept in pasture or in woodland. Capability unit VIIe-4; woodland suitability group 3.

Hixton sandy loam, 20 to 30 percent slopes (HtE).—The individual layers are thinner and the entire profile is shallower to bedrock than in the profile described in the series for Hixton sandy loam.

Because of the steep slope and severe hazard of erosion, this soil should be kept in woodland or used for pasture. If this soil is pastured, grazing should be controlled to prevent erosion. Capability unit VIIe-4; woodland suitability group 3.

Houghton Series

The Houghton series consists of dark-colored, poorly drained soils forming in deposits of peat more than 42 inches thick. The peat was derived from partly decomposed remains of sedges, reeds, and grasses. These soils are in small depressions in bottom lands along the larger streams.

Representative profile of Houghton mucky peat:

- 0 to 12 inches, black, very friable, disintegrated mucky peat.
- 12 to 42 inches, black, very friable, disintegrated mucky peat; many grass and sedge remains.
- 42 to 54 inches, black, massive, disintegrated mucky peat.
- 54 inches +, dark-gray, slightly hard and firm silt and clay.

The Houghton soils are high in moisture-supplying capacity and low in fertility. They are slightly acid to neutral. Movement of water through these soils is slow because the water table is at or near the surface.

Generally, these soils are too wet for crops. In most places they are not suited to artificial drainage because of their small acreage and lack of suitable outlets. If adequate outlets are available, tile or open ditches can be used to remove excess water.

Houghton mucky peat (Hu).—This is the only soil mapped in the Houghton series in this county. Its profile is like that described for the series. Capability unit IIIw-9; woodland suitability group 10.

Huntsville Series

The Huntsville series consists of dark-colored, deep, silty alluvial soils that are well drained to moderately well drained. These soils are along nearly all of the perennial and intermittent streams in the county. They formed in silty materials washed from uplands covered with silt and deposited over the original soil of the bottom lands by stream overflow.

Representative profile of a Huntsville silt loam:

- 0 to 3 inches, very dark brown, friable silt loam.
- 3 to 15 inches, black, friable silt loam.
- 15 to 42 inches +, very dark brown, friable silt loam.

In some places lighter colored layers of very fine sand or silty material occur. In places where the deposit of dark silty material is less than 42 inches thick, there is grayer material at a depth between 30 and 42 inches. This gray material ranges from heavy silt loam to silty clay loam in texture. In some mined areas, chert and mine tailings are on the surface of these soils.

These soils are darker colored throughout than the Arenzville soils. They are better drained than the Lawson soils and occupy slightly higher positions.

Huntsville soils have high moisture-supplying capacity. They are very high in organic matter, are high in natural fertility, and are neutral throughout the profile. Movement of water through these soils is moderate, and artificial drainage generally is not required. In some places the soils are subject to occasional flooding, but the water subsides quickly when the flooding ends. Except in small depressions, where water is retained for longer periods, crops are not seriously damaged by flooding.

If these soils are protected from flooding and are otherwise well managed, they are well suited to corn, small grains, grasses, and legumes, and yields are excellent. Areas that are inaccessible because of meandering streams are best suited to permanent pasture or wildlife habitats.

Huntsville silt loam, 0 to 2 percent slopes (HvA).—The profile of this soil is like that described for the series. The level relief and the thick, friable surface layer make the soil easy to till. Fertility is high.

This soil can be cropped intensively if adequate amounts of lime and fertilizer are added and if the soil is otherwise well managed. If floods do not damage the crops, yields are high. Capability unit IIw-11; woodland suitability group 12.

Huntsville silt loam, 2 to 6 percent slopes (HvB).—This soil is in narrow and gently sloping stream valleys. Its profile is similar to that described for the series. The hazard from flooding, however, is less severe than on the less sloping Huntsville soil, and water from the floods does not remain on the surface so long. Fertility is high.

If this soil is protected from water erosion, it can be cropped intensively. Capability unit IIw-11; woodland suitability group 12.

Keltner Series

In the Keltner series are dark-colored, gently sloping to sloping soils that are well drained to moderately well drained and are moderately deep to deep over shale bedrock. These soils are mostly on the higher uplands near Shullsburg, but a few areas are near the Platte Mounds. They formed under prairie grasses in silt laid down by wind.

Representative profile of a Keltner silt loam in a cultivated field:

- 0 to 9 inches, black, friable silt loam.
- 9 to 12 inches, very dark grayish-brown, friable silt loam.
- 12 to 20 inches, dark yellowish-brown, firm silt loam.
- 20 to 35 inches, dark yellowish-brown, firm silty clay loam.
- 35 to 39 inches, dark grayish-brown and olive-brown, hard and firm light silty clay; many yellowish-brown mottles.
- 39 inches +, dark grayish-brown and olive-brown, firm and hard clay with many, yellowish-brown mottles that grade to partly shattered shale bedrock with increasing depth.

The thickness of the silt ranges from 30 to 50 inches. Color of the surface layer ranges from very dark brown in eroded areas to black in undisturbed areas. The surface layer ranges from 3 to 12 inches in thickness, depending on the steepness of the slope and on the amount of erosion. The combined thickness of the surface layer and subsoil ranges from 36 to 48 inches. The clayey underlying material ranges from 4 to 20 inches in thickness. Depth to shale bedrock is between 36 and 60 inches. In moderately and severely eroded areas, the surface layer is heavy silt loam to silty clay loam in places.

The Keltner soils have a darker, thicker surface layer than the Eleroy soils. They are better drained than soils of the Schapville series, wet subsoil variant, and have less yellow and gray mottling in their subsoil.

The moisture-supplying capacity of the Keltner soils is moderate. Fertility is medium. Unless limed, these soils are slightly acid to medium acid. Water moves slowly through these soils because of the moderately slow to slow permeability of the underlying clay and shale bedrock. In some areas less than 2 acres in size, seepage interferes with tillage.

The less sloping Keltner soils are suited to all crops commonly grown in the county, and they are used for cultivated crops. The steeper soils are best suited to permanent pasture or to forage crops.

Keltner silt loam, 2 to 6 percent slopes (KeB).—The profile of this soil is similar to that described for the series. Because of the gentle slope, runoff is moderately slow. Nevertheless, the soil is subject to erosion.

Included with this soil in mapping are a few small areas of Keltner silt loam that have slopes ranging from 0 to 2 percent. Also included are a few small areas of Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes. The areas of the Schapville variant are slow to dry in spring or following a prolonged rain, and they are therefore difficult to till.

If Keltner silt loam, 2 to 6 percent slopes, is well managed, it is suited to all crops commonly grown in the

county. Capability unit IIe-6; woodland suitability group 12.

Keltner silt loam, 6 to 12 percent slopes, moderately eroded (KeB2).—The mantle of wind-laid silt is thinner and the subsoil is slightly thinner than in the profile described for the series. All but about 4 inches of the original surface layer has been lost through water erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. As a result, the present surface layer is lower in content of organic matter and fertility than that in the profile described for the series.

In a few places the soil is not eroded. A few areas are severely eroded, and here the subsoil is exposed.

If Keltner silt loam, 6 to 12 percent slopes, moderately eroded, is protected from further erosion and is otherwise well managed, it is suited to all of the crops commonly grown in the county. Capability unit IIIe-6; woodland suitability group 12.

Lawson Series

The Lawson series consists of dark-colored, silty alluvial soils that are somewhat poorly drained. These soils formed in silty materials washed from the silt-covered uplands into streams. The material was then deposited over the original soil of the bottom lands by stream overflow.

Representative profile of Lawson silt loam in a pasture:

- 0 to 16 inches, black, friable silt loam; mottles of strong brown in the lower part.
- 16 to 23 inches, black, firm light silty clay loam; mottles of strong brown.
- 23 to 47 inches, black, slightly hard and firm light silty clay loam; mottles of strong brown.
- 47 inches +, light olive-gray, firm light silty clay loam; many mottles of strong brown.

In some places lighter colored layers of very fine sandy loam or silty material are in the profile. In places where the deposit of dark silty material is less than 42 inches thick, grayer material occurs at a depth between 30 and 42 inches. This gray material ranges from silt loam to silty clay loam in texture. In some mined areas chert and mine tailings are on the surface of these soils.

The Lawson soils are darker colored throughout than the Orion soils. They are more poorly drained than the Huntsville soils and occupy slightly lower positions.

These soils are very high in organic matter and are high in moisture-supplying capacity and fertility. They are neutral throughout. Water moves at a moderate rate through these soils, and the water table generally is at a depth of 5 feet or less. Frequent flooding and ponding after a prolonged rain make cultivation difficult. Surface drainage is needed in some areas for best yields.

If these soils are protected from flooding and if adequate drainage is provided, yields of all crops common to the area are good. Areas that it is not feasible to drain, or that are inaccessible, are better suited to pasture or wildlife than to tilled crops.

Lawson silt loam (La).—This is the only Lawson soil mapped in the county. Its profile is like that described for the series. Slopes range from 0 to 2 percent. Capability unit IIw-13; woodland suitability group 12.

Lindstrom Series

The Lindstrom series is made up of dark-colored, deep, silty soils on concave valley slopes. The soils are well drained. They lie below areas of stony and rocky land. The areas are small and are scattered throughout the county. These soils formed mainly under prairie grasses, in deposits of loess and local alluvium washed from the steeper slopes above. The deposits are more than 42 inches thick.

Representative profile of a Lindstrom silt loam in a cultivated field:

- 0 to 15 inches, very dark brown and black, friable silt loam.
- 15 to 21 inches, very dark grayish-brown, friable silt loam.
- 21 to 27 inches, dark-brown, friable silt loam.
- 27 to 34 inches, brown, friable heavy silt loam.
- 34 to 40 inches, brown, friable silt loam.
- 40 inches +, dark yellowish-brown, friable silt loam.

In places where the Lindstrom soils lie below sandstone escarpments, they have a thin surface layer of fine sandy loam. Also, a few stones and boulders are on the surface and within the profile in places.

Lindstrom soils occupy positions similar to those occupied by the valley soils of the Fayette series, but their surface layer is darker and thicker. They are similar to the Tama soils that are on upland ridges, but their subsoil is less well developed.

These soils have high moisture-supplying capacity and fertility. Permeability is moderate. They are slightly acid to neutral.

If slopes are favorable and erosion is controlled, the Lindstrom soils are suited to cultivated crops.

Lindstrom silt loam, 2 to 6 percent slopes (LsB).—The profile of this soil is like that described for the series. In a few small areas the soil is moderately eroded. Capability unit IIe-1; woodland suitability group 12.

Lindstrom silt loam, 6 to 12 percent slopes, eroded (LsC2).—All but about 5 inches of the original surface layer of this soil has been lost through erosion, and plowing has mixed material from the subsoil with the remaining surface layer. The present surface layer is lower in organic matter and fertility than that in the profile described for the series. It also is browner and thinner. If practices that prevent further erosion are applied, cultivated crops can be grown on this soil. Capability unit IIIe-1; woodland suitability group 12.

Lindstrom silt loam, 12 to 20 percent slopes, eroded (LsD2).—This soil has lost from one-third to two-thirds of its original surface layer through erosion. The present surface layer is a mixture of material from the subsoil and of the remaining soil. It is browner and thinner than that of the soil described for the series and is also lower in organic matter and fertility. In uneroded areas the soil profile is similar to that described for the series.

Because of the steep slope, this soil erodes readily. Practices that control further erosion are needed if cultivated crops are grown. Capability unit IVe-1; woodland suitability group 12.

Marsh (Ma)

This land type is made up mostly of very poorly drained alluvial soils on bottom lands of streams, but it includes small areas of peaty soils in the lowest depres-

sions. Most of the areas are covered by floodwater during much of the year. The natural vegetation is cattails, rushes, sedges, willows, and other plants that tolerate wetness.

The soils in this land type have a dark-colored, silty surface layer and a gray, silty subsoil. The water table is high most of the year, and the moisture-supplying capacity is also high. Fertility is moderate. The soils are slightly acid to neutral.

Marsh is not suited to crops, and its use for pasture or woodland is limited. Generally, it is not economical or feasible to drain the areas, because they are too low in relation to the streams to permit drainage. The areas are best suited for use as recreation areas and as sanctuaries for wildlife. Providing level ditches improves the habitat for ducks, muskrats, and other wildlife. Capability unit VIIIw-15; woodland suitability group 10.

Marshan Series

The Marshan series consists of dark-colored, moderately deep, nearly level silt loams that are poorly drained. These soils are on stream terraces. They formed in water-laid silt that overlies loose sand.

Representative profile of Marshan silt loam in a cultivated field:

- 0 to 8 inches, black, friable silt loam.
- 8 to 14 inches, very dark gray, friable silt loam; mottles of light gray and yellowish brown.
- 14 to 19 inches, dark grayish-brown, slightly hard and firm heavy silt loam; mottles of light yellowish brown.
- 19 to 29 inches, dark-gray, hard and firm gritty silty clay loam; mottles of olive brown and gray.
- 29 to 36 inches, gray, hard and firm sandy clay loam; mottles of olive brown and gray.
- 36 inches +, gray, loose sand.

The thickness of the surface layer ranges from 12 to 18 inches, and that of the subsoil from 12 to 24 inches. In some places the lower part of the subsoil is loam or sandy clay loam.

The Marshan soils have a darker, thicker surface layer and a grayer subsoil than soils of the Dakota series, mottled subsoil variant. Unlike the Sable soils they are underlain by sandy material rather than silty material.

Runoff is very slow, and in places water is ponded on these soils. Because of seepage and runoff from the adjacent uplands, the water table is at or near the surface. In small depressed areas water remains long enough to interfere with tillage. Because of the poor drainage, the surface layer has a high content of organic matter. The Marshan soils have high moisture-supplying capacity, have medium fertility, and are slightly acid to neutral. If artificial drainage is provided, movement of water through the silty upper part of these soils is moderately slow, but it is rapid through the sandy underlying material.

If adequate drainage is provided, these soils are suited to the crops commonly grown in the county. Undrained areas are used mainly for pasture, wild hay, or wildlife habitats. If outlets are available, surface ditches and open ditches are the most suitable for removing excess water from these soils.

Marshan silt loam (Mb).—This is the only soil mapped in the Marshan series in this county. Its profile is like that

described for the series. In most places slopes range from 0 to 2 percent, but several small areas have slopes from 2 to 3 percent, and runoff from these areas is somewhat better. Capability unit IIw-5; woodland suitability group 7b.

Meridian Series

The Meridian series consists of light-colored, moderately deep, loamy soils that are well drained. These soils are level to gently sloping and are on terraces of the Pecatonica River in the eastern part of the county. They formed mainly in material from water-laid sand. The native vegetation was a hardwood forest made up of various kinds of trees.

Representative profile of a Meridian loam in a cultivated field:

- 0 to 7 inches, dark-brown, friable loam.
- 7 to 10 inches, brown, very friable light loam.
- 10 to 16 inches, dark-brown, friable loam.
- 16 to 29 inches, strong-brown, slightly hard and friable light sandy clay loam.
- 29 to 37 inches, strong-brown, very friable sandy loam that contains a few chert fragments.
- 37 inches +, yellowish-brown, loose, medium sand.

Representative profile of a cultivated Meridian sandy loam follows:

- 0 to 8 inches, dark-brown, very friable sandy loam.
- 8 to 13 inches, dark yellowish-brown, very friable sandy loam.
- 13 to 24 inches, brown, very friable light loam.
- 24 to 31 inches, yellowish-brown, very friable sandy loam that grades to loamy sand with increasing depth.
- 31 inches +, yellowish-brown, loose, medium sand.

The surface layer ranges from very dark grayish brown to dark gray in color and from 4 to 10 inches in thickness. The subsoil ranges from 9 to 18 inches in thickness. The content of pebbles in the sandy underlying material varies, but it generally is less than 20 percent of the total material. In a few places these soils are mottled in the lower part of the subsoil.

The Meridian soils formed in parent material similar to that of the Dakota soils, but they have a thinner, lighter colored surface layer. They occupy slightly higher and better drained positions than soils of the Dakota series, mottled subsoil variant. Also, they have a lighter colored surface layer and a better drained subsoil.

Movement of water through these soils is moderate to moderately rapid. The moisture-supplying capacity for plants is moderate to moderately low. In places lack of moisture late in summer reduces yields somewhat, especially on the sandy loams. All of the Meridian soils are moderate in fertility and fairly low in organic matter. Unless limed, these soils are medium acid to slightly acid.

Meridian soils are suited to all crops commonly grown in the county, and most areas are cultivated. Generally, erosion is not a problem.

Meridian loam, 0 to 2 percent slopes (MdA).—The profile of this soil is the one described for the Meridian loams. This soil is level and has a thick, friable surface layer. It is therefore easy to till.

Most of this soil is in crops. Yields are high if the soil is well managed and if adequate moisture is available. Erosion is not a hazard, but the soil is slightly limited because of its moderate depth and the sandy nature of its underlying material. The content of organic matter should be

kept high. Also, lime and fertilizer should be applied in the amounts indicated by soil tests. Capability unit IIs-1; woodland suitability group 3.

Meridian loam, 2 to 6 percent slopes (MdB).—This soil has stronger slopes and a slightly thinner surface layer than the soil described in the series for Meridian loam. It also is more subject to erosion because runoff is greater.

A few areas are moderately eroded. Also, in a few areas the slope ranges from 6 to 12 percent, and the soil is slightly eroded and moderately eroded. The moderately eroded soils have lost from one-third to two-thirds of their original surface layer and are not so well suited to crops as the less eroded soils.

If fairly simple practices are used to control erosion, and if a good supply of plant nutrients is maintained and sufficient lime is applied, Meridian loam, 2 to 6 percent slopes, can be cropped fairly intensively. Capability unit IIe-2; woodland suitability group 3.

Meridian sandy loam, 0 to 2 percent slopes (MeA).—The profile of this soil is similar to that described in the series for Meridian sandy loam. Since this soil has a sandy loam surface layer and a coarser textured subsoil than that in the Meridian loams, it is somewhat more droughty. Also, it is not so well suited to intensive tillage.

Meridian sandy loam, 0 to 2 percent slopes, can be used for row crops if practices that conserve water are used and if it is otherwise well managed. Capability unit IIIs-2; woodland suitability group 3.

Meridian sandy loam, 2 to 6 percent slopes (MeB).—The profile of this soil is like that described in the series for Meridian sandy loam. The slope is stronger, and runoff is somewhat greater than on the less sloping Meridian soils.

Mapped with this soil are several small areas where the soil is moderately eroded and has lost from one-third to two-thirds of its original surface layer. The present surface layer is lower in organic matter and fertility than the surface layer in uneroded areas. These areas require larger amounts of fertilizer and barnyard manure for improved yields than the amounts needed in uneroded areas.

Meridian sandy loam, 2 to 6 percent slopes, requires practices that conserve moisture and permit more water from runoff to enter the soil. Capability unit IIIe-4; woodland suitability group 3.

Mifflin Series

The Mifflin series consists of light-colored, well-drained soils on ridges in the uplands. These soils are mainly along the East Branch of the Pecatonica River. They formed in loamy material weathered from alternate layers of sandstone and limestone. In some places the upper part of these soils formed in wind-laid silt.

Representative profile of a Mifflin loam in a cultivated field:

- 0 to 8 inches, dark grayish-brown, friable loam.
- 8 to 14 inches, brown, friable sandy loam.
- 14 to 23 inches, dark yellowish-brown, very friable heavy sandy loam.
- 23 to 27 inches, yellowish-brown and dark yellowish-brown, very friable loam.
- 27 to 37 inches, dark yellowish-brown, hard and firm sandy clay loam.
- 37 to 43 inches, dark-brown and strong-brown, hard and firm silty clay.
- 43 inches +, partly shattered limestone bedrock.

The texture of the surface layer varies within a short distance, and that of the upper part of the subsoil also varies. Where the mantle of silt is thin, the surface layer is commonly silt loam or silty clay loam, but if the mantle of silt is absent, it is dominantly sandy loam or loam. The texture of the entire profile varies considerably because of the alternate layers of different textured parent materials.

The Mifflin soils are similar to the Dubuque soils, but they generally lack a mantle of silt and are coarser textured throughout. Also, the limestone underlying the Mifflin soils is interbedded with thin layers of sandstone.

These soils are moderate in permeability. They are moderate to high in moisture-supplying capacity and moderately high in fertility. Unless limed, these soils are slightly acid to medium acid.

Mifflin soils are suited to all crops commonly grown in the county. If the slope is not too steep, these soils are fairly easy to cultivate and manage.

In Lafayette County the differences between the Mifflin loams and Mifflin sandy loams are small, and requirements of management are similar. Consequently, they were mapped together as undifferentiated units and called Mifflin soils.

Mifflin soils, 2 to 6 percent slopes, eroded (MfB2).—These soils have lost all but 3 to 6 inches of their original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility and is lighter colored and crusts more readily than that of the profile described for the series. In uneroded areas the profile is similar to that described.

Generally, these soils require practices that prevent further erosion. Capability unit IIe-2; woodland suitability group 1.

Mifflin soils, 6 to 12 percent slopes, eroded (MfC2).—These soils have lost all but from 3 to 6 inches of their original surface layer through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is lighter colored, lower in organic matter and fertility, and crusts more readily than that of the profile described for the series. In uneroded areas the profile is similar to that described.

If these soils are protected from erosion and are otherwise well managed, they are suited to the crops commonly grown in the county. Capability unit IIIe-2; woodland suitability group 1.

Mifflin soils, 12 to 20 percent slopes, eroded (MfD2).—These soils have lost all but about 4 inches of their original surface layer through water erosion. Plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the surface layer of the profile described for the series. In uneroded areas the soils are thinner to limestone bedrock. Some small areas are severely eroded. In these areas all of the original surface layer is gone, and the present surface layer is brown loam or silt loam.

If these soils are protected from erosion, they can be cultivated occasionally. Capability unit IVe-2; woodland suitability group 1.

Mifflin soils, 20 to 30 percent slopes, eroded (MfE2).—These soils have lost all but about 4 inches of their original surface layer through water erosion. As a result, the

present surface layer is lower in organic matter and fertility than that of the profile described for the series. In uneroded areas the soils are thinner to limestone bedrock. Some small areas are severely eroded. In these areas all of the original surface layer is gone.

Because of the steep slope, these soils erode readily if cultivated. They should therefore be kept in woodland or under some other kind of permanent vegetation. Capability unit VIe-2; woodland suitability group 1

Mine Pits and Dumps (Mp)

This miscellaneous land type consists of gravelly or stony material dumped in mounds around lead and zinc mines. The material is waste from the mines, which has been piled into steep mounds that range from 2 to 20 acres in size.

Some of the dumps around the mine pits consist of gravelly material less than 3 inches in size that is used for surfacing roads. Other dumps are made up of cobbly and stony material 3 to 24 inches in size that, as yet, has no special use.

The soil material in the dumps is low in fertility and moisture-supplying capacity and high in lime. The areas are not suited to crops, pasture, or woodland. Capability unit VIIIs-10; woodland suitability group 13.

Muscatine Series

The Muscatine series consists of dark-colored, deep, silty, somewhat poorly drained soils. These soils are nearly level to gently sloping and are in the uplands and on benches in stream valleys. They formed under prairie grasses in silt that was blown onto the uplands and benches from the flood plains of the Mississippi River.

Two topographic phases—uplands and benches—have been recognized. The Muscatine silt loams are in drainageways and on nearly level areas in the uplands and are underlain by shale or limestone bedrock. The Muscatine silt loams, benches, are on low benches in stream valleys and are underlain by loose sandy outwash.

Representative profile of a Muscatine silt loam in a cultivated field:

- 0 to 9 inches, black, friable silt loam.
- 9 to 15 inches, very dark gray heavy silt loam.
- 15 to 22 inches, very dark grayish-brown, firm light silty clay loam.
- 22 to 33 inches, dark grayish-brown, firm silty clay loam.
- 33 to 45 inches, grayish-brown, firm heavy silt loam.
- 45 to 60 inches, grayish-brown, friable silt loam.

The mantle of wind-laid silt is 4 to 8 feet thick in most places, but in some nearly level areas the silt is 20 feet or more thick. In the uplands the silt is underlain by shale bedrock in most places, but in a few places the underlying bedrock is limestone. Slopes range from 0 to 6 percent.

These soils are similar to the Tama soils, but they have mottling in the upper part of the subsoil and generally have a grayer subsoil. Their surface layer is thicker and is darker colored than that of the Stronghurst soils.

Muscatine soils are high in moisture-supplying capacity and fertility and in organic matter and nitrogen. Unless limed, these soils are slightly acid to moderately acid.

Movement of water through the soils is moderately slow, and a fluctuating water table is common at a depth between 4 and 6 feet. Runoff is slow in level or depressional areas. In many places tile drains and shallow surface drains can be used to improve drainage and thus permit use of the soils earlier in spring.

These soils are generally suited to crops, and all crops commonly grown have good yields.

Muscatine silt loam, 0 to 2 percent slopes (MsA).—The profile of this soil is the one described for the series. Runoff is slow in level or depressional areas.

Nearly all of this soil is in crops. If good management is used, yields are high. Tile drains or shallow surface drains can be used to improve drainage and thus permit use of the soil earlier in spring. Crops on this soil respond well if fertilizer and lime are added. Capability unit I-1; woodland suitability group 12.

Muscatine silt loam, 2 to 6 percent slopes (MsB).—The surface layer of this soil is slightly thinner than that of the soil described for the series. Also, drainage is somewhat better.

In the more sloping areas, drainage may not need to be improved, but seepage areas are likely to be too wet in places for good growth of crops. Also, the hazard of erosion is moderate in the more sloping areas. On these areas contour stripcropping, use of diversions, and other practices that protect the soil from erosion are needed.

This soil is well suited to row crops if it is protected from erosion. Capability unit IIe-1; woodland suitability group 12.

Muscatine silt loam, 2 to 6 percent slopes, moderately eroded (MsB2).—The surface layer of this soil is thinner and slightly lighter colored than that of the soil described for the series. All but 4 to 7 inches of the original surface layer has been lost through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. Runoff is better on this soil than on Muscatine silt loam, 0 to 2 percent slopes.

If protected from further erosion, Muscatine silt loam, 2 to 6 percent slopes, moderately eroded, is well suited to row crops, to small grains, and to hay crops. Adding fertilizer and applying barnyard manure are ways of improving tilth and replacing plant nutrients that were lost through erosion. Capability unit IIe-1; woodland suitability group 7a.

Muscatine silt loam, benches, 0 to 2 percent slopes (MuA).—The profile of this soil is similar to that described for the series. Runoff is slow in level or depressional areas.

Nearly all of this soil is in crops. Yields are high if good management is used. Tile drains or shallow surface drains can be used to improve drainage and thus permit use of this soil earlier in spring. Crops on this soil respond well if fertilizer and lime are added. Capability unit I-1; woodland suitability group 12.

Muscatine silt loam, benches, 2 to 6 percent slopes (MuB).—The surface layer of this soil is slightly thinner and lighter colored than that of the soil described for the series. Internal drainage is somewhat better, and surface drainage also is better. In places along grassed waterways seepage hinders tillage, and practices that dry these wet spots are needed.

If protected from erosion, this soil is well suited to corn, small grains, and hay crops. Capability unit IIe-1; woodland suitability group 12.

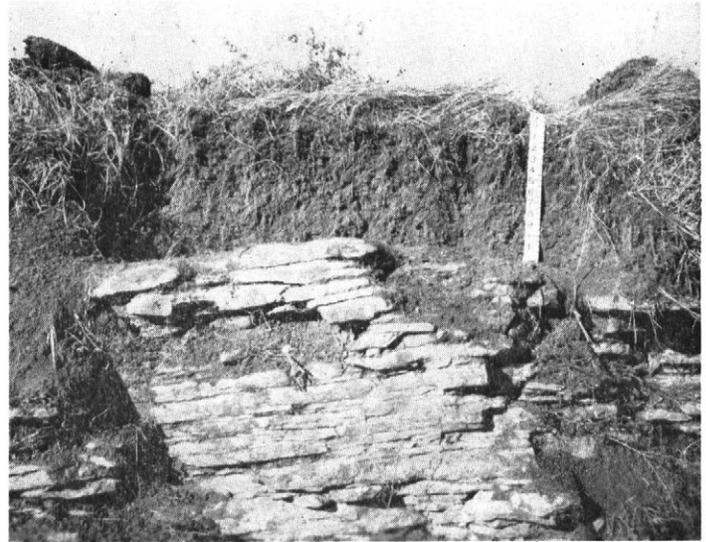


Figure 16.—Profile of a Northfield soil exposed in a roadcut north of Argyle. The soil is shallow over layers of platy, resistant sandstone of the St. Peter formation.

Northfield Series

In the Northfield series are light-colored, loamy, well-drained soils that are shallow to sandstone bedrock. These soils have formed in sandy material weathered from fine-grained sandstone that contains small amounts of silty material. The natural vegetation was a forest made up of various kinds of hardwoods. Figure 16 shows a profile of a Northfield soil.

Representative profile of a Northfield loam in woodland:

- 0 to 2 inches, very dark brown, friable loam.
- 2 to 5 inches, dark grayish-brown, friable loam.
- 5 to 12 inches, brown, friable loam.
- 12 to 21 inches, dark yellowish-brown, friable heavy loam that grades to yellowish-brown loam with increasing depth.
- 21 inches +, iron-cemented, platy sandstone bedrock.

Representative profile of a Northfield sandy loam in woodland:

- 0 to 2 inches, very dark brown, very friable sandy loam.
- 2 to 4 inches, dark grayish-brown, very friable loamy sand.
- 4 to 9 inches, brown, very friable sandy loam with a few sandstone pebbles.
- 9 to 20 inches, reddish-brown, very friable sandy loam with many sandstone pebbles.
- 20 inches +, iron-cemented, platy sandstone bedrock.

The surface layer ranges from 3 to 8 inches in thickness, depending on the amount of erosion. Depth to sandstone bedrock or loose sand ranges from 12 to 24 inches. Where the underlying sandstone is yellowish red in color, the subsoil is redder than in the profiles described. Outcrops of sandstone occur locally.

Northfield soils are near the Hixton soils, but they are less deep to sandstone and have a less well developed subsoil.

These soils are moderately rapid in permeability and moderately low to low in moisture-supplying capacity. They are droughty during extended periods of low rainfall. Natural fertility is moderate, and the soils are slightly acid to strongly acid. In sloping areas the soils

are subject to erosion and practices that control erosion are needed.

Northfield loam, 6 to 12 percent slopes (NfC).—The profile of this soil is the same as that described for the Northfield loams.

Included with this soil in mapping are a few small areas of Northfield loam, 2 to 6 percent slopes. Also included are a few small areas of a soil that has a surface layer of silt loam and slopes that range from 6 to 12 percent.

Northfield loam, 6 to 12 percent slopes, is too sloping and too shallow for intensive use for crops. Row crops can be grown, however, if practices that control erosion are used and if other good management is applied. Because of steepness or shape of the slope, many areas are not suited to tillage and therefore remain in permanent pasture or in woodland. The wooded areas are only moderately productive and should be managed according to suggestions in the section on woodland. Capability unit IVe-3; woodland suitability group 5.

Northfield loam, 6 to 12 percent slopes, moderately eroded (NfC2).—This soil has lost more than one-third of its original surface layer through erosion. The present surface layer is lower in organic matter and thinner than that described for the Northfield loams. Also, the solum is thinner and the soil generally is more droughty.

Mapped with this soil are many small areas in which the surface layer is silt loam.

Northfield loam, 6 to 12 percent slopes, moderately eroded, is suited to limited cultivation only if practices that prevent further erosion are used. Capability unit IVe-3; woodland suitability group 5.

Northfield loam, 12 to 20 percent slopes (NfD).—Because of the steeper slope, this soil has thinner layers than those described in the series for Northfield loam and a thinner profile. Depth to sandstone generally is less than 18 inches. In several small areas the surface layer is silt loam.

This soil has very severe limitations for crops, but it is suitable for pasture or woodland. Capability unit VIe-3; woodland suitability group 5.

Northfield loam, 12 to 20 percent slopes, moderately eroded (NfD2).—This soil has lost all but about 4 inches of its original surface layer through water erosion. The present surface layer is therefore lower in organic matter and fertility and is lighter colored and less friable than that described in the series for Northfield loam. Sandstone is commonly at a depth of less than 18 inches. Some small soil areas have a surface layer of silt loam.

Moderately steep slopes and shallow depth to sandstone make this soil unsuited to row crops. The soil is better suited to pasture and woodland. Capability unit VIe-3; woodland suitability group 5.

Northfield loam, 20 to 30 percent slopes (NfE).—The surface layer of this soil is slightly thinner and lighter colored than that described in the series for Northfield loam. Also, depth to bedrock generally is less than 18 inches.

Because it is steep and erodes readily, this soil should be kept in pasture or trees or used for wildlife. Capability unit VIIe-3; woodland suitability group 5.

Northfield loam, 20 to 30 percent slopes, moderately eroded (NfE2).—This soil has lost all but about 4 inches of its original surface layer through water erosion. The present surface layer is lighter colored, is lower in organic

matter, and is less friable than that described in the series for Northfield loam.

This soil is not suited to cultivation. It should be kept under a protective cover of grasses or trees. Capability unit VIIe-3; woodland suitability group 5.

Northfield sandy loam, 2 to 6 percent slopes, moderately eroded (NoB2).—This is the least extensive of the Northfield sandy loams mapped in this county. Its profile is similar to that described in the series for Northfield sandy loam. All but about 4 inches of the original surface layer has been removed through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil.

The moisture-supplying capacity of this soil is low; consequently, crops are likely to be damaged by lack of water during a prolonged dry spell. The soil is also limited by the hazard of further erosion. Practices that control erosion are needed for maintaining the present soil depth and preventing further erosion.

If adequately protected from erosion and if other good management is applied, this soil can be used for row crops. Capability unit IIIe-3; woodland suitability group 5.

Northfield sandy loam, 6 to 12 percent slopes (NoC).—This soil has a slightly thinner surface layer than that of the profile described for the series and depth to sandstone bedrock is slightly less. Cultivated areas are subject to moderate water erosion and require practices that protect them from erosion. Some areas are in woodland. These areas should be managed according to information in the section about woodland. Capability unit IVe-3; woodland suitability group 5.

Northfield sandy loam, 6 to 12 percent slopes, moderately eroded (NoC2).—This soil has lost from one-third to two-thirds of its original surface layer through erosion. The present surface layer is a mixture of the remaining surface soil and of material from the upper part of the subsoil. It is therefore lower in organic matter and fertility than that of the uneroded Northfield sandy loams.

The moisture-supplying capacity of this soil is low, and during a prolonged dry spell crops are damaged by lack of water. The use of the soil is further limited because of its susceptibility to erosion.

This soil is poorly suited to intensive use for crops. Most areas are best suited to pasture or woodland. Wooded areas should be managed according to information in the section on woodland. Capability unit IVe-3; woodland suitability group 5.

Northfield sandy loam, 12 to 20 percent slopes (NoD)—This soil is on moderately steep side slopes below areas of less sloping Northfield and Hixton soils. Because its slope is steeper, its surface layer and subsoil are slightly thinner than those in the profile described in the series for Northfield sandy loam. The hazard of erosion is severe, and the soil is droughty.

Generally, this soil is not suitable for row crops. It is, however, suited to pasture or woodland. Forage can be harvested for hay from areas that are not too steep. Many areas are in trees, and if these areas are well managed, yields are fair. Wooded areas and areas planted to trees should be managed according to information in the section about woodland. Capability unit VIe-3; woodland suitability group 5.

Northfield sandy loam, 12 to 20 percent slopes, moderately eroded (NoD2).—This is the most extensive of the

Northfield sandy loams mapped in the county. Because of moderate erosion, the surface layer of this soil is thinner and is lighter colored than that of the soil described in the series for Northfield sandy loam. Also, depth to sandstone bedrock is less.

Most of this soil has been cropped at one time, but it is not suited to row crops. It is better suited to pasture or woodland. If the wooded areas are well managed, yields are fair. The wooded areas should be managed according to information in the section about woodland. Capability unit VIe-3; woodland suitability group 5.

Northfield sandy loam, 20 to 30 percent slopes (NoE).—The individual layers of this soil are thinner than those in the profile described in the series for Northfield sandy loam, and the entire soil profile is not so deep to bedrock. Runoff is rapid.

Because of the steep slope and severe hazard of erosion, this soil should be kept in trees or used for pasture. If used for pasture, grazing should be controlled to prevent erosion. Wooded areas should be managed according to information in the section about woodland. Capability unit VIIe-3; woodland suitability group 5.

Northfield sandy loam, 20 to 30 percent slopes, moderately eroded (NoE2).—This soil has lost all but about 4 inches of its original surface layer through erosion. As a result, the present surface layer is lighter colored, is lower in organic matter, and is less friable than that of the profile described in the series for Northfield sandy loam. Also, the entire profile is less deep to bedrock.

Because of the steep slope, nearness of bedrock to the surface, and severe hazard of erosion, this soil is not suited to crops. It is best to use the soil for pasture or woodland. Keeping a good cover of vegetation on pastured areas helps to prevent gullies from forming. Wooded areas should be managed according to information in the section about woodland. Capability unit VIIe-3; woodland suitability group 5.

Northfield sandy loam, 30 to 45 percent slopes (NoF).—The individual layers of this soil are thinner than those in the profile described in the series for Northfield sandy loam, and the entire soil profile is not so deep to bedrock. Runoff is very rapid. In areas where soil material is absent, there are outcrops of sandstone bedrock.

Included with this soil in mapping are a few small areas of a Gale silt loam. In these areas, the soil is silty and the moisture-holding capacity is slightly higher than in Northfield sandy loam, 30 to 45 percent slopes.

The very steep slope, nearness of bedrock to the surface, and severe hazard of erosion make Northfield sandy loam, 30 to 45 percent slopes, suitable only for woodland. Sparse stands of scrub oak are on wooded areas now on this soil, and they give only fair yields of wood products. Norway pine, white pine, and similar kinds of trees are better adapted to this soil than oaks. Information about management of wooded areas is given in the section about woodland. Capability unit VIIe-3; woodland suitability group 5.

Orion Series

The Orion series consists of light-colored, silty alluvial soils that are somewhat poorly drained. These soils formed in silty materials. The materials were washed from the silt-covered uplands and deposited over the

darker original soil of the bottom lands by stream overflow.

Representative profile of Orion silt loam in a pasture:

- 0 to 2 inches, brown, friable silt loam.
- 2 to 20 inches, dark-gray, friable silt loam; many mottles of strong brown.
- 20 to 42 inches, black, friable silt loam; many mottles of strong brown.
- 42 inches +, black, massive, firm silt loam.

In some places the lighter colored material in the upper part of the profile is more than 42 inches thick. Also, there are thin layers of fine sand in places in the upper part of the profile. Yellow and gray mottles normally are at a depth of less than 18 inches.

The Orion soils have a lighter colored surface layer than the Lawson soils. They formed from parent material similar to that of the Orion series, wet variant, but they have a somewhat lighter colored surface layer, are better drained, and occupy slightly higher positions. In some mined areas, chert and mine tailings are on the surface of these soils.

These soils have high moisture-supplying capacity. They are moderate in fertility and are neutral throughout. Water moves through this soil at a moderate rate, and the water table is generally at a depth of less than 5 feet. Frequent flooding and ponding after a flood or a prolonged rain make cultivation difficult. Surface drainage is needed in some areas for high yields of crops.

If these soils are protected from flooding and if adequate drainage is provided, yields of crops are good. Areas that it is not feasible to drain are better suited to pasture, to woodland, or to wildlife habitats than to cultivated crops.

Orion silt loam (On).—This is the only Orion soil mapped in the county. Its profile is similar to that described for the series. Slopes are from 0 to 2 percent. Capability unit IIw-13; woodland suitability group 9.

Orion Series, Wet Variant

The variants from the normal Orion soils are moderately dark colored, silty alluvial soils that are poorly drained. These soils formed in silty materials that were washed from silt-covered uplands and deposited over the darker original soil of the bottom lands by stream overflow.

Representative profile of Orion silt loam, wet variant, in a pasture:

- 0 to 9 inches, very dark gray, friable silt loam; many mottles of light gray and yellowish brown.
- 9 to 17 inches, gray, friable silt loam; mottles of light gray and dark yellowish brown.
- 17 to 27 inches, dark-gray, firm silty clay loam; mottles of dark yellowish brown and gray.
- 27 to 36 inches, black, firm silty clay loam; many mottles of dark yellowish brown.
- 36 inches +, grayish-brown, firm heavy silty clay loam; many mottles of yellowish brown.

The surface layer ranges from dark gray to very dark gray, and in a few places contains light-colored lenses of sand. In some places the upper layer of lighter colored material is more than 42 inches thick.

These variants have a surface layer that is lighter colored and lower in organic matter than that of the Sable soils on benches. They are more poorly drained than the normal Orion soils and have a grayer, more mottled surface layer.

These soils are high in moisture-supplying capacity and fertility. They are neutral throughout the profile. Water moves slowly through the soil profile because the soil is moderately permeable and has a high water table. The water table normally is at or near the surface most of the year. The hazard of flooding is severe.

Generally, it is not feasible to protect these soils from flooding or to provide the drainage needed for tilled crops. Consequently, these soils are not suited to cultivation. Most areas are best suited for pasture or for development of wildlife.

Orion silt loam, wet variant (Ow).—This is the only variant from the Orion series mapped in this county. Its profile is the same as that described for the Orion series, wet variant. Slopes are 0 to 2 percent. Capability unit Vw-14; woodland suitability group 9.

Palsgrove Series

In the Palsgrove series are light-colored, silty, well-drained soils in the uplands on ridges above stream valleys. These soils formed in a moderately thick blanket of wind-laid silt, or loess, that overlies reddish clay weathered from limestone. The natural vegetation was a forest of various kinds of hardwoods.

Representative profile of a Palsgrove silt loam:

- 0 to 5 inches, very dark gray, friable silt loam.
- 5 to 10 inches, brown, friable silt loam.
- 10 to 16 inches, dark yellowish-brown, firm silt loam.
- 16 to 41 inches, dark yellowish-brown, firm silty clay loam.
- 41 to 58 inches, dark reddish-brown to reddish-brown, very firm clay.
- 58 inches +, limestone bedrock.

The mantle of silt ranges from 30 to 50 inches in thickness. Depth to limestone bedrock ranges from 42 to 92 inches. The thickness of the clayey residuum derived from limestone varies considerably within a short distance. In most places it is between 8 and 42 inches in thickness, but in a few places it is less than 8 inches thick. In eroded areas the plow layer ranges from dark grayish brown to yellowish brown.

Palsgrove soils are moderate in permeability and are moderate to high in moisture-supplying capacity. They are moderately high in fertility. Unless limed, these soils are slightly acid to medium acid.

If the slope is not too steep, these soils are fairly easy to manage and cultivate, and they are suited to all crops commonly grown in the county. Crops on these soils respond well if manure and fertilizer are applied.

Palsgrove silt loam, 2 to 6 percent slopes (PaB).—The profile of this soil is similar to that described for the series. Nearly all of this soil is in crops. If the soil is well managed, yields are good.

This soil is subject to erosion if it is cultivated. Contour stripcropping, terracing, and other practices that control erosion are needed. Crops on this soil respond well if fertilizer and lime are added. Capability unit IIe-1; woodland suitability group 1.

Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded (PaB2).—This soil has lost all but about 4 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the surface layer of the soil described for the series.

If this soil is protected from further erosion, it is suited to row crops, small grains, and hay. A cropping system that supplies organic matter and maintains good tilth is also needed. Capability unit IIe-1; woodland suitability group 1.

Palsgrove silt loam, 6 to 12 percent slopes (PaC).—The surface layer of this soil is slightly thinner than that of the soil described for the series.

If cultivated, this soil is subject to moderate erosion. Therefore, practices that provide protection from runoff and thus reduce erosion are needed. Growing crops in alternate strips and on the contour slows runoff. Properly installed terraces divert runoff from fields. Capability unit IIIe-1; woodland suitability group 1.

Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded (PaC2).—The surface layer of this soil is thinner than that of the soil described for the series and the depth to clayey material is less. This soil has lost all but 3 to 6 inches of its original surface layer through water erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. The present surface layer is lighter colored, is lower in organic matter and fertility, and crusts more readily than the original one. Depth to clayey material ranges from 30 to 40 inches.

If this soil is cultivated, management that prevents further erosion is needed. The soil is not suited to intensive tillage. Nevertheless, if adequate amounts of lime and fertilizer are applied, yields of row crops, small grains, and hay are good. Capability unit IIIe-1; woodland suitability group 1.

Palsgrove silt loam, 6 to 12 percent slopes, severely eroded (PaC3).—All, or nearly all, of the original surface layer of this soil has been removed through erosion. The present surface layer consists mainly of material from the subsoil. It is therefore lower in organic matter and fertility and crusts more readily than the surface layer of the soil described for the series. Also, depth to clayey material is less.

Because of strong slopes and severe erosion, this soil is poorly suited to intensive tillage. Management that increases fertility and the content of organic matter and that improves the tilth of the surface soil is needed. Lime is needed, and fertilizer should be applied to supply the content of nitrogen needed for good crop growth. Capability unit IVe-1; woodland suitability group 1.

Palsgrove silt loam, 12 to 20 percent slopes (PaD).—Because of the steep slope, the mantle of silt on this soil is thinner, the subsoil is thinner, and depth to the clayey substratum is slightly less than in the profile described for the series. Typically, the reddish clayey residuum is at a depth between 30 and 40 inches. Runoff is rapid, and erosion is active in cultivated areas.

This soil is too steep for intensive use for crops. Many areas remain in pasture and in woodland. Row crops can be grown if this soil is protected from erosion and if other good management is used. Capability unit IVe-1; woodland suitability group 1.

Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded (PaD2).—The mantle of silt on this soil is slightly thinner, the subsoil is slightly thinner, and the depth to the clayey substratum is slightly less than in the profile described for the series. Generally, the reddish clayey residuum is 30 to 35 inches from the surface.

This soil has lost all but about 4 to 6 inches of its original surface soil through water erosion, and material from the upper part of the subsoil has been mixed with the remaining surface soil by plowing. As a result, the present surface layer is lower in organic matter and fertility than the original one. Some small areas are severely eroded. In these areas all of the original surface layer is gone and the present surface soil is browner and crusts more readily than the one erosion removed.

This soil is not suited to intensive cultivation. Nevertheless, yields of row crops, small grains, and hay are moderately high if the soil is protected from erosion and is well managed otherwise. The cropping system should consist mainly of hay crops. Capability unit IVe-1; woodland suitability group 1.

Palsgrove silt loam, 12 to 20 percent slopes, severely eroded (PaD3).—The mantle of silt on this soil is slightly thinner, the subsoil is slightly thinner, and depth to the clayey residuum is slightly less than in the profile described for the series. Generally, the reddish clayey residuum lies at a depth between 30 and 35 inches. The present surface layer consists mainly of material from the subsoil. It is therefore lower in organic matter and fertility and crusts more readily than that of moderately and slightly eroded Ashdale soils. It is browner and less friable than that of the profile described.

The steep slope and severe erosion make this soil unsuited to row crops. The cropping system should consist mainly of hay crops. Capability unit VIe-1; woodland suitability group 1.

Rozetta Series

The Rozetta series is made up of light-colored, deep, silty, moderately well drained soils on benches and terraces along the larger streams. These soils formed in thick deposits of silt that were laid down by wind and water. The original vegetation was a hardwood forest made up of various kinds of trees.

Representative profile of a Rozetta silt loam, benches, in a cultivated field:

- 0 to 7 inches, dark-gray, friable silt loam.
- 7 to 11 inches, grayish-brown, friable silt loam.
- 11 to 23 inches, brown, friable heavy silt loam that grades to light silty clay loam with increasing depth.
- 23 to 35 inches, brown, firm light silty clay loam; mottles of strong brown and olive brown.
- 35 to 41 inches, brown, friable silt loam; mottles of brown and olive brown.
- 41 to 72 inches, brown, friable, massive silt loam; mottles of strong brown and olive brown.
- 72 inches +, brown, friable layers of silt and fine sand; mottles of strong brown and olive brown.

These soils have more mottles of gray and yellow in their subsoil than the well-drained Fayette soils and fewer mottles than the somewhat poorly drained Stronghurst soils.

The Rozetta soils are high in moisture-supplying capacity and moderately high in fertility. They are medium acid to slightly acid. Water moves at a moderate rate through these soils, and the water table is normally at a depth of more than 4 feet. Generally, flooding is not a problem, and runoff is adequate to remove any excess water. Slopes range from 0 to 6 percent.

Most areas of these soils are cultivated, and the soils are suited to all crops commonly grown in the county. Yields

are moderately high to high if these soils are well managed.

Rozetta silt loam, benches, 0 to 2 percent slopes (RzA).—The profile of this soil is like that described for the series. Because it is nearly level, this soil receives large amounts of water and in places is somewhat slow to dry in spring.

Most of this soil is in crops. Yields are high if the soil is well managed. Capability unit I-1; woodland suitability group 1.

Rozetta silt loam, benches, 2 to 6 percent slopes (RzB).—This soil is on broad, gently sloping parts of stream terraces. Its profile is similar to that described for the series. Slopes generally are long and gentle, and water runs off the areas at a moderate rate. This soil retains nearly all of its original surface layer and readily absorbs water from runoff. Nevertheless, contour stripcropping, terracing, and other good management are needed for control of erosion.

This soil is well suited to row crops, small grains, and hay, and most areas are in crops. A few areas are inaccessible to tillage and remain as woodland. Capability unit IIe-1; woodland suitability group 1.

Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded (RzB2).—The surface layer of this soil is lighter colored and slightly thinner than that in the profile described for the series. All but about 4 inches of the original surface layer has been removed through erosion, and the present surface layer is therefore lower in organic matter and fertility than the original one. Yields of crops are somewhat limited by lack of organic matter and nitrogen.

If practices are applied to prevent further erosion, and if a suitable cropping system is used and a good supply of plant nutrients is maintained, this soil can be used intensively. Crops on this soil respond well if manure is added and a complete fertilizer is applied. Apply lime if needed. Capability unit IIe-1; woodland suitability group 1.

Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded (RzC2).—The surface layer of this soil is thinner and lighter colored than that in the profile described for the series. All but 3 to 6 inches of the original surface layer has been removed through water erosion, and material from the upper part of the subsoil has been mixed with the remaining surface soil by plowing. As a result, the present surface layer is lower in organic matter and fertility than the original one. When the soil is plowed, brown material from the subsoil is turned up in about half of the area. A few areas are only slightly eroded.

If this soil is used for crops, the supply of nutrients needs to be maintained. Also, careful management is required to prevent further erosion. Turning under green-manure crops and adding barnyard manure help to increase the content of organic matter and improve tilth. Crops on this soil respond well if a complete fertilizer is applied. Capability unit IIIe-1; woodland suitability group 1.

Sable Series

The Sable series consists of dark-colored, deep, silty soils that are poorly drained. These soils are in the uplands and on benches. They formed in deposits of silty material laid down by wind and water. The native vegetation was reeds, sedges, marsh grasses, willows, and other plants that tolerate wetness.

In this county only two Sable soils are mapped. Sable silt loam is in nearly level depressions in the higher up-

lands. It is underlain by shale bedrock. The areas are mainly southeast of Shullsburg, but a few areas are near the Platte Mounds. Sable silt loam, benches, is on low benches in the larger stream valleys throughout the county. It is underlain by sandy and silty alluvium.

Representative profile of Sable silt loam in a cultivated field:

- 0 to 16 inches, black, friable silt loam.
- 16 to 23 inches, dark-gray, slightly hard and firm silty clay loam.
- 23 to 35 inches, dark-gray, hard and firm silty clay loam that grades to grayish-brown silty clay loam in the lower part; mottles of yellowish brown and dark brown.
- 35 to 48 inches, grayish-brown, hard and firm light silty clay loam; mottles of yellowish brown and dark brown.
- 48 inches +, olive-yellow and gray, hard and firm silty clay.

The mantle of silt is 4 to 6 feet thick in most places. In the uplands shale bedrock underlies the soils in most places, but in a few areas the underlying bedrock is limestone.

The Sable soils formed in a thicker mantle of silt than the Calamine soils. They are more poorly drained than the Muscatine soils, and they therefore have a darker, thicker surface layer and a grayer subsoil.

The Sable soils are high in moisture-supplying capacity and moderately high in fertility. They are slightly acid to neutral. The surface layer is very high in organic matter. Movement of water through these soils is moderately slow to slow. The water table is at or near the surface, unless these soils are artificially drained. Flooding occurs periodically, and especially after a heavy rain. In small depressed areas water remains long enough to interfere with tillage. Tile drains or open ditches can be used to provide drainage if suitable outlets are available.

If adequate drainage is provided, the Sable soils are suited to the crops commonly grown in the county.

Sable silt loam (Sa).—This soil is in the uplands and is underlain by shale bedrock. Its profile is similar to the profile described for the series. Capability unit IIw-1; woodland suitability group 7b.

Sable silt loam, benches (Sb).—This soil is on benches in stream valleys and is underlain by sandy and silty alluvium. Its profile is similar to that described for Sable silt loam. Capability unit IIw-1; woodland suitability group 7b.

Schapville Series

The Schapville series consists of dark-colored, gently sloping, silty soils that are well drained to moderately well drained. These soils are moderately deep to shale bedrock. They are mostly on the higher uplands south of Shullsburg, but a few areas are near the Platte Mounds (fig. 17). These soils formed under prairie grasses in silt laid down by wind over shale bedrock.

Representative profile of Schapville silt loam in a cultivated field:

- 0 to 8 inches, black, friable silt loam.
- 8 to 11 inches, very dark brown, friable heavy silt loam.
- 11 to 20 inches, dark-brown, firm silty clay loam.
- 20 to 30 inches, light olive-brown, hard and firm silty clay; mottles of olive yellow.
- 30 inches +, light yellowish-brown, partly shattered shale bedrock.



Figure 17.—Schapville soils on slopes that lead up to the mound, and Calamine soils in seepage areas at the base of the mound.

The thickness of the mantle of silt ranges from 15 to 30 inches. The surface layer ranges from very dark gray to black in color. It ranges from 3 to 12 inches in thickness, depending on the steepness of the slope and on the amount of erosion. The surface layer and subsoil combined range from 18 to 36 inches in thickness. Thickness of the clayey underlying material weathered from the shale bedrock ranges from 4 to 20 inches. Depth to the shale bedrock ranges from 18 to 48 inches. In some moderately to severely eroded areas, the surface soil is heavy silt loam to silty clay loam. The severely eroded Schapville soils have lost most of their original surface layer and the mapping unit is called Schapville soils.

The soils of the Schapville series have a darker colored, thicker surface layer than that of the Derinda soils. They are better drained than soils of the Schapville series, wet subsoil variant, and have less yellow and gray mottling in the subsoil.

The Schapville soils have moderately low to high moisture-supplying capacity. They are medium in fertility. Unless limed, these soils are slightly acid to medium acid. Water moves slowly through the soils because of the moderately slow to slow permeability of the underlying clay and shale bedrock. In some areas less than 2 acres in size, seepage interferes with tillage.

The less sloping Schapville soils are suited to all crops commonly grown in the county and are in cultivated crops. The steeper soils are better suited to permanent pasture or to forage crops than to cultivated crops.

Schapville silt loam, 6 to 12 percent slopes, moderately eroded (ScC2).—This soil has lost all but 3 to 5 inches of its original surface layer through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present plow layer tends to crust. The crusting causes increased runoff and makes tillage difficult. The silt mantle is less than 26 inches thick, and depth to bedrock is less than 36 inches. In a few small areas the slope is 2 to 6 percent.

Because of nearness of bedrock to the surface and susceptibility to further erosion; this soil has severe limita-

tions for crops. Nevertheless, if practices are applied for the control of erosion, row crops can be grown. Capability unit IIIe-6; woodland suitability group 12.

Schapville soils, 6 to 12 percent slopes, severely eroded (ShC3).—These soils have lost most of their original surface layer through erosion. The present surface layer consists mainly of material from the subsoil. It is lighter colored, is lower in organic matter and fertility, and crusts more readily than the corresponding layer in the soil described for the series. The subsoil is about 10 inches thick, and bedrock is less than 24 inches from the surface.

Because of severe erosion and nearness of bedrock to the surface, these soils have very severe limitations for crops. Row crops can be grown occasionally, however, if such practices as contour stripcropping and diversions are used. Wheel-track planting and minimum tillage are also needed. Adding large amounts of barnyard manure and plowing under green-manure crops also help control erosion. Furthermore, these practices increase the content of organic matter and improve tilth. Areas that are not in row crops are best used for pasture or for forage crops. Capability unit IVe-6; woodland suitability group 12.

Schapville Series, Wet Subsoil Variant

The variants from the normal Schapville soils are dark-colored, silty, somewhat poorly drained soils that are dominantly moderately deep to shale bedrock. These soils are gently sloping and are on the higher uplands. Most of the areas are south of Shullsburg, but a few areas are near the Platte Mounds. These soils formed under prairie grasses in silt deposited by wind over shale bedrock.

Representative profile of a Schapville silt loam, wet subsoil variant, in a pasture:

- 0 to 16 inches, black, friable silt loam; a few mottles of yellowish brown in the lower part of the horizon.
- 16 to 22 inches, very dark gray, friable silty clay loam; many mottles of yellowish brown.
- 22 to 32 inches, very dark grayish-brown, slightly hard and firm silty clay loam; many mottles of yellowish brown and olive brown.
- 32 to 40 inches, grayish-brown, hard and firm silty clay; many mottles of yellowish brown and olive brown.
- 40 inches +, light yellowish-brown, platy shale bedrock.

The thickness of the mantle of loess ranges from 15 to 30 inches. The surface layer ranges from 3 to 16 inches in thickness, depending on the amount of erosion. In moderately eroded areas, the surface layer is heavy silt loam or silty clay loam. In some places even the surface layer is mottled.

These variants are near soils of the Derinda series, wet subsoil variant, but they have a thicker, darker colored surface layer. They are more poorly drained than the closely associated normal Schapville soils and have more yellow and gray mottling in the upper part of the subsoil.

The soils are moderate in moisture-supplying capacity and medium in fertility. Unless limed, they are slightly acid to medium acid. Water moves slowly through the soil profile because of the moderately slow to slow permeability of the underlying clay and shale bedrock. In some areas less than 2 acres in size, seepage interferes with tillage. Generally, these variants are suited to cultivated crops and to pasture.

Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes (SmB).—This is the only variant from the Schapville series mapped in this county. Its profile is similar to that described for the Schapville series, wet subsoil variant. The slope is gentle, and runoff is moderately slow.

Included with this soil in mapping is a poorly drained Calamine soil less than 2 acres in size. This soil is slow to dry in spring or following a heavy or a prolonged rain, and as a result, it is difficult to till. Also included, are a few small areas of a Schapville wet subsoil variant that has slopes from 0 to 2 percent.

Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes, is subject to erosion. Also, excess water is a problem. Diversions are needed in places above areas of this soil to remove surplus runoff and to reduce erosion. Tile drains can be used for draining seepage areas if the depth to shale bedrock is sufficient.

If protected from erosion and adequately drained, this soil is suited to corn, small grains, grasses, and legumes. Some areas are too wet and too small to be used for cultivated crops and are better suited as pasture, woodland, or wildlife areas than as areas for cultivated crops. Capability unit IIw-3; woodland suitability group 12.

Sogn Series

The Sogn series is made up of dark-colored, well-drained, shallow silt loams in the uplands. These soils are generally on steep side slopes or narrow ridgetops. The Sogn soils formed in a thin layer of silty material that overlies shattered limestone bedrock (fig. 18).

Representative profile of a Sogn silt loam in an undisturbed site:

- 0 to 9 inches, black, friable silt loam.
- 9 inches +, light yellowish-brown, partly weathered limestone bedrock.

In some places in cracks of the bedrock, there is dark reddish-brown clay weathered from limestone, and a thin layer of this clay is between the surface layer and bedrock in places. In many places rocks are on the surface and throughout the profile. The underlying limestone contains thin layers of sandy limestone. In eroded areas chert fragments are in and on the surface layer.

The Sogn soils are near areas of the Dubuque, Dunbarton, Dodgeville, and Edmund soils. They have a darker colored surface layer than the Dubuque soils. Also, unlike the Dubuque and Dodgeville soils, they lack a subsoil.

These soils have very low moisture-supplying capacity and are droughty. They are moderate in fertility and are neutral to moderately alkaline.

The Sogn soils are not well suited to cultivated crops. They are best used for pasture. Their suitability for trees is limited. Yields of timber are small and the timber is of low grade. Because bedrock is near the surface, practices are needed that protect these soils from erosion.

Sogn silt loam, 2 to 12 percent slopes, eroded (SoC2).—The profile of this soil is similar to that described for the series.

This soil is shallow over bedrock and is droughty. It is therefore best suited to hay or pasture. Areas in hay require renovation once in every 5 years. Grazing must be carefully controlled so that a good cover of sod is maintained.



Figure 18.—Typical profile of a Sogn silt loam, showing soil material that is shallow over partly weathered sandstone bedrock.

Trees on this soil are unproductive or yield only small quantities of low-grade timber. The principal hazards for trees are drought and exposure. Planting of trees must be done by hand in many areas because of the nearness of bedrock to the surface. Capability unit VI_s-5; woodland suitability group 6.

Sogn silt loam, 12 to 20 percent slopes (SoD).—This is the most extensive of the Sogn soils mapped in the county. Its profile is similar to the one described for the series.

This soil is not suited to row crops. Because of the steep slope and nearness of bedrock to the surface, this soil should be kept under a protective cover of grass or trees. If used for forage, the areas should be renovated once in every 5 years, or in areas that are too steep or too stony for renovation, topdressing can be substituted. Grazing should be controlled in pastured areas. Capability unit VI_s-5; woodland suitability group 6.

Sogn silt loam, 12 to 20 percent slopes, moderately eroded (SoD2).—All but 3 to 5 inches of the original surface layer of this soil has been removed through water erosion. The present surface layer is lighter colored and less friable than that of the soil described for the series. Chert fragments and limestone slabs are common on and in the surface layer. Runoff is very rapid. In some places the depth to bedrock is less than 4 inches. In other places all of the surface layer is gone and bedrock is exposed.

Because of the slope, nearness of bedrock to the surface, and moderate erosion, this soil is not suited to row crops. It should be kept in grass or trees. If used for pasture, grazing should be controlled. Areas planted to trees ought to be managed according to information in the section on woodland. Capability unit VI_s-5; woodland suitability group 6.

Sogn silt loam, 20 to 30 percent slopes (SoE).—This soil has a slightly thinner and lighter colored surface layer than that in the profile described for the series. It is too steep and too droughty for row crops and is poorly suited to pasture or to forage crops. The steepest parts of this soil are poorly suited to trees, and in those areas most planting of trees must be done by hand. Areas used for trees should be managed according to information in the section on woodland. Capability unit VII_s-5; woodland suitability group 6.

Sogn silt loam, 30 to 45 percent slopes (SoF).—This soil has a slightly thinner and lighter colored surface layer than that in the profile described for the series. It is very steep and is very shallow to bedrock. The hazard of erosion is very severe. Consequently, this soil is not suited to row crops, has little value for pasture or for forage crops, and is poorly suited to the production of timber. Planting of trees must be done by hand. Capability unit VII_s-5; woodland suitability group 6.

Stony and Rocky Land

Stony and rocky land consists of shallow to moderately deep, moderately steep and steep soils in which there are many outcrops of limestone or sandstone. The soils on sandstone are of the Northfield and the Hixton series, and those on limestone are of the Dunbarton and the Sogn series. Additional information about these soils is given under the description of each series. Most areas of these land types have a thin cover of various kinds of hardwoods.

The texture of the soil materials between the rocks ranges from sandy loam to silt loam. The soil materials came from loess or from materials weathered from sandstone or limestone. Depth to bedrock is less than 24 inches in most places, but in small areas where the mantle of silt is thicker, bedrock is 24 to 42 inches from the surface. Slopes generally are more than 20 percent, but in several areas slopes range from 15 to 20 percent.

The soil materials in these land types have a shallow rooting zone. Fertility is moderately low, and the moisture-supplying capacity is low. Runoff is rapid. The areas are subject to erosion, unless they are protected by vegetation. In overgrazed areas, sheet erosion is moderate and shallow gullies have formed.

These miscellaneous land types are not suited to cultivation. On the moderately steep land type, the soil material is slightly deeper than on the steep one and stands of timber are good. On the steep land type, the trees are widely spaced and are stunted (fig. 19).

Stony and rocky land, moderately steep (SrE).—This land type has slopes of 20 to 30 percent. It lies below areas of less sloping soils that are deeper to bedrock. Most areas are in trees or in pasture.

Because of the slope, the nearness of bedrock to the surface, and the severe hazard of erosion, this land type generally is not suited to crops. If this land type is used



Figure 19.—Areas of Stony and rocky land, steep, adjacent to the valley of the Pecatonica River.

for pasture, grazing must be controlled or gullies are likely to form and cut into soils above that are suited to crops. Wooded areas vary in productivity. The less sloping areas, where the soil depth is favorable, are moderately productive, but the steeper areas have less favorable soil depth and are only fairly productive. Areas in trees should be managed according to information in the section about woodland. Capability unit VIIs-5; woodland suitability group 13.

Stony and rocky land, steep (SrF).—This land type has slopes of 30 to 45 percent. It is near less sloping soils that are deeper to bedrock. Most areas are long and narrow and are above areas of Lindstrom soils and of the Fayette soils in valleys.

This land type is poorly suited to pasture because of the steep slope and poor yields of forage crops. If grazing is not controlled in pastured areas, gullies are likely to form and cut into soils above that are suited to crops.

Many areas of this land type are suited to trees. The principal hazards are from drought and exposure. The soil depth is less favorable for trees in the steepest areas than in less steep areas. Consequently, trees on the steep-

est areas are unproductive or yield only small quantities of low-grade timber. Generally, planting of trees must be done by hand. Areas in trees should be managed according to information in the section about woodland. Capability unit VIIs-5; woodland suitability group 13.

Stronghurst Series

In the Stronghurst series are light-colored, deep, silty soils that are nearly level to gently sloping and are somewhat poorly drained. These soils formed in silt that was blown into the county from the flood plains of the Mississippi River.

The phases of Stronghurst silt loam are in two topographic positions—uplands and benches. Stronghurst silt loams are on ridges in the uplands. In most places they are underlain by shale, but in some places they are underlain by limestone. Stronghurst silt loams on benches are in low areas in stream valleys and are underlain by loose, acid, sandy outwash.

Representative profile of a Stronghurst silt loam in a pasture:

- 0 to 4 inches, very dark gray, friable silt loam.
- 4 to 9 inches, grayish-brown, friable silt loam; a few mottles of yellowish brown.
- 9 to 14 inches, brown, friable heavy silt loam; many mottles of yellowish brown.
- 14 to 23 inches, brown, slightly hard and firm silty clay loam; many mottles of yellowish brown.
- 23 to 30 inches, pale-brown, slightly hard and firm silty clay loam; many mottles of strong brown and dark brown.
- 30 to 38 inches, light brownish-gray, slightly hard and firm silty clay loam; many mottles of strong brown and dark brown.
- 38 to 62 inches, light brownish-gray, slightly hard and firm heavy silt loam; many mottles of yellowish brown.

The mantle of wind-laid silt is 4 to 8 feet thick in most places, but on some nearly level ridgetops it is 20 feet or more thick. Shale bedrock underlies these soils in most places, but in a few places the bedrock is limestone. Slopes range from 0 to 6 percent.

These soils are closely associated with the Fayette soils, but their subsoil is generally grayer and has more mottling in the upper part. Their surface layer is thinner and lighter colored than that of the Muscatine soils.

Stronghurst soils are high in moisture-supplying capacity and fertility. They are slightly acid to moderately acid. Generally, lime is required for good yields of legumes. Movement of water through these soils is moderately slow, and a fluctuating water table is common at a depth between 4 and 6 feet. Runoff is slow in places in the more level areas or in depressions. In many places tile and shallow surface drains can be used to improve drainage and thus permit use of the soils earlier in spring.

If adequate drainage is provided, yields of crops commonly grown in the county are good. Areas too wet for cultivation can be used for pasture or for wildlife.

Stronghurst silt loam, 0 to 2 percent slopes (SsA).—This is the most extensive Stronghurst soil in the county. Its profile is the one described for the series. Water remains in small depressions within areas of this soil following a heavy rain or a prolonged rain and interferes with tillage.

Drainage needs to be improved. Alfalfa, in particular, is hard to establish and maintain, unless adequate drainage is provided. Slow internal drainage also delays tillage in spring. If this soil is adequately drained and is otherwise well managed, yields of corn, oats, and hay are high. Corn and small grains on this soil respond well if fertilizer is added. In most places lime is needed for high yields of legumes. Capability unit IIw-2; woodland suitability group 7a.

Stronghurst silt loam, 2 to 6 percent slopes (SsB).—The surface layer of this soil is slightly thinner than that of the profile described for the series. Also, drainage is somewhat better.

Artificial drainage may not be needed on the more sloping areas of this soil, but seepage areas are likely to be too wet in places for good growth of crops. The hazard of erosion is moderate in the more sloping areas. Diversions, contour stripcropping, and other practices that protect the soils from erosion are needed. If this soil is adequately drained and is protected from erosion, it is well suited to row crops. Capability unit IIw-2; woodland suitability group 7a.

Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded (SsB2).—The surface layer of this soil is thinner

and slightly lighter colored than that in the profile described for the series. All but 4 to 7 inches of the original surface layer has been lost through erosion, and plowing has mixed material from the subsoil with the remaining surface soil. Drainage is better than in Stronghurst silt loam, 0 to 2 percent slopes, and a less intensive drainage program is needed.

If protected from further erosion, Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded, is well suited to row crops, small grains, and hay crops. Adding barnyard manure and applying fertilizer improve tilth and replace plant nutrients lost through erosion. Capability unit IIw-2; woodland suitability group 7a.

Stronghurst silt loam, benches, 0 to 2 percent slopes (StA).—The profile of this soil is similar to that described for the series. Water remains in small depressions following a heavy or a prolonged rain and interferes with tillage. In some places there is a slight risk of erosion.

Drainage needs to be improved. Alfalfa, in particular, is hard to establish, unless adequate drainage is provided. Slow internal drainage also delays tillage in spring. If this soil is drained and otherwise well managed, yields of corn, oats, and hay are high. Corn and small grains on this soil respond well if nitrogen fertilizer is added, especially if the fertilizer is applied early in spring. In most places lime is needed for high yields of legumes. Capability unit IIw-2; woodland suitability group 7a.

Stronghurst silt loam, benches, 2 to 6 percent slopes (StB).—The surface layer of this soil is slightly thinner than that in the profile described for the series. Also, drainage is somewhat better. Runoff is better than on Stronghurst silt loam, benches, 0 to 2 percent slopes.

In the more sloping areas, drainage may not need to be improved, but seepage areas are likely to require drainage. Also, the hazard of erosion is moderate in the more sloping areas.

If protected from erosion, and if adequate drainage is provided, this soil is suited to corn, small grains, and hay. Capability unit IIw-2; woodland suitability group 7a.

Tama Series

The Tama series consists of dark-colored, deep, silty, nearly level to sloping soils. These soils are well drained. They are on upland ridges and on benches in stream valleys. Tama soils formed in silt that was blown into the county from flood plains of the Mississippi River.

The phases of Tama silt loam are in two topographic positions—uplands and benches. The Tama silt loams on upland ridges are underlain mainly by limestone bedrock, but in a few places they are underlain by shale. Tama silt loams, benches, on high benches in stream valleys, are underlain by loose, acid, sandy outwash.

Representative profile of a Tama silt loam in a cultivated field:

- 0 to 10 inches, black, friable silt loam.
- 10 to 16 inches, very dark brown, friable silt loam.
- 16 to 21 inches, dark-brown, friable silt loam.
- 21 to 35 inches, dark yellowish-brown, firm silty clay loam.
- 35 to 40 inches, dark yellowish-brown, friable silt loam.
- 40 inches +, yellowish-brown, friable silt loam.

In most places the mantle of wind-laid silt is 4 to 8 feet thick, but on some of the broad, nearly level ridgetops it is 20 feet or more thick. These soils are underlain

by limestone in most places, but in a few areas the bed-rock is Maquoketa shale.

Tama soils have a darker, thicker surface layer than the Fayette or Downs soils. They have a thicker mantle of silt than the Dodgeville soils and lack the clayey sub-soil that is typical of those soils.

These soils are high in moisture-supplying capacity and fertility. They are also high in organic matter and nitrogen. They are slightly acid to strongly acid. Lime is generally required for good yields of legumes.

These soils are well suited to all of the crops commonly grown in the county, and most areas are cultivated. If well managed, they are among the most productive soils in the county.

Tama silt loam, 0 to 2 percent slopes (TaA).—The profile of this soil is like the profile described for the series. Capability unit I-1; woodland suitability group 12.

Tama silt loam, 2 to 6 percent slopes (TaB).—The profile of this soil is similar to that described for the series. Nearly all of this soil is cropped, and if good management is used, yields are high.

If cultivated, this soil is subject to erosion. Practices are needed that protect the soil from erosion and that maintain the supply of plant nutrients and content of organic matter. Crops on this soil respond well if fertilizer and lime are added. Capability unit IIe-1; woodland suitability group 12.

Tama silt loam, 2 to 6 percent slopes, moderately eroded (TaB2).—The surface layer of this soil is slightly thinner than that of the profile described for the series. All but about 4 inches of the original surface layer has been removed through water erosion, and plowing has mixed material from the subsoil with the remaining surface soil. The present surface layer is therefore lower in organic matter and fertility than the original surface soil.

If this soil is protected from further erosion, it is suited to row crops, small grains, and hay. A cropping system is needed that supplies organic matter and maintains good tilth. Capability unit IIe-1; woodland suitability group 12.

Tama silt loam, 6 to 12 percent slopes, moderately eroded (TaC2).—The surface layer of this soil is slightly thinner than that of the profile described for the series. This soil has lost all but 3 to 6 inches of its original surface layer through water erosion, and plowing has mixed material from the upper part of the subsoil with the remaining surface soil. The present surface layer is therefore lighter colored, is lower in organic matter and fertility, and cruds more readily than the original one. A few areas are slightly eroded, and in these areas the surface layer is similar to that in the profile described.

This soil is not suited to intensive tillage. Practices that protect the soil from further erosion are needed. If adequate amounts of lime and fertilizer are applied, yields of row crops, small grains, and hay are moderate. Capability unit IIIe-1; woodland suitability group 12.

Tama silt loam, 6 to 12 percent slopes, severely eroded (TaC3).—Most of the original surface layer of this soil has been removed through erosion. The present surface layer consists mainly of material from the subsoil. It is therefore lower in organic matter and fertility and cruds more readily than that of the surface layer of the profile described for the series.

Because this soil is sloping and is severely eroded, it is poorly suited to intensive tillage. Management that increases the fertility and the content of organic matter and that improves the tilth of the surface soil is needed. Lime and fertilizer should be applied to build the fertility needed for good crop growth. Capability unit IVE-1; woodland suitability group 12.

Tama silt loam, benches, 0 to 2 percent slopes (TbA).—The profile of this soil is similar to that described for the series. This soil is nearly level. It therefore receives large amounts of water and in places is slow to dry out and to warm up in spring.

Most of this soil is in crops, and yields are high if good management is used. Capability unit I-1; woodland suitability group 12.

Tama silt loam, benches, 2 to 6 percent slopes (TbB).—This soil is on broad, gently sloping parts of stream terraces. The profile is similar to that described for the series. This soil retains nearly all of its original surface layer and absorbs water readily. Runoff is therefore not a serious problem. A few small areas are moderately eroded.

This soil is well suited to corn, small grains, and hay. Most of it is in crops, but a few acres that are inaccessible to tillage remain in pasture. If well managed, this soil can be used intensively, and yields are high. Capability unit IIe-1; woodland suitability group 12.

Worthen Series

The Worthen series consists of dark-colored, deep, silty soils that are well drained to moderately well drained. These soils are in narrow drainageways, are on bottom lands of intermittent streams, and are along the lower slopes of steep hills. The areas are small and are widely distributed throughout the county. These soils formed under prairie in local silty material more than 40 inches thick. The material was washed from dark-colored silty soils on adjoining uplands. Fresh deposits of silty material are continually deposited on these soils by overflow. As a result, these soils have no well-developed horizons other than the original layers laid down by floodwater.

Representative profile of a Worthen silt loam in a pasture:

- 0 to 16 inches, black, friable silt loam.
- 16 to 28 inches, very dark grayish-brown, friable silt loam.
- 28 to 40 inches, dark yellowish-brown, friable silt loam.

In most places there are thin layers of lighter colored silt or fine sand in the profile. In a few areas there are thin deposits of sandy material and the texture of the surface layer is sandy loam. In places mottles of yellow and gray are at a depth of more than 2 feet.

These soils occupy positions similar to those of the Chaseburg soils, but they are darker colored throughout the profile. The areas in drainageways and along stream bottoms are narrower than those occupied by the Huntsville soils. Also, their profile contains fewer layers of soil materials and the texture of the materials is less variable.

Worthen soils are high in moisture-supplying capacity and organic matter. They are nearly neutral, and they seldom need lime for legumes. These soils are naturally high in plant nutrients, especially nitrogen. Neverthe-

less, if these soils are cropped intensively, commercial fertilizer is needed in places. These soils are subject to flooding following a heavy rain when runoff is great. The water drains downward readily through the profile or is removed by runoff, and there is little or no damage to crops.

The larger areas of these soils are cultivated and are suited to all of the crops commonly grown in the county. The smaller areas left by meandering streams can be used for pasture or wildlife.

Worthen silt loam, 0 to 2 percent slopes (WoA).—The profile of this soil is similar to that described for the series. Capability unit I-1; woodland suitability group 12.

Worthen silt loam, 2 to 6 percent slopes (WoB)—This soil has a profile similar to that described for the series. In a few places the layer of recently deposited, dark-colored, silty material is less than 40 inches thick. In these places the profile contains a darker, buried soil that has a subsoil of silty clay loam.

Mapped with this soil are a few small areas of a Worthen silt loam that have slopes ranging from 6 to 12 percent. This included soil occupies narrower drainageways than Worthen silt loam, 2 to 6 percent slopes. If it is cultivated, runoff is rapid, and erosion may be a problem.

Runoff is greater on Worthen silt loam, 2 to 6 percent slopes, than on less sloping Worthen soils, and flooding is not so common. Capability unit IIe-5; woodland suitability group 12.

Formation, Morphology, and Classification of Soils

In this section the factors that affect the formation of soils, the morphology and composition of the soils, and their classification into higher categories are discussed. Following this discussion, each soil series in the county is described and a soil profile typical of that soil is given.

Factors of Soil Formation

Soil is formed by weathering and other processes that act on parent material. The characteristics of the soil at any given point depend upon (1) parent material, (2) climate, (3) living organisms, (4) relief, and (5) time, or age.

Climate and living organisms are the active forces of soil formation. They act on the parent material accumulated through the weathering of rocks and slowly change it into soil. All five factors come into play in the formation of every soil. The relative importance of each differs from place to place; sometimes one is more important and sometimes another. In extreme cases one factor may dominate in the formation of a soil and fix most of its properties. In general, however, it is the combined action of the five factors that determines the present character of each soil.

Parent material

Lafayette County is in the Driftless Area of Wisconsin, and it has therefore not been glaciated. The parent material from which the soils formed consists mainly

(1) of material derived from the weathering of rock in places and (2) of material transported by wind, water, or gravity and laid down as unconsolidated deposits of sand, silt, and clay. Also, the parent material of a few of the soils is organic matter. These differences in parent material are important in the kinds of soils that occur in the county. It is therefore helpful to know something of the geology of the county.

The parent material formed in place consists of material weathered mainly from limestone, sandstone, shale, and outwash. Because the underlying material was weathered from various formations of rock as well as from outwash, and because this material differs greatly in chemical and mineralogical composition, the soils formed in it also differ in characteristics. For example, some parent rocks are coarse textured, and the soils formed in material from them are coarse textured. Other parent rocks are fine textured. The soils formed in material from these rocks are fine textured.

The rocks from which the parent material of the soils was derived are of the Ordovician period. They consist mainly of Galena dolomite, but some of the soils formed in material derived from Niagara dolomite, Maquoketa shale, and St. Peter sandstone. Niagara dolomite and Maquoketa shale may once have been a continuous surface formation. As a result of erosion, however, the dolomite has been dissected deeply and in places has worn away. Now there are only remnants of this capping. They occur in the northern part of the county, near Belmont, and in the southern part, near Shullsburg. In places along stream channels all of the dolomite has been removed and St. Peter sandstone outcrops. The soils of the Hixton series, which are mostly in the eastern part of the county, formed in material weathered from this sandstone.

Of the material transported by wind, water, or gravity, loess has been the most important in the formation of the soils in this county. Loess, thought to be Peorian in age, covers most of the county. It is wholly or in part the parent material of most of the soils in the uplands. The loess ranges in thickness from a few inches to 6 or more feet. It generally is thickest on the level or nearly level central parts of the uplands, where it ranges in thickness from 30 to 100 inches. Soils of the Fayette, Lindstrom, Downs, and Tama series formed in this thick mantle of loess.

Peripheral to the areas of soils formed in deep loess, and in most places adjacent to the marginal breaks of areas of stony and rocky land are the soils of the Dubuque and Gale series. The soils of these two series formed in a moderately thick layer of loess. Dubuque soils, however, formed in loess that overlies dolomite, and the Gale in loess that overlies St. Peter sandstone. The lower part of the solum of these soils formed in residuum from the parent rock. Beyond the outer bounds of the Dubuque and Gale soils, the loess thins out on the steeper slopes and in areas along streams where accelerated erosion has been active. In these areas the Sogn soils, classified as Lithosols, predominate.

Although in this county loess has been the most important of the materials transported by wind, water, or gravity, many of the soils formed in alluvium and colluvium. The soils on terraces and on flood plains of the

present streams and rivers formed in material deposited originally as local alluvium washed from the uplands.

Where streams and rivers built a succession of terraces in the valleys, the higher terraces represent earlier deposits of alluvium, and the lower terraces, the later ones. The age of the various terraces has been obscured in many places, however, by the layer of Peorian loess that covers the older materials. Among the soils on these loess-covered alluvial terraces are Fayette, Muscatine, Rozetta, Stronghurst, and Tama soils, on benches. Fairly extensive areas of these terraces are along the Pecatonica River.

The recent terraces, at lower elevations, are still receiving deposits of fresh material when the streams overflow. These more recent terraces are along most of the large streams, particularly along the lower reaches of the Pecatonica River. Soils of the Dakota and Meridian series are on these recent, lower lying terraces.

The dominant areas of soils formed in alluvium are along the major streams. These soils are mainly those of the Arenzville, Boaz, Huntsville, Lawson, and Orion series. Others are of the Chaseburg series, which are in colluvial and alluvial areas in drainageways in the uplands.

Within areas where soils have formed in alluvium are small areas of low bottom lands where the parent material consists primarily of sedges and grasses in various stages of decomposition. In these areas are soils of the Houghton series.

Climate

Climate is important, both directly and indirectly, in the formation of soils. It affects the environment through the moisture (precipitation) and the heat energy (temperature) it contributes.

The most important effect climate has on the formation of soils is the weathering of rocks and the altering of parent materials. The indirect effects, however, are often of equal or of greater importance than the direct effects. For example, as an indirect effect, the content of clay tends to increase in the soils as precipitation increases and as the temperature rises.

Climate also influences the formation of soils through its effect on living organisms, for which it supplies energy and a suitable environment. This is of special significance because organisms affect the amount of organic matter that accumulates in soils and the fertility of the soils. In Lafayette County, the effect of climate through its effect on living organisms is shown in the Dodgeville, Tama, and other soils classified as Brunizem (Prairie) soils and in the Downs soils, which are intergrading toward the Brunizem great soil group.

Soils formed on extensive land areas, such as continents, are affected by general, or macroclimatic, conditions. In smaller areas, such as a county, however, variations in climate are more limited and the effect of climate on the soils is more restricted.

In Lafayette County the effects of climate are modified by variations in relief and by the aspect of the slope. On the steep slopes in many parts of the county, more of the rainfall is lost through runoff than in areas where the slopes are gentle. Consequently, in the steep areas less water penetrates the soils to furnish moisture for plant growth, to support microbiological activity, and to

hasten weathering of rocks and cause them to disintegrate. As a result, in the steep areas biological, physical, and chemical agents of weathering are suppressed, and the formation of soils is slowed.

The Sogn soils, classified as Lithosols, for example, formed on steep slopes or near the edges of ridges, where less rainfall is retained than on gentle slopes; they have a shallow profile in which the layers are indistinct. The effect of climate on the formation of soils, as a result of local conditions is also shown in soils classified as Regosols, Brunizems, and Gray-Brown Podzolic soils. In many places soils of these groups formed in close association with one another.

On slopes facing south or west, the soils are warmed and dried by sun and wind more than soils facing north or east. On slopes that face north or east, more moisture is retained and the temperature is somewhat cooler. Thus, there is a denser growth of trees on north- and east-facing slopes. On the warmer, less humid south- and west-facing slopes, there is more grass and the stands of trees are sparser.

Living organisms

The plant cover has had the main effect on the formation of soils in this county, but bacteria, fungi, earthworms, rodents, and man have also been important. Two of the chief functions of plant and animal life are to furnish organic matter for the soil and to bring plant nutrients from the lower part of the solum to the upper layers.

The native vegetation in the eastern part of the county consisted mainly of heavy stands of sugar maple, basswood, and oak. In the western part of the county, grassed areas and areas made up of oak forests and grasses were dominant. An example of the influence of the vegetation on the characteristics of the soils can be seen in the contrast between the dark-colored Brunizem (Prairie) soils, formed under grass, and the lighter colored Gray-Brown Podzolic soils, formed under trees. Even though the soils of both great soil groups may have had similar parent material, the presence of trees as the dominant vegetation in some places, and of grass in others, has caused Gray-Brown Podzolic or Brunizem soils to form.

The greater amount of organic matter in soils that formed under grass than in soils that formed under trees is ascribed partly to the fact that soils formed under trees are generally more acid than those formed under grass. This is because the relatively nonacid organic matter of grasslands is more stable than the more soluble, acid organic matter of forests.

In places where the vegetation was a mixture of trees and grasses, the characteristics of soils are intermediate between those of the Brunizems and those of the Gray-Brown Podzolic soils. The Downs soils are an example of Gray-Brown Podzolic soils that are intergrading toward Brunizems.

In areas of Lafayette County that have been cultivated for a long time, man has been responsible for extensive changes in the soils. These include (1) altering the pH and fertility of acid soils by liming, (2) perpetuating grass by burning areas that are normally wooded, (3) using improper cropping and tillage practices and thus causing loss of organic matter, and (4) causing accel-

erated erosion by removing the cover of plants on benches and uplands.

Man has also changed the soils in many areas by varying the kind of vegetation that grows on them. For example, he may have left one field in permanent pasture and have used the other for row crops. Eventually, even though the soils in the two fields were originally similar in fertility, in organic matter, or other characteristics, their characteristics change because of the differences in the kinds of plants growing on them. Through repeated cutting of the woodlands, cultivating of the soils, the introducing of new plant species, the building of structures to control water, and the improving of natural drainage, man continues to influence the kind of soils that form in the county and their rate of development.

The Arenzville soils are examples of soils formed as the result of changes made by man. In many places these soils formed as the result of recent erosion in areas where the cover of plants was removed by man. Soil materials were washed from the silty soils on uplands and terraces, where the vegetation had been removed, and deposited over areas of wet, dark-colored alluvium on the flood plains of streams. The Arenzville soils formed in such transported materials that were deposited over older alluvium.

Relief

The differences in relief in Lafayette County reflect the influence of the underlying material and the work of rain, rivers, and winds on the material throughout long periods of time. For example, the dip of rock formations provides surface direction and slope for movement of water. Resistance or weakness in the texture of the rock has determined where the lowlands would be dissected by stream erosion.

Relief influences the formation of soils by controlling drainage, runoff, and erosion. The differences in elevation in the county are in many places closely related to differences (1) in drainage, (2) in thickness of the A horizon and its content of organic matter, (3) in thickness of the solum, and (4) in degree of horizon differentiation.

Drainage characteristics are generally reflected in the color of the soil and in the degree and kind of mottling or gleying in the soil profile. Of the well-drained soils, the Downs, Dubuque, Fayette, Gale, Hixton, Tama, and Lindstrom are all on gently undulating to rolling uplands, and the Dakota, Gotham, and Meridian soils and the bench phases of the Fayette and Tama soils are on nearly level to gently sloping stream terraces. All of these soils are mottled in about the same way. All are free of mottling in the A and B horizons, but they may be mottled in places in the C horizon or at a depth below several feet.

In contrast to the well-drained soils, the moderately well drained soils of the Rozetta series, which are on benches on nearly level to sloping stream terraces, have mottles in the lower part of the B horizon and in the C horizon. Also, the bench soils of the Stronghurst and Muscatine series, on nearly level to gently sloping stream terraces, have mottles in the lower part of the A horizon and in the B and C horizons. The mottles are below a depth of 6 to 16 inches. These soil are somewhat poorly drained. The Stronghurst are Gray-Brown Podzolic soils

that are intergrading toward Low-Humic Gley soils, and the Muscatine are Brunizems that are intergrading toward Humic Gley soils.

The very poorly drained bench soils of the Sable series, on low stream terraces and on bottom lands, are in level or concave areas and are classified as Humic Gley soils. Humic Gley soils are poorly drained or very poorly drained. They have dark-colored, organic-mineral surface horizons, generally more than 6 inches thick, and are underlain by a gleyed, mineral horizon.

The thickness of the surface layer and its content of organic matter are commonly related, directly or indirectly to relief. The usual toposequence in Lafayette County, consists of light-colored soils on the steeper slopes and of soils that have a successively darker and thicker surface layer on the gentler slopes and in the convex to concave areas. In areas that have mild slopes, runoff is slower and the soils absorb more moisture than on strong slopes. As a result, the content of moisture in soils that have mild slopes is more favorable for plants to grow, and consequently, for organic matter to accumulate.

In areas that have concave relief, the soils are likely to be waterlogged. As the result of the extra moisture, more organic matter may be produced than can be decomposed readily by the micro-organisms in the soil. In such areas mesophytic plants supersede hydrophytic plants, micro-organisms become less active or die, and the soils take on the characteristics of Low-Humic Gley or Humic Gley soils with their characteristic black A horizon. In very poorly drained areas, decomposing plant remains may accumulate to a depth of several feet and organic soils form.

Relief also affects the thickness of the solum and the degree of horizon differentiation. The soils that have steep slopes characteristically are shallow and lack horizon differentiation. They are classified as Lithosols. As the slope becomes milder, the solum of these soils becomes progressively deeper and the soils have a more clayey subsoil. The Sogn and Dodgeville soils are examples of this relationship. The soils of both series formed from the same kind of parent material, but the Sogn soils lack the textural and structural B horizon that characterizes the profile of the Dodgeville soils, which are deeper and more gently sloping.

Time, or age

Time is required by the active agents of soil formation to form soils from parent material. Some soils form rapidly, others slowly. The length of time required for a particular soil to form depends on the other factors involved.

The loessal material that now forms the land surface in most of Lafayette County was probably deposited during and after the Wisconsin glaciation of regions peripheral to the Driftless Area. The last advance of these glaciers was approximately 11,000 years ago. It was probably at about this time that soils of the Downs, Fayette, and Tama series, and other loessal soils whose entire solum formed in silt, began to form. Soils that have a strongly developed solum and that formed partly in silt and partly in residuum may be much older than the soils formed wholly in silt.

When soils begin to form, the soil material has characteristics almost identical to those of the parent material and are said to be immature. Among such immature soils in Lafayette County are the Arenzville, Boone, Chaseburg, Huntsville, Lawson, and Orion. These soils have little or no genetic differentiation between horizons, although there is some geological layering.

The ages of the original soils on the high stream terraces in the county are difficult to determine. This is because the material of various ages on the terraces has been covered by a mantle of loess, which conceals the age of the underlying material. The alluvium, underlying the loess-covered stream terraces is called old alluvium to distinguish it from alluvium deposited recently on the lower lying terraces. Among the silty soils formed in loess overlying the older alluvium on terraces are the bench phases of the Fayette, Rozetta, Stronghurst, and Tama soils. Among the soils on the lower lying terraces where sandy material has been deposited more recently are those of the Gotham series.

Morphology and Composition of Soils

Soil morphology in Lafayette County is expressed generally in prominent horizons. In some of the soils, however, the solum is weakly developed and the horizons are faint or indistinct. For example, soils formed in medium- to fine-textured materials on well-drained, gently sloping uplands generally show distinct differentiation of horizons. The Fayette and Tama soils are some of these. In contrast, the Gotham soils formed in recent, sandy alluvium and the Boone soils, formed in residuum from sandstone, have faint horizons or none.

The differentiation of horizons in soils of the county is the result of one or more of the following processes: (1) Accumulation of organic matter, (2) leaching of carbonates and soils, (3) removal and subsequent accumulation of silicate clay minerals, and (4) reduction and transfer of iron.

Some organic matter has accumulated in the uppermost layers of all but a few soils in Lafayette County to form an A1 horizon. Much of that organic matter is in the form of humus. The quantities are small in some soils but fairly large in others. Soils such as those of the Boone series have faint and thin A1 horizons, low in organic matter at best. Other soils, such as those of the Tama and Dakota series, have thick A1 horizons, fairly high in organic matter.

Leaching of carbonates and salts has occurred in almost all soils of the county, although it has been of limited importance in horizon differentiation. The effects of leaching have been indirect, in that the leaching permitted the subsequent translocation of silicate clay minerals in some soils. Carbonates and salts have been carried almost completely out of the profiles of most of the well-drained soils. Even in the wettest soils, some leaching is indicated by the absence of free carbonates and by the acid reaction. Leaching of these wet soils is slow because water movement through the profile is itself slow.

Accumulation of silicate clay minerals has contributed to the development of horizons in many soils of Lafayette County. Soils in an advanced stage of development have illuvial horizons of clay accumulation. In some

mature soils, such as Fayette and Tama soils formed in deep loess on uplands, silicate clay accumulation is expressed in illuvial B horizons that contain more total clay and more fine clay than the horizons above or below. In soils formed in shallower deposits of loess, for example the Dubuque soils, the B horizon formed partly in residuum from the underlying dolomite. In such soils the horizons of illuviation may have no more total clay than the C horizon, but they do have more fine clay. Clay films occur in most soils that have blocky structure. The films occur as thin layers on the faces of peds. The long axes of the clay particles lie parallel to the surface on which they are deposited. If the amount of translocated clay is large it fills the natural cracks of the soil and juts into crevices and openings left by plant roots, animals, or insects.

The horizon from which clay is being removed is bleached in color, is friable in consistence, and generally is platy in structure.

The Gotham, Worthen, and other nearly structureless soils have slight silicate clay accumulation in their B horizon. They do not, however, have clay films on the surfaces of the peds, because none of the peds have prominent cleavage planes, nor have they been subjected to intensive or prolonged periods of weathering. The clays in the illuvial horizon of these soils generally occur as coatings on the individual sand grains, and in many places they are oriented with the surface of the grain. Occasional pores in these horizons persist long enough to have weak, discontinuous clay films.

The reduction and transfer of iron have occurred in all of the very poorly drained, poorly drained, and somewhat poorly drained soils. In the naturally wet soils of Lafayette County, the reduction and transfer of iron, a process often called gleying, is of importance in horizon differentiation. It is most pronounced in the Sable soils, which are Humic Gley soils.

The gray colors in the deeper horizons of wet soils indicate the reduction of iron oxides. This reduction is commonly accompanied by some transfer of the iron, which may be local or general in character. After it has been reduced, iron may be removed completely from some horizons and may even go out of the soil profile. More commonly, in Lafayette County, it has moved a short distance and stopped either in the horizon of its origin or in a nearby horizon. Iron has been segregated in the solum of the moderately well drained and somewhat poorly drained soils and within deeper horizons of some of the poorly drained to very poorly drained soils to form yellowish-red, strong-brown, or yellowish-brown mottles. Spots of black manganese also are common.

Classification of Soils

One of the main objectives of a soil survey is to identify and describe the soils and to determine their relationship to agriculture. Another objective is to group the soils according to the characteristics they have in common. Such a grouping will show the relationship of the soils to one another and to soils of other areas. This is necessary because there are so many different kinds of soils that it would be difficult to remember the characteristics of all of them. If the soils are placed in a few groups, each group having selected characteristics in

common, their general characteristics can be remembered more easily.

The lower categories, the soil type and soil series, are defined in the section "How This Soil Survey Was Made." The soil phase, a subdivision of the soil type based on characteristics significant in management, is also defined in that section.

Soil series are also classified into great soil groups. The great soil groups are given in table 11, and the soil series within each great soil group are listed along

with major physiographic features. Each of these soil groups is described in the pages that follow. Many of the soil series within each group are not representative of the central concept of that group but intergrade between two groups. Some of these intergrade towards Low-Humic Gley soils, which are otherwise not represented. Each series represented in the county is described in the pages that follow the discussion of the great soil groups. Also described is a representative profile for each series.

TABLE 11.—*Classification of the soils and major physiographic features*

Great soil group and soil series	Physiographic position	Relief	Internal drainage	Parent material
Gray-Brown Podzolic:				
Derinda.....	Uplands.....	Gently sloping to moderately steep.	Slow to medium....	Loess, over residuum from shale, over shale.
Derinda series, wet subsoil variant (intergrading toward Low-Humic Gley soils).	Uplands.....	Gently sloping to sloping.	Slow.....	Loess, over residuum from shale, over shale.
Downs (intergrading toward Brunizems).	Uplands.....	Gently sloping to sloping.	Medium.....	Loess.
Dubuque.....	Uplands.....	Gently sloping to steep.	Medium.....	Loess, over residuum from limestone, over limestone.
Dunbarton.....	Uplands.....	Gently sloping to very steep.	Medium.....	Thin loess, over residuum from limestone, over limestone.
Eleroy.....	Uplands.....	Gently sloping to moderately steep.	Slow to medium....	Thick loess, over residuum from shale, over shale.
Fayette.....	Uplands and valley slopes.	Gently sloping to moderately steep.	Medium.....	Loess.
Fayette, benches.....	Stream terraces.....	Gently sloping to sloping.	Medium.....	Thick silt, over sandy alluvium.
Gale.....	Uplands and valley slopes.	Sloping to moderately steep.	Medium.....	Loess, over sandstone or residuum from sandstone.
Hixton.....	Uplands and valley slopes.	Gently sloping to steep.	Medium.....	Residuum from sandstone, over sandstone.
Meridian.....	Stream terraces.....	Nearly level to gently sloping.	Medium.....	Sandy alluvium.
Mifflin.....	Uplands.....	Gently sloping to steep.	Medium.....	Residuum from sandy limestone.
Northfield.....	Uplands.....	Sloping to very steep.	Medium to rapid....	Residuum from sandstone.
Palsgrove.....	Uplands.....	Gently sloping to moderately steep.	Medium.....	Thick loess, over residuum from limestone, over limestone.
Rozetta, benches.....	Stream terraces.....	Nearly level to sloping.	Medium to slow....	Thick silt over sandy alluvium.
Stronghurst (Intergrading toward Low-Humic Gley soils).	Uplands.....	Nearly level to gently sloping.	Slow.....	Loess.
Stronghurst, benches (intergrading toward Low-Humic Gley soils).	Stream terraces.....	Nearly level to gently sloping.	Slow.....	Thick silt over sandy alluvium.
Brunizem (Prairie):				
Ashdale.....	Uplands.....	Gently sloping to moderately steep.	Medium.....	Thick loess, over residuum from limestone, over limestone.
Dakota.....	Stream terraces.....	Nearly level to gently sloping.	Medium.....	Sandy and loamy outwash.
Dakota series, mottled subsoil variant (intergrading toward Humic Gley soils).	Stream terraces.....	Nearly level to gently sloping.	Medium to slow....	Sandy and loamy outwash.
Dodgeville.....	Uplands.....	Gently sloping to moderately steep.	Medium.....	Loess, over residuum from limestone, over limestone.
Edmund.....	Uplands.....	Gently sloping to moderately steep.	Medium.....	Thin loess, over residuum from limestone, over limestone.
Gotham (intergrading toward Gray-Brown Podzolic soils).	Stream terraces.....	Gently sloping to moderately steep.	Rapid.....	Sandy alluvium.
Keltner.....	Uplands.....	Gently sloping to sloping.	Medium to slow....	Thick loess, over residuum from shale.
Lindstrom.....	Uplands and concave valley slopes.	Gently sloping to moderately steep.	Medium.....	Loess and alluvium.
Muscatine (intergrading toward Humic Gley soils).	Uplands.....	Nearly level to gently sloping.	Medium to slow....	Loess.
Muscatine, benches (intergrading toward Humic Gley soils).	Stream terraces.....	Nearly level to gently sloping.	Slow.....	Thick silt, over sandy alluvium.
Schapville.....	Uplands.....	Sloping.....	Slow to medium....	Loess, over residuum from shale, over shale.

TABLE 11.—*Classification of the soils and major physiographic features*—Continued

Great soil group and soil series	Physiographic position	Relief	Internal drainage	Parent material
Schapville, wet subsoil variant (intergrading toward Humic Gley soils).	Uplands.....	Gently sloping.....	Slow.....	Loess, over residuum from shale, over shale.
Tama.....	Uplands.....	Nearly level to sloping.	Medium.....	Loess.
Tama, benches.....	Stream terraces.....	Nearly level to gently sloping.	Medium.....	Thick silt over sandy alluvium.
Worthen (intergrading toward Alluvial soils).	Drainageways in uplands.	Nearly level to gently sloping.	Medium.....	Thick deposits of local colluvium and alluvium.
Humic Gley: Calamine.....	Uplands.....	Nearly level to sloping.	Very slow.....	Loess, over residuum from shale, over shale.
Marshan.....	Stream terraces.....	Nearly level.....	Very slow.....	Moderately thick silt, over sandy alluvium.
Sable.....	Uplands.....	Nearly level.....	Very slow.....	Loess.
Sable, benches.....	High bottoms.....	Nearly level.....	Very slow.....	Medium-textured alluvium.
Bog soils: Houghton.....	Stream bottoms.....	Nearly level.....	Very slow, unless drained.	Grassy and sedgy materials.
Alluvial: Arenzville.....	Flood plains of streams.	Nearly level.....	Medium.....	Silty alluvium that in many places overlies an old, buried, alluvial soil.
Boaz.....	Bottom lands of streams or low terraces.	Nearly level.....	Slow.....	Medium-textured alluvium.
Chaseburg.....	Drainageways in uplands.	Nearly level to gently sloping.	Medium.....	Thick deposits of local colluvium and alluvium.
Huntsville (intergrading toward Brunizems).	Flood plains of streams.	Nearly level to gently sloping.	Medium.....	Silty alluvium.
Lawson (intergrading toward Humic Gley soils).	Flood plains of streams.	Nearly level.....	Slow.....	Silty alluvium.
Orion (intergrading toward Low-Humic Gley soils).	Flood plains of streams.	Nearly level.....	Slow.....	Silty alluvium that in many places overlies an old, buried alluvial soil.
Orion, wet variant (intergrading toward Low-Humic Gley soils).	Flood plains of streams.	Nearly level.....	Very slow.....	Silty alluvium that in many places overlies an old, buried alluvial soil.
Lithosols: Sogn.....	Uplands.....	Gently sloping to very steep.	Medium.....	Very thin silty deposits, over limestone.
Regosol: Boone.....	Uplands.....	Sloping to moderately steep.	Rapid.....	Residuum from sandstone.

Gray-Brown Podzolic soils

These soils, under virgin conditions, have a thin cover of organic matter (AO) and an organic-mineral (A1) horizon. The organic-mineral horizon overlies a grayish-brown, leached A2 horizon, which, in turn, rests upon a fine-textured, illuvial brown B horizon. In Lafayette County the material underlying the Gray-Brown Podzolic soils consists of sandstone, limestone, shale, and loessal or alluvial silt, clay, and sand.

Gray-Brown Podzolic soils in this county formed under deciduous trees in a cool, moist, subhumid, continental climate. The trees generally consisted of sugar maple, basswood, and oak. The oak forests contained openings. The Derinda, Dubuque, Dunbarton, Eleroy, Fayette, Gale, Hixton, Meridian, Millin, Northfield, Palsgrove, and Rozetta soils are in this great soil group. The wet subsoil variants from the Derinda series, the Downs soils, and the Stronghurst soils are also classified as Gray-Brown Podzolic soils, but they are intergrading toward other great soil groups.

Soils belonging to the Gray-Brown Podzolic group occupy much of the acreage in Lafayette County. Of these, the Dubuque, Palsgrove, and Fayette are the most extensive.

Differences among the Gray-Brown Podzolic soils in this county are related mainly to differences in parent material and relief. The parent material weathered from many kinds of rocks and minerals. It was further altered by relief, which influenced drainage, horizon differentiation, thickness of the solum, and accumulation of organic matter.

The soils of the Fayette series are typical of Gray-Brown Podzolic soils. These soils formed in Peorian loess, 42 inches or more thick. They are gently sloping to steep and are on upland ridges or on valley slopes below escarpments of dolomite or sandstone. The most common slope range is from 6 to 12 percent. Fayette soils are well drained, but in places in the more level areas, they are slightly mottled in the C horizon.

Generally, the Dubuque, Derinda, and Gale soils are associated with the Fayette soils and occupy areas peripheral to them where the deposit of loess is thinner and the slope is steeper. These soils formed partly in loess, less than 42 inches thick, and partly in material weathered from the underlying bedrock. The lower part of the Dubuque soils formed in residuum from limestone; that of the Derinda soils, in residuum from shale; and that of the Gale soils, in residuum from sandstone.

The Hixton, Mifflin, and Northfield soils differ from the other Gray-Brown Podzolic soils of the uplands in having formed, wholly or in part, in residuum from St. Peter sandstone rather than in loess or in sandy alluvium.

Differences among the Gray-Brown Podzolic terrace soils, such as the bench phases of the Fayette, Rozetta, and Stronghurst soils, are related chiefly to differences in thickness of loess over the underlying sandy alluvium and to differences in drainage. The Fayette soils are well drained, the Rozetta are moderately well drained, and the Stronghurst are somewhat poorly drained. These soils formed in loess 42 inches or more thick. The well-drained Meridian soils, also on terraces, formed in medium-textured material, 24 to 42 inches thick over sand.

The soils of the Derinda series, wet subsoil variant, and of the Downs and Stronghurst series, also classified as Gray-Brown Podzolic soils, are similar to the Gray-Brown Podzolic soils, but they have characteristics of other great soil groups. Of these, the Downs soils formed in deep deposits of loess and are intergrading toward the Brunizem great soil group. The somewhat poorly drained Derinda and Stronghurst are intergrading toward Low-Humic Gley soils.

Brunizem (Prairie) soils

The Brunizem, or Prairie, soils formed in a cool, moderately humid, temperate climate under a cover of tall grasses dominated by bluestem (*Andropogon* spp.). Typically, Brunizems that have not been cultivated have a thick, very dark brown to black A horizon. This soil material grades through a dark yellowish-brown B horizon to the lighter colored parent material below. The B horizon in most Brunizems contains slightly higher concentrations of clay than the horizons in the rest of the profile. Most Brunizems have a comparatively thick, dark surface layer, but when cultivated, the color and thickness of the A horizon changes.

Generally, Brunizems are said to have formed under prairie in a moderately humid climate, and Gray-Brown Podzolic soils, under timber in a humid climate. Within Lafayette County, however, there is little room for such climatic differences, and prairie and forest coexist. Such areas are not extensive, and may be on the same ridge or in the same drainage way.

The reason that prairie and forest occur in the same area is not known. It is thought, however, that prairie grasses grow best on level soils that are slowly permeable and that have a high water table. Trees, on the other hand, grow best on rolling areas where drainage is good. It is also believed that because prairies were pastured by herds of buffalo and burned by man, grasslands were perpetuated and trees prevented from growing in areas that normally would be wooded. Another theory is that

a climatic change favorable to the growth of trees has taken place and that all the areas in the county in prairie would ultimately have been forested if they had not been cultivated.

The parent material of the Brunizem soils in the county, like the parent material of most of the Gray-Brown Podzolic soils, is loess and alluvial silt and sand, or material weathered from sandstone, limestone, and shale.

The Ashdale, Dakota, Dodgeville, Edmund, Keltner, Lindstrom, Schapville, and Tama soils are in the Brunizem great soil group. The mottled subsoil variant from the Dakota series, the wet subsoil variant from the Schapville series, and the Muscatine soils are also in this great soil group, but they are intergrading toward Humic Gley soils. In addition, the Worthen soils are in the Brunizem great soil group but are intergrading toward Alluvial soils. The Gotham soils, also Brunizems, are intergrading toward Gray-Brown Podzolic soils.

The Ashdale, Dodgeville, Edmund, Keltner, Lindstrom, Muscatine, Schapville, Tama, and Worthen soils, on uplands, occupy most of the acreage in the Brunizem great soil group. Soils of the terraces, such as the Dakota and Gotham, the bench phases of the Muscatine and Tama soils, and the wet subsoil variant from the Schapville series make up the rest of the acreage.

The Tama soils, the Lindstrom soils, and the Muscatine soils all formed in loess more than 42 inches thick. The Tama, on broad upland ridges, and the Lindstrom, on uplands and in concave valley slopes, are well drained.

Also extensive are the Ashdale and Dodgeville soils. These soils, which are somewhat like the Dubuque and Palsgrove soils of the Gray-Brown Podzolic group, formed partly in loess. The lower part of their solum formed in residuum from limestone. Dodgeville soils have slopes from 2 to 20 percent, but in most places slopes are from 12 to 20 percent. Ashdale soils have slopes of 2 to 20 percent.

The Worthen soils formed in upland drainageways in thick deposits of silty colluvium and alluvium. These soils have very weak structural development. The well-drained Huntsville soils formed on flood plains of streams in silty alluvium.

The Schapville soils are somewhat like the Derinda soils of the Brunizem great soil group. These soils formed in loess, less than 42 inches thick. The lower part of their solum formed in residuum from shale.

The well-drained Tama soils on benches, which are similar to the Fayette soils on benches of the Gray-Brown Podzolic group, formed on terraces in silt that was 42 to 60 inches or more thick over sandy alluvium. The associated bench phases of the Muscatine series, also on terraces, formed in like material and are somewhat poorly drained. The Dakota soils formed on terraces in medium-textured material that was 24 to 42 inches thick over sandy outwash.

Humic Gley soils

The Humic Gley soils, formerly called Wiesenboden or Half Bog soils, have poor or very poor drainage. They have a dark-colored organic-mineral surface layer that is generally more than 6 inches thick. The subsoil is strongly gleyed and is mottled. These soils lack an A2

horizon. The texture of the different horizons differs little throughout the profile.

In Lafayette County the Calamine, Marshan, and Sable soils are in the Humic Gley great soil group. The Calamine and Sable soils, in depressions or on seepage slopes in the uplands, formed in loess over residuum from shale. The Calamine soils formed in a thinner mantle of silt than the Sable soils, and the lower part of their solum formed in clayey residuum from shale. In contrast, the upland Sable soils formed in loess, 42 inches or more thick, and have a silty C horizon. The Sable soils on benches, however, formed in medium-textured alluvium on the high bottoms of flood plains. The Marshan soils are on nearly level stream terraces. They formed in silty material, 24 to 42 inches thick, over sandy alluvium.

Bog soils

The Bog soils are organic soils. These soils generally have a surface layer of peat or muck that is underlain by peat. They have formed in a humid or subhumid climate under swamp or marsh vegetation. These soils are in depressions along stream bottoms and terraces and are wet unless drained. They vary in thickness over mineral material.

In Lafayette County Bog soils consist of Houghton muck and peat. They are made up of decomposed and partly decomposed reeds, grasses, and sedges.

Alluvial soils

Alluvial soils have formed in recently deposited material on flood plains and in fans and draws. They have little or no profile development and are subject to flooding. They receive fresh deposits of sediment during periods of high runoff.

In Lafayette County the Arenzville and Chaseburg soils are representative Alluvial soils. The Boaz and the Orion are also Alluvial soils, but they are intergrading toward Low-Humic Gley soils. In addition, the Huntsville and Lawson soils are in the Alluvial great soil group but Huntsville soils are intergrading toward Brunizems and Lawson soils are intergrading toward Humic Gley soils.

The well-drained Arenzville soils and the associated somewhat poorly drained and poorly drained Orion soils have formed in thick, silty alluvium that overlies an older and darker, buried alluvial soil. Chaseburg soils, also well drained, are in drainageways in the uplands in silty colluvium and alluvium.

The Boaz soils are somewhat poorly drained. These soils have formed in a mixture of local, medium-textured alluvium moved from higher lying areas.

Lithosols

Typically, Lithosols are shallow soils that have little or no profile development. They consist primarily of partly weathered fragments of rock or of nearly bare rock.

In Lafayette County the Sogn soils are classified as Lithosols. These soils have fragments of limestone on the surface and throughout the profile. Partly shattered dolomite bedrock is at a depth of less than 12 inches.

Regosols

Regosols consist of deep, sandy deposits or of soft, rocky deposits that have little or no soil development. They have an AC profile.

In Lafayette County the only soils classified as Regosols are those of the Boone series. These soils are shallow over sandstone bedrock.

Detailed Descriptions of Soil Series

In this section the soil series in Lafayette County are discussed in alphabetical order. At least one representative profile of each series is described in detail. The great soil group is given for each series for easy cross reference to table 11.

The color of the soil is indicated in two ways in this section. First it is indicated by a descriptive term, for example, grayish brown. Then it is indicated by a Munsell notation, such as (10YR 5/2). The Munsell notation denotes color more precisely than is possible by the use of words. Unless otherwise stated, the color given is that of moist soil.

ARENZVILLE SERIES

The soils of the Arenzville series are deep and are well drained to moderately well drained. These soils are on broad flood plains along major streams and on narrow bottom lands along smaller streams. They belong to the Alluvial great soil group. Arenzville soils formed in silty alluvium washed from uplands that had a mantle of loess. They have a light-colored surface layer and overlie a buried, dark-colored soil, which is at a depth between 18 and 48 inches.

These soils are lighter colored than the Huntsville soils, which are similar in texture and occupy similar positions. They are more stratified than Chaseburg soils, which lack a dark-colored, buried soil. Arenzville soils are associated with the somewhat poorly drained Orion soils.

Representative profile of Arenzville silt loam in a cultivated field (SE $\frac{1}{4}$ /SE $\frac{1}{4}$ sec. 24, T. 24 N., R. 16 E., Pierce County, Wis.):

- A1—0 to 9 inches, dark-gray (10YR 4/1) to dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; many grass roots; neutral.
- C1—9 to 20 inches, grayish-brown (10YR 5/2) to dark grayish-brown (10YR 4/2) silt loam; weakly stratified; has thin layers of very fine sand; friable; many plant roots; neutral.
- C2—20 to 34 inches, light grayish-brown (10YR 6/2) to brown (10YR 5/3) stratified silt loam with thin layers of fine sand; friable; many plant roots to a depth of 24 inches, and a few plant roots below that depth; neutral.
- Ab—34 inches +, very dark brown (10YR 2/2) to very dark gray (10YR 3/1) silt loam; weak, medium, granular structure; friable; a few plant roots; neutral.

The number, thickness, and color of the horizons vary, depending on the rate of deposition and the amount of material deposited. In some areas the deposits are more than 42 inches thick. In places thin layers of fine sand are in the uppermost horizons. In some mining areas, chert and mine tailings are on the surface. Mottles are present in places, but normally the material is not mottled in the upper 18 inches.

ASHDALE SERIES

In the Ashdale series are deep, dark-colored, well-drained soils on limestone uplands. These soils belong to the Brunizem great soil group. They formed under prairie in loess, 30 to 50 inches thick, underlain by clayey residuum from dolomitic limestone. Depth to the limestone ranges from 42 to 92 inches.

Ashdale soils have a thicker, darker colored surface layer than the Palsgrove soils. The mantle of silt in which they formed is thinner than that in which the Tama soils formed and thicker than that in which the Dodgeville formed. Ashdale soils are similar to the Keltner soils, but those soils formed in material from shale.

Representative profile of Ashdale silt loam in an undisturbed pasture:

- A1—0 to 10 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; neutral; clear, wavy boundary.
- A3—10 to 16 inches, very dark brown (10YR 2/2) silt loam; weak, thick, platy structure; friable; medium acid; clear, wavy boundary.
- B1—16 to 24 inches, dark yellowish-brown (10YR 3/4) heavy silt loam; moderate, medium, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
- B2—24 to 33 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
- IIB3—33 to 38 inches, dark-brown, (7.5YR 4/4) silty clay; moderate and strong, fine, angular blocky structure; hard when dry, plastic when wet; strongly acid; gradual, wavy boundary.
- IIC—38 inches +, dark-brown (7.5YR 4/4) clay; moderate, fine, angular blocky structure; hard when dry, plastic when wet; strongly acid.

BOAZ SERIES

In the Boaz series are deep, silty, somewhat poorly drained soils. These soils are on the high parts of bottom lands. They belong to the Alluvial great soil group, but they are intergrading toward Low-Humic Gley soils. Boaz soils formed in alluvium washed from uplands that had a mantle of loess. The original vegetation was grasses, sedges, reeds, and other plants that tolerate wetness.

These soils are near the Sable soils on benches. They are also near the Orion and the Arenzville soils. They are lighter colored and somewhat better drained than the Sable soils on benches. Their subsoil is finer textured than that of the Arenzville and Orion soils.

Representative profile of Boaz silt loam in a cultivated field (NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 36, T. 3 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 7 inches, very dark gray (10YR 3/1) silt loam; moderate, fine, subangular blocky structure; friable; neutral to mildly alkaline; abrupt, smooth boundary.
- B1—7 to 13 inches, grayish-brown (10YR 5/2) silt loam; many, fine, distinct mottles of yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2); weak and moderate, fine, subangular blocky structure; friable; neutral; clear, wavy boundary.
- B21—13 to 23 inches, grayish-brown (10YR 5/2) heavy silt loam; many, medium, distinct mottles of dark brown (7.5YR 4/4) and strong brown (7.5YR 5/8); weak, medium, prismatic and moderate, medium, subangular blocky structure; friable; manganese concretions; light-gray (10YR 6/1) silt coatings on surfaces of peds; medium acid; clear, wavy boundary.
- B22g—23 to 30 inches, grayish-brown (2.5Y 5/2) light clay loam; many, medium, distinct mottles of dark brown (7.5YR 4/4) and strong brown (7.5YR 5/8);

weak, medium, prismatic and weak, medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; manganese concretions; light-gray (10YR 6/1) silt coatings on surfaces of peds; neutral; clear, wavy boundary.

B3g—30 to 43 inches, gray (5Y 5/1) light silty clay loam; many, large, prominent mottles of strong brown (7.5YR 5/6 to 5/8); massive, slightly hard when dry, slightly plastic when wet; neutral; clear, wavy boundary.

C—43 inches +, gray (5YR 5/1) silt loam; many, large, prominent mottles of strong brown (7.5YR 5/8); massive; slightly hard when dry, slightly plastic when wet; neutral.

In some places thin layers of fine sand are in the profile. In places, at a depth of more than 3 feet, the layers consist of stratified silt, sand, and clayey material. Locally, recent deposits of silty material, 8 to 18 inches thick, overlie the Ap horizon.

BOONE SERIES

The Boone soils are sandy soils that are excessively drained. They are on valley slopes below sandstone escarpments. They belong to the Regosol great soil group. Boone soils consist primarily of sand weathered from sandstone bedrock. The native vegetation was deciduous hardwoods, chiefly oaks.

These soils are coarser textured throughout the profile than the Hixton and Northfield soils and unlike those soils lack a textural B horizon. They also are coarser textured than the Gotham soils and have a lighter colored surface layer.

Representative profile of Boone fine sand in a pasture (SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 24, T. 3 N., R. 9 E., Green County, Wis.):

- A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) fine sand; weak, fine, subangular blocky structure; very friable; neutral; clear, wavy boundary.
- C1—4 to 5 inches, brown (10YR 5/3 and 4/3) fine sand; single grain; loose; medium acid; abrupt, wavy boundary.
- C2—5 to 10 inches, yellowish-brown (10YR 5/4) fine sand; single grain; loose; strongly acid; clear, wavy boundary.
- C3—10 to 36 inches, yellowish-brown (10YR 5/6) fine sand; single grain; loose; strongly acid; clear, wavy boundary.
- C4—36 inches +, light yellowish-brown (10YR 6/4) fine sand; single grain; loose; strongly acid.

The color of the A1 horizon in undisturbed areas ranges from dark gray (10YR 4/1) to black (10YR 2/1). Depth to sandstone bedrock ranges from 1 foot to more than 4 feet.

CALAMINE SERIES

In the Calamine series are poorly drained soils that belong to the Humic Gley great soil group. These soils are in depressions and on seepage slopes in the shale uplands. They are mainly southeast of Shullsburg, but a few areas are near the Platte Mounds. Calamine soils formed partly in loess, 15 to 30 inches thick, and partly in clayey residuum from shale. The native vegetation was grasses, sedges, reeds, and other plants that tolerate wetness.

The Calamine soils have finer textured lower horizons than the Sable soils. They have poorer drainage than soils of the Schapville series, wet subsoil variant, and a darker, thicker surface layer and a grayer subsoil.

Representative profile of Calamine silt loam in a cultivated field (SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 13, T. 1 N., R. 2 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, black (10YR 2/1) silt loam; moderate, medium, subangular blocky structure; friable; mildly alkaline; abrupt, smooth boundary.
- A12—8 to 17 inches, black (10YR 2/1) heavy silt loam; moderate, fine, angular blocky structure; firm; mildly alkaline; clear, wavy boundary.
- A3—17 to 22 inches, very dark gray (10YR 3/1) heavy silt loam; moderate, fine, angular blocky structure; firm when moist, slightly plastic when wet; mildly alkaline; gradual, wavy boundary.
- IIB1g—22 to 28 inches, dark-gray (5Y 4/1) silty clay loam; a few, fine, distinct mottles of olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6); moderate, fine, angular blocky structure; hard when dry, slightly plastic when wet; black (10YR 2/1) organic stains on surfaces of peds; mildly alkaline; gradual, wavy boundary.
- IIB2g—28 to 35 inches, olive-gray (5Y 5/2) heavy silty clay loam; moderate and strong, fine, angular blocky structure; hard when dry, slightly plastic when wet; mildly alkaline; abrupt, wavy boundary.
- IIB3g—35 to 41 inches, light olive-gray (5Y 6/2) silty clay; weak, medium, subangular blocky structure; hard when dry, plastic when wet; mildly alkaline; gradual, irregular boundary.
- IICg—41 to 48 inches, light olive-gray (5Y 6/2) silty clay; many, medium, distinct mottles of strong brown (7.5YR 5/6); massive; hard when dry, plastic when wet; gradual, wavy boundary.
- IIR—48 inches +, weakly calcareous shale.

Depth to residuum from shale, which also is the thickness of the mantle of silt, ranges from 15 to 30 inches. The A horizon ranges from 8 to 24 inches in thickness, depending on the slope and the amount of erosion. In some places a layer of recently deposited light-colored silt loam is on the surface. This layer commonly is less than 18 inches thick. In many places to a depth of 30 inches, organic stains cover the surface of peds and line root channels.

CHASEBURG SERIES

In the Chaseburg series are light-colored, silty soils that are well drained to moderately well drained. These soils are in upland drainageways, are on fans at the ends of drainageways, and are along the base of steep slopes. The areas are small and are widely distributed throughout the county. They belong to the Alluvial great soil group. Chaseburg soils formed under deciduous hardwoods in deep, silty alluvium. The alluvium is more than 40 inches thick and was washed from uplands that had a mantle of loess.

Generally, Chaseburg soils lack a textural B horizon, but in some places the profile contains a weakly expressed B horizon. These soils occupy positions similar to those of the Worthen soils, but they are lighter colored. They are less stratified than the Arenzville soils and lack the buried, dark-colored soil that typically is in those soils.

Representative profile of Chaseburg silt loam in a pasture (NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, T. 1 N., R. 6 E., Green County, Wis.):

- A1—0 to 16 inches, dark grayish-brown (10YR 4/2) silt loam with thin layers of grayish-brown (10YR 5/2) silt loam; moderate, thin and medium, platy structure; friable; neutral; abrupt, smooth boundary.
- C1—16 to 24 inches, dark-gray (10YR 4/1) silt loam with thin layers of grayish-brown (10YR 5/2) silt loam;

moderate, thin and medium, platy structure; friable; neutral; abrupt, smooth boundary.

- C2—24 to 27 inches, thin layers of yellowish-brown (10YR 5/4) silt and sand; weak, fine, granular structure; friable; neutral; abrupt, wavy boundary.
- C3—27 to 50 inches, dark-gray (10YR 4/1) silt loam with thin layers of brown (10YR 5/3) silt loam; weak, medium, platy structure; friable; neutral.

Differences in the source of sediments cause minor variations in color and texture throughout the profile. In a few places the soils contain chert fragments less than 2 inches in size. A thin layer of coarser textured overwash is on the surface in a few areas, and here the surface soil is fine sandy loam. The soils range from slightly acid to neutral.

DAKOTA SERIES

The Dakota soils are moderately deep, nearly level to gently sloping, and well drained. These soils belong to the Brunizem great soil group. They formed on stream terraces in sandy and loamy outwash and are underlain by loose sand at a depth between 2 and 3 feet.

These soils formed in materials similar to those of the Meridian soils and are in similar positions. They differ from those soils in having a thicker, darker colored surface layer. Dakota soils have a thicker, darker colored surface layer than the Gotham soils and a finer textured subsoil. They are better drained than the somewhat poorly drained soils of the Dakota series, mottled subsoil variant, on lower terraces.

Representative profile of Dakota loam in a cultivated field (southeast corner of sec. 6, T. 1 N., R. 6 E., Green County, Wis.):

- Ap—0 to 9 inches, black (10YR 2/1) loam; moderate, medium, granular structure; friable; roots abundant; slightly acid; abrupt, smooth boundary.
- A12—9 to 12 inches, black (10YR 2/1) loam; weak, fine, subangular blocky structure; friable; roots abundant; many earthworm holes and casts; slightly acid; clear, wavy boundary.
- A3—12 to 15 inches, very dark grayish-brown (10YR 3/2) loam; weak, medium, subangular blocky structure; friable; many earthworm holes; roots plentiful; slightly acid; clear, wavy boundary.
- B1—15 to 18 inches, dark-brown (10YR 4/3) loam; weak, medium, subangular blocky structure; friable; many earthworm holes; roots plentiful; slightly acid; clear, wavy boundary.
- B2—18 to 26 inches, dark-brown (10YR 4/3) heavy loam; moderate, medium, subangular blocky structure; friable; a few thin, patchy, very dark brown (10YR 2/2) clay films on faces of peds; roots plentiful; many earthworm holes; medium acid; clear, wavy boundary.
- B3—26 to 32 inches, dark yellowish-brown (10YR 4/4) sandy loam; weak, medium, subangular blocky structure; very friable; roots plentiful; medium acid; clear, wavy boundary.
- C—32 to 60 inches, yellowish-brown (10YR 5/4) medium sand; single grain; loose; medium acid in the upper part, but slightly acid at a depth below 50 inches.

Variations are mainly in thickness of the A horizon, in thickness of the solum, and in nature of the underlying sand. Thickness of the A horizon ranges from 9 to 24 inches, and that of the solum, from 24 to 42 inches. The underlying sand generally is medium textured, but it ranges from fine to coarse. The content of pebbles in the C horizon varies, but it is generally less than 20 percent of the total material.

DAKOTA SERIES, MOTTLED SUBSOIL VARIANT

The variants from the normal Dakota soils are dark colored, nearly level to gently sloping, and somewhat poorly drained. These variants belong to the Brunizem great soil group, but they are intergrading toward Humic Gley soils. They formed in sandy and loamy outwash on stream terraces and are underlain by loose sand at a depth between 24 and 42 inches.

These variants have a grayer, more mottled subsoil than the soils of the Dakota series, and they have a higher water table. Their surface layer is thinner than that of the Marshan soils, and their subsoil is browner and better drained.

Representative profile of Dakota loam, mottled subsoil variant, in a cultivated field (SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 2, T. 3 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 9 inches, very dark brown (10YR 2/2) loam; moderate, medium, subangular blocky structure; friable; neutral; abrupt, smooth boundary.
- B1—9 to 14 inches, dark-brown (10YR 4/3) loam; many, fine, faint mottles of yellowish brown (10YR 5/6); weak, medium, subangular blocky structure; friable; neutral; clear, wavy boundary.
- B2—14 to 29 inches, dark-brown (7.5YR 4/4) heavy loam; many, medium, faint mottles of strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; slightly acid; gradual, wavy boundary.
- B3—29 to 36 inches, strong-brown (7.5YR 5/6) sandy loam; many, medium, faint mottles of light brownish gray (10YR 6/2); weak, medium, subangular blocky structure; very friable; a few manganese streaks; medium acid; gradual, irregular boundary.
- C—36 inches +, yellowish-brown (10YR 5/4) medium and fine sand; many, fine, distinct mottles of dark brown (7.5YR 4/4) and grayish brown (10YR 5/2); single grain; loose; manganese streaks; medium acid.

The color of the surface layer ranges from black (10YR 2/1) to very dark brown (10YR 2/2). The texture of the B2 horizon ranges from loam to light sandy clay loam. A few pebbles occur in the C horizon, but they comprise less than 20 percent of the mass. Depth to the underlying sand ranges from 24 to 42 inches.

DERINDA SERIES

Soils of the Derinda series are light colored and are well drained to moderately well drained. They are on the higher shale uplands south of Shullsburg and near the Platte Mounds. These soils belong to the Gray-Brown Podzolic great soil group. They formed under deciduous forest, partly in loess and partly in residuum from shale. In Lafayette County, the upper part of the solum of the Derinda soils formed in loess, 10 to 30 inches thick, and the lower part in clayey residuum from shale.

The Derinda soils have a lighter colored, thinner surface layer than the Schapville soils. They are better drained and less mottled than soils of the Derinda series, wet subsoil variant. They are similar to the Dubuque soils, but the lower part of the solum of those soils formed in red, clayey residuum from dolomite. Derinda soils have a thinner mantle of loess than the Eleroy soils.

Representative profile of Derinda silt loam in a pasture (SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 22, T. 1 N., R. 2 E., Lafayette County, Wis.):

- A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; clear, wavy boundary.

- A2—3 to 7 inches, brown (10YR 5/3) silt loam; moderate, medium, platy structure; friable; neutral; gradual, wavy boundary.
- B1—7 to 12 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; slightly acid; gradual, wavy boundary.
- B2—12 to 20 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular and angular blocky structure; slightly hard when dry, slightly plastic when wet; slightly acid; clear, wavy boundary.
- IIB3—20 to 26 inches, light olive brown (2.5YR 5/4) silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; hard when dry, plastic when wet; neutral to mildly alkaline; clear, wavy boundary.
- IIR—26 inches +, light yellowish-brown (2.5Y 6/4 to 6/5) and olive-yellow (2.5Y 6/6), partly disintegrated shale bedrock.

Variations are chiefly in thickness of the mantle of loess and in depth to bedrock. Thickness of the loess ranges from 10 to 30 inches. Depth to shale bedrock ranges from 12 to 48 inches. In places bleached silt coatings are on the surface of peds in the B1 and B2 horizons. In cultivated areas the Ap horizon ranges from dark grayish brown (10YR 4/2) to very dark gray (10YR 3/1).

DERINDA SERIES, WET SUBSOIL VARIANT

The variants from the normal Derinda soils are moderately dark colored and are somewhat poorly drained. These soils are on the higher shale uplands south of Shullsburg and near the Platte Mounds. They are Gray-Brown Podzolic soils that are intergrading toward Low-Humic Gley soils. The upper part of these soils formed in loess 10 to 30 inches thick, but the lower part of the subsoil formed in clayey residuum from shale.

These variants are near areas of the normal Derinda soils, but they are more poorly drained and have mottling in the upper part of the subsoil. In drainage they are similar to soils of the Schapville series, wet subsoil variant, but they have a thinner, lighter colored surface soil.

Representative profile of Derinda silt loam, wet subsoil variant, in a cultivated field (NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 35, T. 1 N., R. 2 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, very dark brown (10YR 2/2) silt loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.
- A2—8 to 12 inches, grayish-brown (10YR 5/2) silt loam; a few, fine, faint mottles of yellowish brown (10YR 5/6) and distinct mottles of dark yellowish brown (10YR 4/4); moderate, medium, platy structure; friable; slightly acid; clear, wavy boundary.
- B1—12 to 17 inches, brown (10YR 5/3) heavy silt loam; many, fine, faint mottles of yellowish brown (10YR 5/6) and distinct mottles of dark brown (7.5YR 4/4); moderate, fine and medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; medium acid; gradual, irregular boundary.
- B2—17 to 27 inches, brown (10YR 4/3) silty clay loam; many, medium, faint mottles of yellowish brown (10YR 5/6) and distinct mottles of dark brown (7.5YR 4/4); moderate, fine and medium, angular blocky structure; hard when dry, slightly plastic when wet; medium acid; gradual, wavy boundary.
- IIB3—27 to 34 inches, grayish-brown (2.5Y 5/2) and light olive-brown (2.5Y 5/4) silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/6) and prominent mottles of dark brown (7.5YR 4/4); weak, medium, prismatic structure that breaks to moderate,

medium, angular blocky; hard when dry, plastic when wet; organic stains and clay films on surfaces of peds; slightly acid; gradual, irregular boundary.

IIR—34 inches +, light olive-brown (2.5Y 5/4), partly disintegrated shale bedrock; thick clay films and organic stains on surfaces of peds.

Variations are chiefly in thickness of loess and depth to bedrock. The loess ranges from 10 to 30 inches in thickness. Depth to bedrock ranges from 18 to 48 inches. The color of the Ap horizon ranges from very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2).

DODGEVILLE SERIES

The Dodgeville series consists of dark-colored, well-drained soils on limestone uplands. These soils belong to the Brunizem great soil group. They formed under prairie grasses partly in loess, 15 to 30 inches thick, and partly in clayey residuum from limestone.

These soils have a darker colored, thicker surface layer than that of the Dubuque soils. They are similar to the Schapville soils, but those soils formed in material from shale. They differ from the Ashdale and Edmund soils in that their B2 horizon formed in clayey residuum from limestone, but only the lower part of the B horizon of the Ashdale soils formed in the residuum and the entire B horizon of the Edmund soils formed in that material.

Representative profile of Dodgeville silt loam in a cultivated field (SE $\frac{1}{4}$ sec. 9, T. 6 N., R. 6 E., Dane County, Wis.):

- A1—0 to 10 inches, very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; friable; neutral; clear, wavy boundary.
- B1—10 to 15 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; moderate, fine, subangular blocky structure; firm; neutral; clear, wavy boundary.
- B21—15 to 20 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; firm; medium acid; clear, wavy boundary.
- IIB22—20 to 29 inches, dark reddish-brown (5YR 3/4) silty clay; strong, fine, angular blocky structure; hard when dry, plastic when wet; medium acid; gradual, wavy boundary.
- IIC1—29 to 33 inches, reddish-brown (5YR 4/4) clay; moderate, fine, angular blocky structure; hard when dry, plastic when moist; medium acid; clear, wavy boundary.
- IIR—33 inches +, partly disintegrated and shattered dolomite bedrock.

These soils vary chiefly in thickness of the A horizon and in depth to bedrock. Depth to limestone bedrock ranges from 24 to 42 inches.

DOWNS SERIES

The Downs series consists of deep, silty, well-drained soils on upland ridges. These soils belong to the Gray-Brown Podzolic great soil group, but they are intergrading toward Brunizems. Downs soils formed under a mixture of prairie grasses and hardwoods in silt more than 42 inches thick.

The surface layer of the Downs soils is thicker and slightly darker colored than that of the Fayette soils, but it is thinner and lighter colored than that of the Tama soils. Downs soils have a thicker mantle of silt than the Palsgrove and Ashdale soils and lack the clayey subsoil that is typical of those soils.

Representative profile of Downs silt loam in a cultivated field (SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 32, T. 1 N., R. 6 E., Green County, Wis.):

- Ap—0 to 9 inches, very dark gray (10YR 3/1) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.
- A2—9 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; weak, thin, platy structure; friable; neutral; abrupt, smooth boundary.
- B1—12 to 18 inches, brown (10YR 4/3) silt loam; moderate, fine, subangular blocky structure; friable; neutral; clear, wavy boundary.
- B21—18 to 22 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.
- B22—22 to 36 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.
- B3—36 to 41 inches, brown (10YR 4/3) silt loam; moderate, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.
- C—41 inches +, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct mottles of dark reddish brown (5YR 3/4); massive and weak, medium, subangular blocky structure; friable; medium acid.

Variations are mainly in color of the surface layer. The surface layer ranges from very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2), but in a few areas it is very dark brown (10YR 2/2). Thickness of the loess ranges from 4 to 8 feet or more.

DUBUQUE SERIES

In the Dubuque series are light-colored, well-drained soils on limestone uplands. These soils belong to the Gray-Brown Podzolic great soil group. They formed under a deciduous forest partly in loess, 15 to 30 inches thick, and partly in clayey residuum from limestone.

The Dubuque soils have a lighter colored, thinner surface layer than the Dodgeville soils. They are similar to the Derinda soils, but those soils formed over shale. They differ from the Palsgrove and the Dunbarton soils in that part of their B2 horizon formed in clayey residuum from limestone, but only the B3 horizon of the Palsgrove soils formed in the residuum and the entire B horizon of the Dunbarton soils formed in that material.

Representative profile of Dubuque silt loam in a cultivated field (SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 21, T. 3 N., R. 6 E., Green County, Wis.):

- Ap—0 to 7 inches, dark-gray (10YR 4/1) silt loam; weak, fine, granular structure; friable; neutral; clear, wavy boundary.
- B1—7 to 14 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, subangular blocky structure; friable; neutral; clear, wavy boundary.
- B21—14 to 19 inches, dark-brown (10YR 4/3) silty clay loam; moderate, fine, subangular, blocky structure; friable; slightly acid; clear, wavy boundary.
- IIB22—19 to 26 inches, reddish-brown (5YR 4/3) light silty clay; moderate, medium, subangular blocky structure; firm; slightly acid; clear, wavy boundary.
- IIB23—26 to 32 inches, dark reddish-brown (5YR 3/4) silty clay; moderate, medium, subangular blocky structure; firm; neutral; clear, wavy boundary.
- IIR—32 inches +, partly shattered and disintegrated dolomite bedrock.

Variations are chiefly in the thickness and color of the surface layer and in depth to limestone bedrock. Depth to limestone bedrock ranges from 24 to 42 inches.

DUNBARTON SERIES

The Dunbarton series consists of light-colored, well-drained soils on limestone uplands. These soils belong to the Gray-Brown Podzolic great soil group. They formed under a deciduous forest partly in loess, 0 to 15 inches thick, and partly in clayey residuum from limestone.

The Dunbarton soils have a thinner, lighter colored surface layer than the Edmund soils. Unlike the Dubuque soils, all of their B horizon formed in clayey residuum, instead of partly in loess and partly in residuum.

Representative profile of Dunbarton silt loam in a cultivated field (SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec 31, T. 3 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 7 inches dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.
- B1—7 to 9 inches, brown (10YR 4/3) heavy silt loam; moderate, fine, subangular blocky structure; firm; neutral; clear, wavy boundary.
- IIB21—9 to 13 inches, dark-brown (7.5YR 4/4) heavy silty clay loam; moderate, fine, angular blocky structure; hard when dry, slightly plastic when wet; clay films and very dark gray (10YR 3/1) organic stains on surfaces of peds; neutral; clear, wavy boundary.
- IIB22—13 to 18 inches, reddish-brown (5YR 4/4) silty clay; strong, fine, angular blocky structure; hard when dry, plastic when wet; clay films and very dark gray (10YR 3/1) organic stains on surfaces of peds; neutral; clear, wavy boundary.
- IIC—18 to 21 inches, reddish-brown (5YR 4/4) clay; massive; hard when dry, plastic when wet; organic stains and clay films along vertical cracks; mildly alkaline; clear, irregular boundary.
- IIR—21 inches +, partly shattered dolomite bedrock with reddish-brown (5YR 4/4) clay in cracks between the rocks in the upper part of the horizon.

The surface layer varies in color, texture, and thickness. It ranges from very dark grayish brown to yellowish brown in color, from silt loam to silty clay in texture, and from 4 to 9 inches in thickness. Depth to limestone bedrock ranges from 12 to 24 inches.

EDMUND SERIES

In the Edmund series are dark-colored, well-drained soils on limestone uplands. These soils belong to the Brunizem great soil group. They formed under prairie grasses partly in loess, 0 to 15 inches thick, and partly in clayey residuum from limestone.

These soils have a thicker, darker colored surface layer than the Dunbarton soils. They differ from the Dodgeville soils in that their B horizon formed entirely in residuum, rather than partly in loess and partly in residuum.

Representative profile of Edmund silt loam in a cultivated field:

- Ap—0 to 7 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.
- A3—7 to 10 inches, very dark brown (10YR 2/2) and very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, subangular blocky structure; friable; neutral; clear, wavy boundary.
- IIB21—10 to 14 inches, dark-brown (7.5YR 3/2) silty clay; moderate, fine, angular blocky structure; hard when dry, plastic when wet; neutral; clear, wavy boundary.
- IIB22—14 to 18 inches, dark reddish-brown (5YR 3/3) silty clay; moderate, fine, subangular blocky structure;

hard when dry, plastic when wet; clear, wavy boundary.

IIR—18 inches +, partly shattered dolomite bedrock.

Variations are chiefly in color, texture, and thickness of the surface layer. The surface layer ranges from black to dark brown in color, from 6 to 12 inches in thickness, and from silt loam to silty clay in texture. Depth to limestone bedrock ranges from 12 to 24 inches.

ELEROY SERIES

The soils of the Eleroy series are light colored and well drained to moderately well drained. They are on the higher shale uplands south of Shullsburg and near the Platte Mounds. These soils belong to the Gray-Brown Podzolic great soil group. Eleroy soils formed under deciduous forest. The upper part of the solum formed in loess, 30 to 50 inches thick, and the lower part, in clayey residuum from shale.

These soils have a lighter colored, thinner surface layer than the Keltner soils and a thicker mantle of loess than the Derinda soils. They are better drained and less mottled than soils of the Derinda series, wet subsoil variant. They are similar to the Palsgrove soils, but the lower part of the solum of those soils formed in red, clayey residuum from dolomite.

Representative profile of Eleroy silt loam in a pasture (SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 22, T. 1 N., R. 2 E., Lafayette County, Wis.):

- A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; clear, wavy boundary.
- A2—3 to 7 inches, brown (10YR 5/3) silt loam; moderate, medium, platy structure; friable; neutral; gradual, wavy boundary.
- B1—7 to 20 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; slightly acid; gradual, wavy boundary.
- B2—20 to 38 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, faint mottles of yellowish brown (10YR 5/6); moderate, medium, angular and subangular blocky structure; slightly hard when dry, slightly plastic when wet; slightly acid; clear, wavy boundary.
- IIB3—38 to 42 inches, light olive-brown (2.5Y 5/4) silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; hard when dry, plastic when wet; neutral to mildly alkaline; clear, wavy boundary.
- IIR—42 inches +, light yellowish-brown (2.5Y 6/4) and olive-yellow (2.5Y 6/6), partly disintegrated shale bedrock.

Variations are chiefly in thickness of loess and depth to bedrock. Thickness of loess ranges from 30 to 50 inches. Depth to shale bedrock ranges from 36 to 54 inches. In places in the B1 and B2 horizons, there are bleached silt coatings on the surfaces of the peds. In cultivated areas the Ap horizon ranges from dark grayish brown (10YR 4/2) to very dark gray (10YR 3/1).

FAYETTE SERIES

The Fayette series consists of deep, light-colored, well-drained soils. These soils belong to the Gray-Brown Podzolic great soil group. They formed in deposits of loess, more than 42 inches thick, on upland ridges, benches, and valley slopes. The original vegetation was a deciduous forest.

Fayette silt loams, valleys, have a somewhat coarser textured subsoil and substratum than the Fayette silt loams, uplands, and Fayette silt loams, benches. Also, they have slightly less structural development in the B horizon, a few fragments of sandstone and limestone in the solum, and in places sand is mixed in the surface layer.

Fayette soils formed in material similar to that of the Downs, Tama, and Lindstrom soils, but they have a thinner, lighter colored surface layer. They have a thicker mantle of loess than the Palsgrove soils and lack the clayey lower B horizon that is typical of those soils.

Representative profile of Fayette silt loam in a cultivated field (NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 29, T. 1 N., R. 6 E., Green County, Wis.):

- Ap—0 to 6 inches, dark-gray (10YR 4/1) silt loam; moderate, fine, granular structure; very friable; mildly alkaline; abrupt, wavy boundary.
- A2—6 to 10 inches, brown (10YR 5/3) silt loam; moderate, thin, platy structure; friable; mildly alkaline; abrupt, wavy boundary.
- B1—10 to 16 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, subangular blocky structure; friable; slightly acid; clear, wavy boundary.
- B21—16 to 22 inches, dark-brown (10YR 4/3) silty clay loam; moderate, fine, subangular blocky structure; friable; light-colored silt coatings on faces of peds; medium acid; clear, wavy boundary.
- B22—22 to 32 inches, dark-brown (10YR 4/3) silty clay loam; moderate, medium, subangular blocky structure; friable; light-colored silt coatings on faces of peds; medium acid; clear, wavy boundary.
- B23—32 to 37 inches, dark-brown (10YR 4/3) silty clay loam; moderate, medium, subangular blocky structure; friable; clay films on faces of peds; medium acid; clear, wavy boundary.
- B3—37 to 47 inches, dark-brown (10YR 4/3) silt loam; weak, coarse, subangular blocky structure; friable; clay films on faces of peds; medium acid; clear, wavy boundary.
- C—47 inches +, yellowish-brown (10YR 5/4) silt loam; massive; friable; slightly acid.

Thickness of loess is generally 4 to 8 feet, but in places it is 20 feet or more. The color of the Ap horizon ranges from very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2). The solum ranges from 36 to 55 inches in thickness.

GALE SERIES

In the Gale series are light-colored, well-drained soils. These soils are mainly on uplands and valley slopes that border the East Branch of the Pecatonica River. They belong to the Gray-Brown Podzolic great soil group. The upper part of the solum of the Gale soils formed in loess, 24 to 36 inches thick, and the lower part formed in sandy material weathered from sandstone bedrock. The original vegetation was a hardwood forest.

The Gale soils are near the Hixton and Northfield soils, but their surface layer and subsoil are silty rather than loamy. Also, they are deeper to sandstone bedrock than the Northfield soils. They are similar to the Dubuque soils, but those soils formed over dolomitic limestone bedrock.

Representative profile of Gale silt loam in a pasture that has not been cultivated (NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 3 N., R. 5 E., Lafayette County, Wis.):

- A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; neutral; clear, wavy boundary.

- A2—4 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, thin, platy structure; friable; neutral; abrupt, wavy boundary.
- B1—7 to 12 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, fine, subangular blocky structure; friable; slightly acid; clear, wavy boundary.
- B21—12 to 15 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, very fine, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
- B22—15 to 21 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
- B23—21 to 25 inches, dark yellowish-brown (10YR 4/4) gritty silty clay loam; moderate, fine and medium, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
- IIB3—25 to 31 inches, dark yellowish-brown (10YR 4/4) loam; moderate, medium, subangular blocky structure; friable; strongly acid; clear, wavy boundary.
- IIR—31 inches +, white (10YR 8/2) to yellow (10YR 7/8), partly weathered sandstone; breaks to single grain; strongly acid.

Variations are mainly in depth to underlying sand or sandstone. Thickness of the mantle of loess ranges from 24 to 36 inches, but it is generally 30 to 36 inches. In color, the Ap horizon ranges from very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2). Texture of the B3 horizon is sandy loam in places.

GOTHAM SERIES

The Gotham series consists of sandy and somewhat excessively drained soils on stream terraces. These soils belong to the Brunizem great soil group, but they are intergrading toward Gray-Brown Podzolic soils. They formed in sandy outwash derived partly from local sandstone formations. The original vegetation was a mixture of grasses and hardwoods.

Gotham soils are coarser textured throughout the solum than the Dakota or Meridian soils. Also, their A horizon is intermediate in color between that of those soils.

Representative profile of Gotham loamy fine sand in a cultivated field (NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 23, T. 2 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) loamy fine sand; weak, medium, granular structure; very friable; slightly acid; abrupt, smooth boundary.
- A3—8 to 12 inches, dark-brown (10YR 3/3) loamy fine sand; weak, coarse, subangular blocky structure; very friable; slightly acid; clear, wavy boundary.
- B1—12 to 16 inches, dark yellowish-brown (10YR 3/4) loamy sand; weak, medium, subangular blocky structure; very friable; medium acid; gradual, irregular boundary.
- B2—16 to 24 inches, dark-brown (7.5YR 4/4) heavy loamy sand; weak, medium, subangular blocky structure; very friable; medium acid; clear, wavy boundary.
- B3—24 to 29 inches, dark-brown (7.5YR 4/4) medium sand; weak, medium, subangular blocky structure to single grain; loose; medium acid; clear, wavy boundary.
- C1—29 to 36 inches, strong-brown (7.5YR 5/6) medium sand; single grain; loose; medium acid; gradual, wavy boundary.
- C2—36 inches +, brownish-yellow (10YR 6/6) medium sand that contains thin layers of dark-brown (7.5YR 4/4) loamy sand, $\frac{1}{8}$ to $\frac{1}{4}$ inches thick; single grain; loose; medium acid.

The Gotham soils vary mainly in the color and thickness of the A horizon. The A horizon ranges from very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2) in color and from 6 to 16 inches in thickness. The solum ranges from 26 to 36 inches in thickness.

The B2 horizon is sandy loam in places and generally is less than 10 inches thick. In places layers of loamy sand to light sandy loam, generally less than 1 inch thick, are in the C horizon.

HIXTON SERIES

The soils of the Hixton series are light colored and well drained. They are in the uplands and on valley slopes along the East Branch of the Pecatonica River. These soils belong to the Gray-Brown Podzolic great soil group. They formed under a deciduous forest in sandy material weathered from fine-grained sandstone. Sand or sandstone bedrock commonly is at a depth between 24 and 36 inches.

Hixton soils formed in material similar to that of Northfield soils, but they have a B3 horizon and they are deeper to sandstone bedrock. Their surface layer and subsoil are coarser textured than those in the Gale soils.

Representative profile of Hixton loam in a cultivated field (NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T. 4 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, dark-brown (10YR 3/3) loam; weak, medium, subangular blocky structure; friable; slightly acid; abrupt, wavy boundary.
- A2—8 to 12 inches, dark grayish-brown (10YR 4/2) loam; weak, medium, platy structure; friable; slightly acid; clear, wavy boundary.
- B1—12 to 14 inches, dark yellowish-brown (10YR 3/4) loam; weak, medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.
- B2—14 to 21 inches, dark yellowish-brown (10YR 4/4) heavy loam to sandy clay loam; moderate, medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.
- B3—21 to 27 inches, yellowish-brown (10YR 5/4) sandy loam; weak, medium, subangular blocky structure; very friable; medium acid; gradual, irregular boundary.
- C—27 to 33 inches, yellowish-brown (10YR 5/4) medium sand; single grain; loose; medium acid; gradual, irregular boundary.

The Ap horizon ranges from very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) in color. In places texture of the B2 horizon is sandy clay loam, loam, or sandy loam. The solum ranges from 22 to 36 inches in thickness. Depth to bedrock ranges from 2 to 31 $\frac{1}{2}$ feet.

HOUGHTON SERIES

The soils of the Houghton series are dark colored and are poorly drained. They are in small depressions in bottom lands along the larger streams. These soils belong to the Bog great soil group. Houghton soils consist of deposits of partly decomposed peat, more than 42 inches thick, made up of remains of sedges, reeds, and grasses.

Representative profile of Houghton mucky peat in a site that has not been cultivated (NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 14, T. 3 N., R. 5 E., Lafayette County, Wis.):

- O1—0 to 12 inches, black (N 2/0), disintegrated mucky peat; weak, medium, granular structure; very friable; slightly acid; clear, wavy boundary.
- O2—12 to 42 inches, black (N 2/0), disintegrated mucky peat; weak, coarse, granular structure; very friable; neutral; a few fibrous roots and remains of grasses and sedges; clear, wavy boundary.
- O3—42 to 54 inches, black (5YR 2/1), disintegrated mucky peat, massive; very friable; neutral; many dark reddish-brown (5YR 2/2) remains of sedges; clear, wavy boundary.

IICg—54 inches +, dark-gray (5Y 4/1) silt and clay; massive; slightly hard when dry, slightly plastic when wet; neutral.

Variations are mainly in degree of disintegration of the plant remains. In some places a thin cover of silty alluvium is on the surface.

HUNTSVILLE SERIES

In the Huntsville series are deep, dark-colored, well drained to moderately well drained soils. These soils are on broad flood plains of major streams and on narrow bottom lands along smaller streams. They belong to the Alluvial great soil group, but they are intergrading toward Brunizems. Huntsville soils formed in silty alluvium washed from uplands that had a mantle of loess.

These soils formed in positions similar to those of the Arenzville soils, but they have a darker colored surface layer. They are better drained than the Lawson soils and occupy slightly higher positions.

Representative profile of Huntsville silt loam in a bluegrass pasture:

- A11—0 to 3 inches, very dark brown (10YR 2/2) silt loam; moderate, very fine, subangular blocky structure; friable; mildly alkaline; abrupt, smooth boundary.
- A12—3 to 15 inches, black (10YR 2/1) silt loam; weak, thick, platy structure; friable; mildly alkaline; clear, wavy boundary.
- A13—15 to 42 inches, very dark gray (10YR 3/1) silt loam; moderate, fine and medium, subangular blocky structure; friable; neutral; clear, wavy boundary.
- A14—42 inches +, very dark brown (10YR 2/2) silt loam; moderate, fine, subangular blocky structure; friable; slightly acid.

In places there is a thin deposit of sandy overwash on the surface. Thin layers of sand occur throughout the profile in places. Gray silt loam or light silty clay loam occurs at a depth between 30 and 42 inches in places. In some mined areas chert and mine tailings are on the surface of these soils.

KELTNER SERIES

The soils of the Keltner series are dark colored and are well drained to moderately well drained. These soils are on the higher shale uplands south of Shullsburg and near the Platte Mounds. They belong to the Brunizem great soil group. Keltner soils formed under prairie grasses, partly in loess and partly in clayey residuum from shale. The upper part of their solum formed in loess, 30 to 50 inches thick, and the lower part formed in the residuum.

These soils have a darker colored, thicker surface layer than the Eleroy soils. They are similar to the Schapville soils, but less of the B horizon of those soils formed in loess. They are better drained and have less mottling than soils of the Schapville series, wet subsoil variant. Keltner soils are similar to Ashdale soils, but the lower part of the subsoil of those soils formed in residuum from dolomite.

Representative profile of Keltner silt loam in a cultivated field (SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 23, T. 1 N., R. 2 E., Lafayette County, Wis.):

- Ap—0 to 9 inches, black (10YR 2/1) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.
- A3—9 to 12 inches, very dark grayish brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; neutral; clear, wavy boundary.

- B1—12 to 20 inches, dark yellowish-brown (10YR 3/4) heavy silt loam; moderate, medium, subangular blocky structure; firm; medium acid; gradual, irregular boundary.
- B2—20 to 35 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.
- IIB3—35 to 39 inches, dark grayish-brown (2.5Y 4/2) and olive-brown (2.5Y 4/4) light silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/8) and grayish brown (10YR 5/2); weak, coarse, prismatic structure that breaks to moderate, medium, angular blocky; hard when dry, plastic when wet; clay films prominent; very dark gray (10YR 3/1) organic stains on faces of peds; neutral; clear, irregular boundary.
- IIC—39 inches +, dark grayish-brown (2.5Y 4/2) and olive-brown (2.5Y 4/4) light silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/8) and grayish brown (10YR 5/2); massive to moderate, medium, angular blocky structure; hard when dry, plastic when wet; a few partly weathered, yellowish-brown (10YR 5/6) shale rocks; effervesces weakly.

LAWSON SERIES

Soils of the Lawson series are deep, dark colored, and somewhat poorly drained throughout. They are on broad flood plains of major streams and on narrow bottom lands along smaller streams. These soils belong to the Alluvial great soil group but are intergrading toward the Humic Gley soils. Lawson soils formed in silty alluvium washed from uplands that had a mantle of loess.

These soils are more poorly drained than the Huntsville soils and occupy slightly lower positions. They are darker colored throughout than the Orion soils.

Representative profile of Lawson silt loam in a bluegrass pasture:

- A11—0 to 5 inches, black (10YR 2/1) silt loam; moderate, fine, subangular blocky structure; friable; mildly alkaline; clear, wavy boundary.
- A12—5 to 16 inches, black (10YR 2/1) silt loam; a few, fine, distinct mottles of strong brown (10YR 5/6); weak, thick, platy and moderate, medium, subangular blocky structure; friable; neutral; clear, wavy boundary.
- A13—16 to 23 inches, black (10YR 2/1) light silty clay loam; many, fine, distinct mottles of strong brown (10YR 5/6); moderate, fine, subangular blocky structure; firm; neutral; clear, wavy boundary.
- A14—23 to 47 inches, black (10YR 2/1) light silty clay loam; many, fine, distinct mottles of strong brown (10YR 5/6); moderate, fine and medium, angular blocky structure; slightly hard when dry, slightly plastic when wet; neutral; clear, wavy boundary.
- Cg—47 inches +, light olive-gray (5Y 6/2) light silty clay loam; many, medium, distinct mottles of strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2); massive; hard when dry, plastic when wet; neutral.

In some places lighter colored layers of very fine sand and silt are in the upper horizons. In places where the deposit of dark silty material is less than 42 inches thick, grayer material occurs at a depth between 30 and 42 inches.

LINDSTROM SERIES

In the Lindstrom series are deep, dark-colored, well-drained soils on valley slopes. These soils belong to the Brunzem great soil group. They formed under prairie grasses in silty deposits more than 42 inches thick.

The parent material in which these soils formed is similar to that of Fayette valley soils, and these soils occupy similar positions. They have a thicker, darker

A horizon than those soils. They have a somewhat coarser textured subsoil and substratum than the Tama soils, on upland ridges, and slightly less structural development in the B horizon. Also, unlike those soils, Lindstrom soils have fragments of sandstone and limestone in a few places in the solum and in some places sand is mixed in the surface layer.

Representative profile of Lindstrom silt loam in a cultivated field (NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 31, T. 3 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.
- A12—8 to 15 inches, black (10YR 2/1) and very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; friable; neutral; clear, irregular boundary.
- A3—15 to 21 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, subangular blocky structure; friable; neutral; clear, wavy boundary.
- B1—21 to 27 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, subangular blocky structure; friable; very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; gradual, wavy boundary.
- B2—27 to 34 inches, brown (10YR 4/3) heavy silt loam; moderate, medium, subangular blocky structure; friable; very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; gradual, wavy boundary.
- B3—34 to 40 inches, brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable; very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; gradual, wavy boundary.
- C—40 to 66 inches, dark yellowish-brown (10YR 4/4) silt loam; massive; friable; slightly acid.

In most places the A horizon is very dark brown (10YR 2/2) or black (10YR 2/1), but in cultivated and eroded areas, the A horizon is very dark grayish brown (10YR 3/2) or very dark gray (10YR 3/1). In places the solum contains small amounts of chert and coarse-textured material that washed or rolled from higher lying areas. The B2 horizon is thin in most places, and in some places it is light silty clay loam.

MARSHAN SERIES

The Marshan series consists of dark-colored, poorly drained soils on terraces. These soils belong to the Humic Gley great soil group. They formed in moderately thick, silty alluvium over sandy alluvium and are underlain by loose sand at a depth between 24 and 42 inches.

The Marshan soils occupy higher terraces than the Sable soils and are underlain by sandy material, rather than silty material. They have a darker, thicker surface layer and a grayer subsoil than soils of the Dakota series, mottled subsoil variant.

Representative profile of Marshan silt loam in a cultivated field (SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 23, T. 2 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; medium acid; abrupt, smooth boundary.
- A12—8 to 14 inches, very dark gray (10YR 3/1) gritty silt loam; a few, fine, distinct mottles of light gray (10YR 6/1) and yellowish brown (10YR 5/4); moderate, thick, platy structure; friable; medium acid; gradual, wavy boundary.
- B1g—14 to 19 inches, dark grayish-brown (2.5Y 4/2) heavy silt loam; a few, fine, faint mottles of light brownish gray (2.5Y 6/2) and olive brown (2.5Y 4/4); moderate, medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; neutral; clear, wavy boundary.

- B2g—19 to 29 inches, dark-gray (5Y 4/1) gritty silty clay loam; many, medium, distinct mottles of olive brown (2.5 4/4) and gray (N 5/0); moderate, medium, angular blocky structure; hard when dry, plastic when wet; very dark gray (10YR 3/1) organic stains; neutral; clear, wavy boundary.
- B3g—29 to 36 inches, gray (5Y 5/1) sandy clay loam; many, medium, distinct mottles of olive brown (2.5Y 4/4) and gray (N 5/0); moderate, medium, angular blocky structure; hard when dry, plastic when wet; very dark gray (10YR 3/1) organic stains; neutral; gradual, wavy boundary.
- Cg—36 inches +, gray (5Y 5/1) medium sand; single grain; loose; mildly alkaline.

The A horizon ranges from 12 to 18 inches in thickness. Depth to the underlying sand ranges from 24 to 42 inches.

MERIDIAN SERIES

In the Meridian series are light-colored, nearly level to gently sloping, well-drained soils on stream terraces. These soils belong to the Gray-Brown Podzolic great soil group. They formed under deciduous forest in sandy and loamy outwash and are underlain by loose sand at a depth between 2 and 3 feet.

These soils formed in parent material similar to that of the Dakota soils and occupy similar positions but they have a thinner, lighter colored surface layer. They are associated with the coarser textured Gotham soils, but they have a thinner, lighter colored A horizon and a finer textured B horizon.

Representative profile of Meridian loam in a cultivated field (SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 2, T. 3 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 7 inches, dark-brown (10YR 3/3) loam; moderate, fine, subangular blocky structure; friable; neutral; abrupt, smooth boundary.
- A2—7 to 10 inches, brown (10YR 4/3) light loam; weak, thick, platy structure; very friable; neutral; clear, wavy boundary.
- B1—10 to 16 inches, dark-brown (7.5YR 4/4) loam; moderate, medium, subangular blocky structure; friable; neutral; gradual, wavy boundary.
- B2—16 to 29 inches, strong-brown (7.5YR 4/6) light sandy clay loam; moderate, medium, subangular blocky structure; slightly hard when dry, slightly plastic when wet; slightly acid; clear, wavy boundary.
- B3—29 to 37 inches, strong-brown (7.5YR 5/6) sandy loam; weak, medium, subangular blocky structure; very friable; a few chert fragments; medium acid; gradual, irregular boundary.
- C—37 inches +, yellowish-brown (10YR 5/6) medium sand; single grain; loose; medium acid.

The surface layer ranges from very dark grayish brown (10YR 3/2) to dark gray (10YR 4/1). Texture of the B2 horizon ranges from sandy loam to sandy clay loam. In places thin layers of sandy loam or loamy sand, less than 1 inch thick, are in the C horizon.

MIFFLIN SERIES

The soils of the Mifflin series are light colored and are well drained. They are on upland ridges that border the East Branch of the Pecatonica River. These soils belong to the Gray-Brown Podzolic great soil group. They formed under deciduous forest in loamy material weathered from bedrock of sandstone and dolomitic limestone laid down in alternate layers.

These soils generally lack the mantle of loess that is typical of the Dubuque soils and are coarser textured throughout the solum. They are associated with the Hixton soils, but the lower part of their solum formed

in clayey residuum from limestone rather than in residuum from sandstone.

Representative profile of Mifflin loam in a cultivated field (SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 35, T. 4 N., R. 5 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loam; moderate, medium, subangular blocky structure; friable; slightly acid; abrupt, smooth boundary.
- A2—8 to 14 inches, brown (10YR 5/3) sandy loam; weak, thick, platy structure; very friable; slightly acid; clear, wavy boundary.
- B1—14 to 23 inches, dark yellowish-brown (10YR 4/4) heavy sandy loam; weak, medium, subangular blocky structure; very friable; medium acid; gradual, wavy boundary.
- B21—23 to 27 inches, yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) loam; moderate, medium, subangular blocky structure; very friable; organic stains on faces of pedis; medium acid; clear, wavy boundary.
- B22—27 to 37 inches, dark yellowish-brown (10YR 4/4) sandy clay loam; moderate, medium, subangular blocky structure; hard when dry, slightly plastic when wet; organic stains on faces of pedis; medium acid; gradual, irregular boundary.
- IIB23—37 to 43 inches, dark-brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) silty clay; strong, medium, angular blocky structure; hard when dry, plastic when wet; organic stains; slightly acid; abrupt, wavy boundary.
- IIR—43 inches +, partly shattered and disintegrated dolomite bedrock.

The texture of the surface layer varies widely within a short distance. There are areas of sandy loam, silt loam, or loam but the texture is mainly loam. The texture of the B horizon ranges from sandy loam to silty clay, depending on the kind of material and the sequence of the layers. Depth to clayey residuum ranges from 24 to 40 inches, but in some places the clayey residuum is absent.

MUSCATINE SERIES

In the Muscatine series are dark-colored, somewhat poorly drained soils that are in the uplands and on stream terraces. These soils belong to the Brunizem great soil group but are intergrading toward Humic Gley soils. They formed under prairie grasses in 42 inches or more of loess.

The Muscatine soils in the uplands are underlain by shale in most places, but in a few places they are underlain by dolomitic limestone. Muscatine soils on low benches are underlain by loose sand.

These soils formed in parent material similar to that of the Tama soils, but their B horizon is generally grayer throughout and is mottled in the upper part. Their drainage is similar to that of the Stronghurst soils, but they have a thicker, darker colored A horizon and lack an A2 horizon.

Representative profile of Muscatine silt loam in a cultivated field (SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 31, T. 1 N., R. 3 E., Lafayette County, Wis.):

- Ap—0 to 9 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; roots abundant; neutral; abrupt, smooth boundary.
- A3—9 to 15 inches, very dark gray (10YR 3/1) heavy silt loam; moderate, fine, subangular blocky structure; friable; many, fine, distinct mottles of dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6); roots plentiful; slightly acid; gradual, wavy boundary.
- B1—15 to 22 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; moderate, fine, subangular

blocky structure; firm; many, fine, distinct mottles of yellowish brown (10YR 5/6) and grayish brown (10YR 5/2); roots plentiful; black (10YR 2/1) organic stains on faces of peds; slightly acid; gradual, wavy boundary.

B2g—22 to 33 inches, dark grayish-brown (10YR 4/2) silty clay loam; many, fine, distinct mottles of yellowish brown (10YR 5/6) and gray (10YR 5/1); moderate, fine and medium, subangular blocky structure; firm; roots plentiful; some very dark brown (10YR 3/2) organic stains on the vertical faces of peds; thin patchy clay films on peds; medium acid; gradual, wavy boundary.

B3g—33 to 45 inches, grayish-brown (10YR 5/2) heavy silt loam; many, medium, distinct mottles of strong brown (7.5YR 5/6); weak, medium, subangular blocky structure; firm; a few roots; thin patchy clay films on peds; strongly acid; gradual, wavy boundary.

Cg—45 to 60 inches, grayish-brown (2.5Y 5/2) silt loam; many, medium, distinct mottles of strong brown (7.5YR 5/6) and gray (10YR 6/1); massive; friable; slightly acid.

The mantle of loess generally is 4 to 8 feet thick, but in places in the more level areas it is more than 8 feet thick. Thickness of the A horizon ranges from 12 to 18 inches, but in places where there is a thin layer of silty overwash, it is more than 18 inches thick.

NORTHFIELD SERIES

The soils in the Northfield series are light colored and are well drained. They are in the uplands and on valley slopes that border the East Branch of the Pecatonica River. These soils belong to the Gray-Brown Podzolic great soil group. They formed under a hardwood forest in sandy material 12 to 24 inches thick. The sandy material was weathered from fine-grained, platy sandstone.

These soils are near the Gale and Hixton soils. They are shallower to sandstone than the Hixton soils. They have a coarser textured subsoil than the Gale soils. Also, they lack the silty parent material and subsoil of the Gale soils.

Representative profile of Northfield loam in a wooded area that has not been cultivated (SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 13, T. 5 N., R. 5 E., Lafayette County, Wis.):

A1—0 to 2 inches, very dark brown (10YR 2/2) loam; moderate, medium, granular structure; friable; medium acid; clear, smooth boundary.

A2—2 to 5 inches, dark grayish-brown (10YR 4/2) loam; moderate, thin, platy structure; friable; medium acid; clear, wavy boundary.

B1—5 to 12 inches, brown (10YR 4/3) loam, moderate, medium, subangular blocky structure; friable; medium acid; clear, wavy boundary.

B2—12 to 18 inches, dark yellowish-brown (10YR 4/4) heavy loam; moderate, medium, subangular blocky structure; friable; a few sandstone pebbles; medium acid; clear, wavy boundary.

B3—18 to 21 inches, yellowish-brown (10YR 5/4) loam; weak, medium, subangular blocky structure; friable; medium acid; abrupt, wavy boundary.

R—21 inches +, iron-cemented, platy sandstone.

In cultivated areas the color of the A horizon ranges from very dark grayish brown (10YR 3/2) to dark gray (10YR 4/1). Depth to bedrock ranges from 12 to 24 inches. In places in the sandy loams, the B2 horizon consists only of sandy loam.

ORION SERIES

The soils of the Orion series are light colored and are somewhat poorly drained. These soils formed in deep, silty alluvium on broad flood plains of major streams

and on narrow bottoms of smaller streams. They belong to the Alluvial great soil group but are intergrading toward Low-Humic Gley soils. A darker, buried soil is in the profile at a depth of more than 18 inches.

These soils are similar in texture to the Lawson soils and occupy similar positions, but they have a lighter colored surface layer. They are better drained than soils of the Orion series, wet variant, and have a slightly lighter colored surface layer.

Representative profile of Orion silt loam in a pasture (in the center of the SW $\frac{1}{4}$ sec. 24, T. 7 N., R. 5 E., Iowa County, Wis.):

A11—0 to 2 inches, brown (10YR 5/3) silt loam; moderate, medium, platy structure; friable; neutral; abrupt, wavy boundary.

A12g—2 to 20 inches, dark-gray (10YR 4/1) silt loam; many medium, distinct mottles of strong brown (7.5YR 5/6); moderate, fine and medium, subangular blocky structure; friable; neutral; clear, wavy boundary.

A11gb—20 to 31 inches, black (10YR 2/1) silt loam; many, medium, prominent mottles of strong brown (7.5YR 5/6); weak, fine and medium, subangular blocky structure; friable; neutral; clear, wavy boundary.

A12gb—31 to 42 inches, black (2.5Y 2/2) and very dark grayish-brown (2.5 3/2) silt loam; many, fine, distinct mottles of yellowish brown (10YR 5/6); massive; firm; neutral; clear, wavy boundary.

A13gb—42 inches +, black (N 2/0) silt loam; massive; firm; neutral.

The thickness and arrangement of the horizons vary greatly because of stratification. In some places the upper layer of lighter colored material is more than 42 inches thick. Also, thin layers of fine sand are in the upper layers in some places. Mottling generally is at a depth of less than 18 inches. In some places the upper horizons are very dark grayish brown (10YR 3/2).

ORION SERIES, WET VARIANT

The variants from the normal Orion soils are deep and are poorly drained. They are in depressions on broad flood plains of major streams and on narrow bottoms of smaller streams. They belong to the Alluvial great soil group but are intergrading toward Low-Humic Gley soils. These variants formed in light colored to moderately dark colored silty alluvium. A darker, buried soil is in their profile at a depth of more than 18 inches.

These variants are near the normal Orion soils, but they are more poorly drained and therefore have a slightly darker and grayer surface layer. Their surface layer is lighter colored and lower in organic matter than that of the Sable soils on benches.

Representative profile of Orion silt loam, wet variant, in a bluegrass pasture:

A11—0 to 9 inches, very dark gray (10YR 3/1) silt loam; a few, medium, distinct mottles of light gray (10YR 6/1) and dark yellowish brown (10YR 4/4); moderate, fine, granular structure; friable; mildly alkaline; clear, wavy boundary.

A12—9 to 17 inches, gray (10YR 5/1) silt loam; a few, medium, distinct mottles of light gray (10YR 6/1) and dark yellowish brown (10YR 4/4); moderate, thin, platy structure; friable; mildly alkaline; abrupt, smooth boundary.

A13—17 to 27 inches, dark-gray (10YR 4/1) silty clay loam; many, medium, distinct mottles of dark yellowish brown (10YR 3/4) and gray (10YR 6/1); moderate, medium, subangular blocky structure; firm; bleached silt coatings and a few clay films on the faces of peds; mildly alkaline; clear, wavy boundary.

- A1b—27 to 36 inches, black (10YR 2/1) silty clay loam; many, medium, distinct mottles of dark yellowish brown (10YR 3/4) and gray (10YR 6/1); moderate, medium, subangular and angular blocky structure; firm; neutral; gradual, wavy boundary.
- Bgb—36 inches +, grayish-brown (2.5Y 5/2) heavy silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; firm; neutral.

The thickness and the arrangement of the horizons vary greatly because of stratification. In some places the upper layer of lighter colored material is more than 42 inches thick. Also, thin layers of fine sand are in the upper layers in some places. The upper horizons are dark gray (5Y 4/1) or gray (5Y 5/1) in places.

PALSGROVE SERIES

In the Palsgrove series are light-colored, well-drained soils in the limestone uplands. These soils belong to the Gray-Brown Podzolic great soil group. They formed under a deciduous forest, partly in loess, 30 to 50 inches thick, and partly in clayey residuum from limestone. Depth to limestone bedrock ranges from 42 to 60 inches.

Palsgrove soils have a thinner, lighter colored surface layer than the Ashdale soils. They are similar to the Fayette soils but formed partly in loess and partly in clayey residuum rather than entirely in loess. They have a thicker mantle of loess than the Dubuque soils. Also, only their B3 horizon formed in clayey residuum, but more of the B horizon of the Dubuque soils formed in that material. They are similar to the Eleroy soils, but the lower part of the solum of those soils formed in residuum from shale.

Representative profile of Palsgrove silt loam in an undisturbed site (SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 30, T. 1 N., R. 6 E., Green County, Wis.):

- A1—0 to 5 inches, very dark gray (10YR 3/1) silt loam; weak, fine, granular structure; friable; roots plentiful; neutral; abrupt, wavy boundary.
- A2—5 to 10 inches, brown (10YR 5/3) silt loam; moderate, thin, platy structure; friable; roots plentiful; neutral; clear, wavy boundary.
- B1—10 to 16 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, fine, subangular blocky structure; firm; roots plentiful; some yellowish-brown (10YR 5/4) and brown (10YR 5/3) silica coatings on faces of peds; slightly acid; gradual, wavy boundary.
- B21—16 to 21 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; roots plentiful; a few thin, patchy clay films on peds; medium acid; gradual, wavy boundary.
- B22—21 to 29 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; roots plentiful; many thin, patchy clay films on faces of peds; medium acid; clear, wavy boundary.
- B23—29 to 41 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, coarse, subangular blocky structure; firm; roots plentiful; many thin, patchy, dark brown (7.5YR 4/4) clay films on ped faces; strongly acid; abrupt, wavy boundary.
- IIB31—41 to 49 inches, dark reddish-brown (5YR 3/4) clay; strong, fine, angular blocky structure; very firm when moist, hard when dry, plastic when wet; a few plant roots; very dark gray (5YR 3/1) organic stains on vertical faces of peds; medium acid; gradual, wavy boundary.
- IIB32—49 to 58 inches, reddish-brown (5YR 4/4) clay; moderate, medium, angular blocky structure; hard when dry, plastic when wet; medium acid; rests abruptly on limestone bedrock.
- IIR—58 inches +, limestone bedrock.

ROZETTA SERIES

In the Rozetta series are deep, light-colored, moderately well drained soils on benches and terraces along streams. These soils belong to the Gray-Brown Podzolic great soil group. They formed under a deciduous forest in silt more than 42 inches thick.

These soils are associated with the well-drained Fayette soils on benches and the somewhat poorly drained Stronghurst soils on benches and have similar parent material. They have a lighter colored and thinner surface layer than the Tama soils and more mottling in the B horizon.

Representative profile of Rozetta silt loam, benches, in a cultivated field (SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 26, T. 4 N., R. 2 E., Lafayette County, Wis.):

- Ap—0 to 7 inches, dark-gray (10YR 4/1) silt loam; moderate, fine, granular structure; friable; slightly acid; abrupt, wavy boundary.
- A2—7 to 11 inches, grayish-brown (10YR 5/2) silt loam; moderate, thin, platy structure; friable; neutral; clear, wavy boundary.
- B1—11 to 16 inches, brown (10YR 5/3) heavy silt loam; weak, fine, subangular blocky structure; friable; light-colored silt coatings on faces of peds; neutral; clear, wavy boundary.
- B21—16 to 23 inches, brown (10YR 4/3) light silty clay loam; moderate, fine and medium, subangular blocky structure; light-colored silt coatings on faces of peds; friable; neutral; clear, wavy boundary.
- B22—23 to 29 inches, brown (10YR 4/3) silty clay loam; a few, fine, distinct mottles of strong brown (7.5YR 5/6) and light olive brown (2.5Y 5/4); weak, fine, prismatic structure that breaks to moderate, fine and medium, angular blocky; firm when moist, slightly sticky when wet; clay films on faces of peds; medium acid; clear, wavy boundary.
- B23—29 to 35 inches, brown (10YR 5/3) light silty clay loam; many, fine, distinct mottles of strong brown (7.5YR 5/6) and light olive brown (2.5Y 5/4); weak, fine, prismatic structure that breaks to moderate, fine and medium, angular blocky; firm when moist, slightly sticky when wet; clay films on faces of peds; slightly acid; clear, wavy boundary.
- B3—35 to 41 inches, brown (10YR 5/3) silt loam; many, fine, distinct mottles of strong brown (7.5YR 5/6) and light olive brown (2.5Y 5/4); moderate, medium, subangular blocky structure; friable; clay films on faces of peds; slightly acid; clear, wavy boundary.
- C1—41 to 72 inches, brown (10YR 5/3) silt loam; common, medium, distinct mottles of strong brown (7.5YR 5/6) and light olive brown (2.5Y 5/4); massive; friable; slightly acid; clear, wavy boundary.
- C2—72 inches +, brown (10YR 5/3) layers of sand and coarse silt; common, medium, distinct mottles of strong brown (7.5YR 5/6) and light olive brown (2.5Y 5/4); stratified; friable; slightly acid.

The color of the Ap horizon is very dark grayish brown (10YR 3/2), very dark gray (10YR 3/1), or dark gray (10YR 4/1). Depth to stratified sand and silt varies considerably but generally is more than 5 feet. The underlying sand is fine to medium.

SABLE SERIES

Soils of the Sable series are dark colored and are poorly drained. They are in the uplands and on benches. These soils belong to the Humic Gley great soil group. They formed in 42 inches or more of silt laid down by wind or water. The natural vegetation was grasses, sedges, reeds, and other plants that tolerate wetness.

The Sable soils on uplands are in nearly level depressions and generally are underlain by shale bedrock. The

Sable soils on benches are in low areas in stream valleys and are underlain by loose sand.

The Sable soils are associated with the Muscatine soils. They are more poorly drained than those soils, and they therefore have a darker and thicker surface layer and a grayer subsoil. They differ from the Calamine soils in having formed entirely in silt, rather than partly in silt and partly in residuum from shale.

Representative profile of Sable silt loam in a cultivated field (SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 36, T. 1 N., R. 3 E., Lafayette County, Wis.)

- Ap—0 to 8 inches, black (10YR 2/1) silt loam; moderate, fine and medium, angular blocky structure; friable; mildly alkaline; abrupt, smooth boundary.
- A12—S to 16 inches, black (10YR 2/1) silt loam; moderate, fine, crumb structure; friable; mildly alkaline; clear, wavy boundary.
- A3g—16 to 23 inches, dark-gray (10YR 4/1) silty clay loam; moderate, fine, crumb structure; slightly hard when dry, slightly plastic when wet; mildly alkaline; gradual, wavy boundary.
- B2g—23 to 31 inches, dark-gray (5Y 4/1) silty clay loam; many, fine, prominent mottles of yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4); moderate, fine, angular blocky structure; hard when dry, plastic when wet; clay films on faces of peds; mildly alkaline; gradual, irregular boundary.
- B3g—31 to 35 inches, grayish-brown (2.5Y 5/2) silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4); moderate, fine, angular blocky structure; hard when dry, plastic when wet; clay films on faces of peds; mildly alkaline; clear, wavy boundary.
- C1g—35 to 48 inches, grayish-brown (2.5Y 5/2) light silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4); massive; slightly hard when dry, slightly plastic when wet; mildly alkaline; abrupt, wavy boundary.
- IIC2g—48 to 66 inches, olive-yellow (2.5Y 6/8) and gray (N 6/0) silty clay; hard when dry, plastic when wet; effervesces weakly.

The mantle of silt on these soils ranges from 4 to 8 feet in thickness. Thickness of the A horizon ranges from 18 to 26 inches.

SCHAPVILLE SERIES

Soils of the Schapville series are dark colored and are well drained to moderately well drained. They are on the higher shale uplands south of Shullsburg and near the Platte Mounds. These soils belong to the Brunizem great soil group. In Lafayette County, the upper part of the solum of the Schapville soils formed in loess, 15 to 30 inches thick, and the lower part in clayey residuum from shale. The native vegetation was prairie grasses.

The Schapville soils have a darker colored, thicker surface layer than the Derinda soils. They are better drained and less mottled than the soils of the Schapville series, wet subsoil variant. They are similar to the Dodgeville soils, but the lower part of the subsoil of those soils formed in residuum from dolomite.

Representative profile of Schapville silt loam in a cultivated field (SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 23, T. 1 N., R. 2 E., Lafayette County, Wis.):

- Ap—0 to 8 inches, black (10YR 2/1) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

- A3—8 to 11 inches, very dark brown (10YR 2/2) silt loam; moderate, fine, subangular blocky structure; friable; neutral; clear, wavy boundary.
- B1—11 to 15 inches, dark-brown (10YR 4/3) silty clay loam; moderate, medium, subangular blocky structure; firm; medium acid; gradual, wavy boundary.
- B21—15 to 20 inches, dark-brown (10YR 4/3) heavy silty clay loam; moderate, fine and medium, angular blocky structure; slightly hard when dry, slightly plastic when wet; medium acid; gradual, wavy boundary.
- IIB22—20 to 27 inches, light olive-brown (2.5Y 5/4) silty clay; many, fine, faint mottles of olive yellow (2.5Y 6/6); moderate, fine, angular blocky structure; hard when dry, plastic when wet; slightly acid; gradual, wavy boundary.
- IIB23—27 to 30 inches, light olive-brown (2.5Y 5/4) silty clay; many, medium, faint mottles of olive yellow (2.5Y 6/6); weak, medium, subangular and angular blocky structure; hard when dry, plastic when wet; neutral; gradual, wavy boundary.
- IIR—30 inches +, light yellowish-brown (2.5Y 6/4) shale bedrock; platy structure; effervesces with acid.

SCHAPVILLE SERIES, WET SUBSOIL VARIANT

The variants from the normal Schapville soils are dark colored and are somewhat poorly drained. They are on the higher shale uplands south of Shullsburg and near the Platte Mounds. These soils belong to the Brunizem great soil group, but they are intergrading toward Humic Gley soils. The upper part of these variants formed in loess, 10 to 36 inches thick, and the lower part of the subsoil formed in clayey residuum from shale. The natural vegetation was prairie grasses.

These variants are associated with the normal Schapville soils, but they are more poorly drained and the upper part of their subsoil is mottled. Their drainage is similar to that of the soils of the Derinda series, wet subsoil variant, but their surface layer is thicker and darker colored.

Representative profile of Schapville silt loam, wet subsoil variant, in a pasture (NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 26, T. 1 N., R. 2 E., Lafayette County, Wis.):

- A1—0 to 12 inches, black (10YR 2/1) silt loam; moderate, fine, granular structure; friable; neutral; clear, wavy boundary.
- A3—12 to 16 inches, black (10YR 2/1) silt loam; moderate, fine, subangular blocky structure; friable; medium acid; clear, wavy boundary.
- B1—16 to 22 inches, very dark gray (10YR 3/1) light silty clay loam; a few, fine, distinct mottles of yellowish brown (10YR 5/4); moderate, fine, subangular blocky structure; friable; medium acid; gradual, irregular boundary.
- B2g—22 to 32 inches, very dark grayish-brown (10YR 3/2 and 2.5Y 3/2) silty clay loam; many, medium, distinct mottles of yellowish brown (10YR 5/4) and olive brown (2.5Y 4/4); moderate, fine, angular and subangular blocky structure; slightly hard when dry, slightly plastic when wet; clay films and very dark gray organic stains on faces of peds; medium acid; gradual, irregular boundary.
- IIB3g—32 to 40 inches, grayish-brown (2.5Y 5/2) silty clay; many, medium, distinct mottles of yellowish brown (10YR 5/4) and olive brown (2.5Y 4/4); moderate, medium, angular and subangular blocky structure; hard when dry, plastic when wet; clay films and very dark gray organic stains on faces of peds; mildly alkaline; abrupt, wavy boundary.
- IIR—40 inches +, light yellowish-brown (2.5Y 5/4) platy shale bedrock; effervesces weakly when acid is applied.

The A horizon ranges from black (10YR 2/1) to very dark gray (10YR 3/1) in color. Depth to shale bedrock ranges from 18 to 48 inches.

SOGN SERIES

The Sogn series consists of dark-colored, steep, well-drained soils that are very shallow to limestone bedrock. These soils belong to the Lithosol great soil group. They formed in the uplands, partly in loess and partly in loamy residuum from limestone. The loess is less than 10 inches thick. Originally, the vegetation was prairie grasses and hardwood trees.

Sogn soils are associated with the Dubuque and Dodgeville soils, but they formed in a thinner mantle of loess than those soils. Also, they lack the textural B horizon and red clayey residuum of the Dubuque and Dodgeville soils.

Representative profile of Sogn silt loam in a pasture (SE $\frac{1}{4}$ sec. 16, T. 7 N., R. 3 E., Iowa County, Wis.):

- A1—0 to 9 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; mildly alkaline; abrupt, wavy boundary.
 B1R—9 inches +, partly weathered, light yellowish-brown (10YR 6/4) limestone (dolomite) bedrock.

The A horizon ranges from 6 to 12 inches in thickness.

STRONGHURST SERIES

In the Stronghurst series are moderately dark colored, somewhat poorly drained soils that are in the uplands and on benches. These soils belong to the Gray-Brown Podzolic great soil group, but they are intergrading toward Low-Humic Gley soils. They formed under a deciduous forest in loess 42 inches or more thick.

The Stronghurst soils in the uplands are underlain by shale or limestone bedrock; those on low benches are underlain by loose sand.

These soils are associated with the Fayette soils and formed from similar parent materials, but generally they have a grayer B horizon that is mottled in the upper part. Their drainage is similar to that of the Muscatine soils, but they differ from those soils in having an A2 horizon and a thinner, lighter colored surface layer.

Representative profile of Stronghurst silt loam in a wooded pasture (NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 28, T. 1 N., R. 3 E., Lafayette County, Wis.):

- A1—0 to 4 inches, very dark gray (10YR 3/1) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, wavy boundary.
 A2—4 to 9 inches, grayish-brown (10YR 5/2) silt loam; a few, fine, distinct mottles of yellowish brown (10YR 5/6); moderate, thin, platy structure; friable; medium acid; clear, wavy boundary.
 B1—9 to 14 inches, brown (10YR 5/3) heavy silt loam; a few, fine, faint mottles of yellowish brown (10YR 5/6); weak, medium, subangular blocky structure; friable; strongly acid; gradual, wavy boundary.
 B21—14 to 23 inches, brown (10YR 5/3) silty clay loam; many, medium, faint mottles of yellowish brown (10YR 5/6); moderate, fine, subangular blocky structure; slightly hard when dry, slightly plastic when wet; clay films on faces of peds; strongly acid; gradual, wavy boundary.
 B22—23 to 30 inches, pale-brown (10YR 6/3) silty clay loam; many, medium, distinct mottles of strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4); moderate, fine, subangular blocky structure; slightly hard when dry, slightly plastic when wet; bleached silt coatings and clay films on faces of peds; very dark gray

- (10YR 3/1) organic stains; strongly acid; gradual, irregular boundary.
 B3—30 to 38 inches, light brownish-gray (10YR 6/2) silty clay loam; many, medium, distinct mottles of strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4); moderate, medium, angular blocky structure; slightly hard when dry, slightly plastic when wet; bleached silt coatings and clay films on faces of peds; strongly acid; gradual, irregular boundary.
 C—38 to 62 inches +, light brownish-gray (10YR 6/2) heavy silt loam; massive; slightly hard when dry, slightly plastic when wet; slightly acid; abrupt, wavy boundary.

The mantle of loess is 4 to 8 feet thick in most places, but it is 8 feet or more thick in some places. In color, the A horizon ranges from very dark gray (10YR 3/1) to dark gray (10YR 4/1).

TAMA SERIES

The Tama series consists of dark-colored, well-drained soils on broad ridges in the uplands and on stream terraces. These soils belong to the Brunizem great soil group. They formed under prairie grasses in 42 inches or more of loess.

The Tama soils in the uplands are underlain by limestone bedrock; those on high benches in stream valleys are underlain by acid, sandy outwash.

These soils formed in parent material similar to that of the Downs and Fayette soils, but they have a thicker, darker colored surface layer. Unlike the Palsgrove soils, whose B3 horizon formed in clayey residuum from limestone, their solum formed entirely in loess.

Representative profile of Tama silt loam in a hayfield:

- Ap—0 to 10 inches, black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; neutral; abrupt, wavy boundary.
 A3—10 to 16 inches, very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; friable; neutral; clear, wavy boundary.
 B1—16 to 21 inches, dark-brown (10YR 3/3) silt loam; moderate, fine, subangular blocky structure; friable; medium acid; clear, wavy boundary.
 B21—21 to 28 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
 B22—28 to 35 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; strongly acid; clear, wavy boundary.
 B3—35 to 40 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; very dark brown (10YR 2/2) organic stains on faces of peds; strongly acid; clear, wavy boundary.
 C—40 inches +, yellowish-brown (10YR 5/4) silt loam; weak, coarse, prismatic structure; friable; medium acid.

Depth to limestone bedrock or to acid, sandy outwash ranges from 4 to 8 feet. In places on the broad ridgetops in the uplands, the loess is more than 8 feet.

WORTHEN SERIES

In the Worthen series are dark-colored, deep, silty soils that are well drained to moderately well drained. These soils are in small areas in drainageways, at the ends of drainageways, and along foot slopes of steeper soils. They are widely distributed throughout the county. They belong to the Brunizem great soil group, but they are intergrading toward Alluvial soils. The Worthen soils formed under prairie in silty alluvium moved by water or by soil creep from uplands mantled with loess.

Typically, these soils lack a textural B horizon, but some profiles have a weakly expressed B horizon.

These soils are darker colored than the Chaseburg soils, which occupy like positions. They lack the textural B horizon of the Lindstrom soils, which are on uplands, and are less stratified than the Huntsville soils, which are on flood plains of streams.

Representative profile of Worthen silt loam in a bluegrass pasture (SW $\frac{1}{4}$ sec. 22, T. 1 N., R. 3 E., Lafayette County, Wis.):

A11—0 to 16 inches, black (10YR 2/1) silt loam; moderate, medium, crumb structure; friable; neutral; gradual, wavy boundary.

A12—16 to 28 inches, very dark grayish-brown (10YR 3/2) heavy silt loam; weak, medium, subangular blocky structure; friable; neutral; gradual, wavy boundary

B—28 to 40 inches, dark yellowish-brown (10YR 4/4) silt loam; a few, medium, faint mottles of grayish brown (10YR 5/2); weak, coarse, subangular blocky structure; friable; slightly acid; gradual, irregular boundary.

C—40 inches +, brown (10YR 4/3) silt loam; massive; friable; medium acid.

The color of the surface layer ranges from black (10YR 2/1) to very dark gray (10YR 3/1). In a few areas, a layer of sandy overwash is on the surface and the texture of the surface layer is sandy loam. In places at a depth of more than 2 feet, mottling occurs. There are thin layers of lighter colored silt or sand throughout the profile in places.

Additional Facts About the County

In this section the settlement and development of Lafayette County are discussed. Also discussed are the more outstanding features of the agriculture.

Settlement and Development

At first Lafayette County was part of Iowa County. In 1846, however, the present boundaries were established and the new county named for the Marquis de Lafayette, hero of the American Revolution.

Indians are believed to have mined lead in Lafayette County long before the French explorers, Dubuque and Du Bois, traveled through the area. Later, representatives of the Hudson Bay Company traded for furs in the area.

Miners attracted by the rich deposits of lead, established themselves on the site of the former village of Nachez, near the present village of New Diggings, in 1824. This was the first permanent settlement, but soon other lead deposits were located and other settlements established. The area abounded in wildlife, and the streams were well stocked with fish. Little farming was done by the miners.

Following the opening of the Erie Canal and the end of the Blackhawk War a few years later in 1832, many immigrants settled in the area, among them farmers. By 1850, there were 399 farms in the area. Their number increased until by 1880 there was a high of 2,463 farms, but this number decreased to 1,935 in 1959. According to the U.S. Census, the population of Lafayette

County was 18,142 in 1960, and more than half of the people lived on farms.

Wheat, other small grains, corn, and flax were the main crops grown by the early farmers. Gradually, the raising of beef cattle and hogs for market predominated. By 1900, however, dairying became the main source of income on the farms, and the acreage in corn, oats, tame hay, and pasture increased.

Transportation for moving agricultural products to market was limited until the railroad was extended to Prairie du Chien in 1857. This railroad, and other railroads completed in the 1880's, provided means for shipping agricultural products from the area. Most farmers now have access to good roads, and, on the average, are about 5 miles from market.

Lafayette County has many places of historical and scenic interest to the traveler. Recreational facilities are available throughout the county, and these have been increased by the recent construction of Yellowstone Lake.

Agriculture

The agriculture of Lafayette County is based primarily on dairy farming, but production of beef cattle and hogs is also important. The more outstanding features of the agriculture are discussed in the pages that follow. The statistics used are mainly from reports published by the U.S. Bureau of the Census.

Land use.—In 1959, farms occupied 384,185 acres in Lafayette County, or about 93 percent of the total land area. The farmland by use and the acreage used for each purpose in that year were as follows:

	<i>Acres</i>
Cropland, total	244,968
Harvested	205,120
Used only for pasture	36,061
Not harvested or pastured	3,787
Woodland, total	29,578
Pastured	23,024
Not pastured	5,954
Other land pastured (not cropland and not woodland)	93,727
Other land (house lots, roads, wasteland, and so on)	15,912

The proportion of land suitable for crops is higher in Lafayette County than the average for the State. As a result, the county ranks among the highest in the State in acreage used for crops per farm.

Types and sizes of farms.—There were 1,935 farms in Lafayette County in 1959. Of these 128 were miscellaneous or unclassified. The rest are listed according to major source of income as follows:

	<i>Number</i>
Dairy farms	1,275
Livestock farms other than dairy and poultry	447
Poultry farms	5
General farms	60
Field crops	20

The average size of the farms in 1959 was 198.5 acres, a slight increase from 190 acres in 1954. In general, the size of the individual farms has increased and the number of farms has decreased. The record number was in 1900 when there were 2,501 farms.

Crops.—Corn, hay, and oats are the main crops grown. In addition, some barley, wheat, and soybeans are grown, and corn and peas are grown on a few farms for canning. The main cropping system consists of growing

corn and oats for 1 year each, and then hay for 2 years. The following gives the acreage of the main crops grown in 1959:

Crop:	Acres
Corn for all purposes -----	87,317
Small grains, threshed or combined:	
Oats -----	44,152
Barley -----	289
Wheat -----	106
All hay -----	73,643
Alfalfa and alfalfa mixtures cut for hay -----	62,446
Clover and timothy and mixtures of clover and grasses cut for hay -----	8,001
Other hay cut -----	3,196
Soybeans for all purposes -----	128

The acreages in corn, hay, and oats have been fairly stable since about 1900, but yields have increased. This increase has come partly through using improved varieties of seed and partly because of using better management.

Corn, the main crop, has increased in acreage greatly since 1940, when 59,110 acres were grown. Yields have also increased. The increase in corn is probably because many of the farms are operated by tenants who grow hybrid corn for seed. In 1959, 870,783 bushels of hybrid seed corn was sold from the farms.

Alfalfa is the principal hay crop. The acreage in alfalfa and mixtures of alfalfa and grasses has increased greatly since 1940, when 24,390 acres of alfalfa was grown. On the other hand, the acreage in clover and timothy decreased as that of alfalfa and alfalfa mixtures increased. In 1959, only 8,001 acres was used to grow clover and timothy, as compared to 34,360 acres in 1940. Of the hay cut, only 17 acres was classified as wild hay.

Oats have always been an important crop in the county. The acreage has decreased somewhat since 1954, but the yield per acre has increased.

Once a main crop, wheat reached its peak in 1870, when 38,865 acres of wheat was grown. The acreage in barley, also an important crop at one time, has declined steadily from 1930, when a high of 12,760 acres of barley was grown. Soybeans were grown on only a few farms.

In 1959, truck vegetables were sold from a few farms, and strawberries also were sold from some farms.

Livestock and livestock products.—In 1959, livestock and livestock products accounted for about 94 percent of the total income derived from the sale of farm products. Of this, about 44 percent came from the sale of dairy products, about 25 percent from the sale of hogs and pigs, and about 24 percent from the sale of cattle and calves. Poultry and poultry products accounted for about 2 percent of the farm income, and miscellaneous products and cash crops accounted for the remaining 5 percent.

Milk is the largest single source of farm income. Cheese, butter, ice cream, and whole milk are the chief products, and Lafayette County ranks among the highest counties in the State in production of Swiss cheese.

Sheep and lambs were sold alive from about 210 farms in 1959. In addition, 46,308 pounds of wool were sold.

Pasture.—About 33.8 percent of the land in farms, or 129,788 acres, was in pasture in 1959. This acreage consisted of cropland used for pasture and of areas other than woodland. An additional 23,624 acres of woodland

was pastured, or 15.4 percent of the total used for pasture.

The acreage of woodland pastured has decreased in recent years. On many farms some of the wooded areas formerly used for pasture are now fenced and protected from fire and grazing.

Farm tenure.—Full owners operated about 46 percent of the farms in 1959. Tenants in that year operated about 40 percent and part owners, about 13 percent. Managers operated less than 1 percent of the farms.

The proportion of farms operated by tenants has been declining since 1945, and the number of owners who rent additional land is increasing. About 22 percent of the farmers who own and operate their own farms also rent additional land to work.

Conservation practices.—The use of practices that help conserve soil and water is important in Lafayette County. Many of the cultivated soils in the county are eroded. Much of the erosion is caused by excessive runoff, which causes gullies to form, scours galled spots on hillsides, and deposits soil material from higher areas onto fertile soils of the bottom land.

Stripcropping, farming on the contour, and the growing of cover crops are the practices most widely used in this county to conserve the soils and save water. Other practices used are terracing, establishing diversions, constructing grassed waterways, building structures for the control of gullies, improving pastures, planting trees, selective cutting of woodland, and improving the areas for wildlife. In addition, farm ponds have been built in many places, and in some places drainage systems have been installed.

The reason runoff causes erosion is because the soils receive water faster than they can absorb it. Applying practices that help increase the rate of infiltration slows runoff and thus reduces erosion. The rate at which water infiltrates a soil depends on many factors. Some are related to the characteristics of the soil, and some result from the way the land is used. Therefore, a knowledge of recent research and practical experience about land use is helpful in planning the use of individual soils on a farm. Such information is available from local technicians of the Soil Conservation Service.

The number of farmers that are placing their farms under a complete soil conservation program is increasing. In 1959, more than 55 thousand acres, or greater than 14 percent of all the land in farms, was under land use practices.

Glossary

Acidity. See Reaction.

AC soil. A soil that has only A and C horizons in the profile and no clearly developed B horizon; lacks a subsoil.

Aggregate, soil. A single mass or cluster consisting of many individual soil particles held together, such as a prism, crumb, or clod.

Alluvium. Soil or rock material, such as gravel, sand, silt, or clay, deposited by a stream.

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

Catena. A group of soils developed from similar parent materials but that have different characteristics because of differences in relief and drainage.

Chert. Irregularly shaped, angular fragments of crystalline quartz rock weathered from cherty limestone.

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.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

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

Loose.—Noncoherent; will 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.

Contour stripcropping. Growing crops in strips that follow the contour or that are parallel to terraces or diversions; strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Diversion. A broad-bottomed ditch that serves to divert runoff water so that it will flow around the slope to a safe outlet.

Drainage, natural. Refers to the conditions 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 drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have 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 in Podzolic soils commonly have mottlings below 6 to 16 inches in the lower A horizon and in the B and C horizons.

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.

Dolomite. A calcium-magnesium carbonate mineral. Limestone that contains magnesium carbonate is commonly called dolomitic limestone.

Dune. A mound or ridge of loose sand piled up by wind.

Erosion. The wearing away of the land surface by wind, moving water, or ice and by such processes as landslides and creep.

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.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, that has distinct characteristics produced by soil-forming processes. The relative positions of the several soil horizons in the profile and their nomenclature follow:

Horizon A. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and that have lost clay minerals, iron, and aluminum with resultant concentration of the more

resistant minerals; or (3) horizons belonging to both of these categories.

Horizon B. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, with accessory organic materials; or (2) blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizons or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly, the lower limit of the B horizon corresponds to the lower limit of the solum.

Horizon C. A mineral layer, excluding bedrock, that is either like or unlike the material from which the solum is presumed to have formed, relatively little affected by pedogenic processes, and lacking properties of A or B but including materials modified by weathering outside the zone of major biological activity.

Horizon R. Underlying consolidated bedrock, such as granite, sandstone, or limestone. If presumed to be like the parent rock from which the adjacent overlying layer was formed, the symbol R is used alone. If presumed to be unlike the overlying material, the R is preceded by a Roman numeral, which denotes lithologic discontinuity.

Humus. The well-decomposed, more or less stable, dark-colored part of the organic matter in mineral soils.

Loess. Geological deposits of fairly uniform, fine material, mostly silt, presumably deposited by wind.

Massive. Large uniform masses of cohesive soil, in some places with ill-defined and irregular breakage, as in some of the fine-textured alluvial soils; structureless.

Morphology, soil. The physical constitution of the soil, including the texture, structure, consistence, color and other physical, chemical, mineralogical and biologic properties of the various horizons that make up the soil profile.

Mottled. Irregularly marked with different colors that vary in number and size. Mottling in soils generally indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common, or many*; size—*fine, medium, or coarse*; contrast—*faint, distinct, or prominent*.

Muck. An organic soil consisting of fairly well decomposed organic material that is relatively high in mineral content, finely divided, and dark in color.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 3/2 is a color with the hue of 10YR, the value of 3, and the chroma of 2.

Parent material (soil). The horizon of weathered rock or partly weathered soil material from which the soil has formed.

Peat. Unconsolidated soil material, largely undecomposed organic matter, that has accumulated where there has been excess moisture.

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

Permeability, soil. The quality of a soil that enables it to transmit air and water. The following relative classes of soil permeability refer to estimated rates of movement of water in inches per hour through saturated undisturbed cores under a one-half inch head of water:

	<i>Inches per hour</i>
Very slow.....	Less than 0.05
Slow.....	0.05 to 0.20
Moderately slow.....	0.20 to 0.80
Moderate.....	0.80 to 2.50
Moderately rapid.....	2.50 to 5.00
Rapid.....	5.00 to 10.00
Very rapid.....	10 or more.

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

Reaction. The degree of acidity or alkalinity of soil expressed in pH values or in words as follows:

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

Relief. The elevations and inequalities of the land surface, considered collectively.

Sand. Individual fragments of rocks and minerals that have diameters ranging from 0.05 millimeter (0.002 inch) to 2.0 millimeters (0.079 inch). Most sand grains consist of quartz, but they may be of any mineral composition. The term sand also is applied to a soil that contains 85 percent or more of sand and not more than 10 percent of 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.

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 upon parent material as conditioned by relief over periods of time.

Solum, soil. 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.

Stratified. Deposited in layers. In soils, it refers to sandy and gravelly material, or both, when laid down by running water on stream terraces.

Structure, soil. The arrangement of primary soil particles into lumps, granules, or other aggregates. Structure is described by grade (weak, moderate, or strong), that is, the distinctness and durability of the aggregates; by the size of the aggregates (very fine, fine, medium, coarse, or very coarse); and their shape (platy, prismatic, columnar, blocky, granular, or crumb). A soil is described as structureless if there are no observable aggregates. Structureless soils may be massive (coherent) or single grain (noncoherent).

Blocky, angular. Aggregates are block shaped; they may have flat or rounded surfaces that join at sharp angles.

Blocky, subangular. Aggregates have some rounded and some plane surfaces; vertices are rounded.

Columnar. Aggregates are prismatic and are rounded at the upper ends.

Crumb. Generally soft, small, porous aggregates, irregular, but tending toward a spherical shape.

Granular. Roughly spherical, firm, small aggregates that may be either hard or soft but that are generally firmer than crumb and lack the distinct faces of blocky structure.

Platy. Soil particles are arranged around a plane that is generally horizontal.

Prismatic. Soil particles are arranged around a vertical line; aggregates have flat, vertical faces.

Subsoil. The B horizon of soils with distinct profiles. Generally, that portion of the profile that is between the plow layer and the unweathered layers below.

Substratum. Any layer beneath the solum, either conforming (C or R) or unconforming.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil.

Terrace, stream. An area that is fairly level and formerly was the flood plain of a stream but now lies above the present flood plain; the area is underlain by stratified stream sediments.

Terracing. Construction of shallow, nearly level ditches that have broad slopes suitable for farming; used for controlling runoff water on sloping land.

Texture. The relative proportion of sand, silt, and clay particles in a soil. The basic textural classes in increasing proportions 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. The condition of a soil or seedbed in relation to the growth of plants, especially soil structure.

Upland. Land that lies above the stream terraces and that is underlain by bedrock at fairly shallow depths; generally, all areas that are not on terraces or bottom land.

Vesicular. Small openings or pores within the structural aggregates of a soil.

Weathering. The physical and chemical disintegration and decomposition of rocks and minerals. Soil is the result of weathering and other chemical, physical, and biological alterations that have changed the upper part of the earth's crust through various periods of time.

GUIDE TO MAPPING UNITS, CAPABILITY UNITS, AND WOODLAND SUITABILITY GROUPS

[See table 10, p. 71, for the acreage and proportionate extent of the soils, and table 5, p. 27, for the estimated yields. To find the engineering properties of the soils, see the section beginning on p. 38]

Map symbol	Soil name	Page	Capability unit		Woodland suitability group	
			Symbol	Page	Number	Page
Ad	Alluvial land-----	73	Vw-14	24	9	35
An	Arenzville silt loam-----	74	IIw-11	17	1	31
AsB	Ashdale silt loam, 2 to 6 percent slopes-----	74	IIe-1	14	12	36
AsB2	Ashdale silt loam, 2 to 6 percent slopes, moderately eroded-----	74	IIe-1	14	12	36
AsC	Ashdale silt loam, 6 to 12 percent slopes-----	74	IIIe-1	18	12	36
AsC2	Ashdale silt loam, 6 to 12 percent slopes, moderately eroded-----	74	IIIe-1	18	12	36
AsC3	Ashdale silt loam, 6 to 12 percent slopes, severely eroded-----	74	IVe-1	20	12	36
AsD	Ashdale silt loam, 12 to 20 percent slopes-----	75	IVe-1	20	12	36
AsD2	Ashdale silt loam, 12 to 20 percent slopes, moderately eroded-----	75	IVe-1	20	12	36
AsD3	Ashdale silt loam, 12 to 20 percent slopes, severely eroded-----	75	VIe-1	24	12	36
Ba	Boaz silt loam-----	75	IIw-13	17	9	35
BoD2	Boone fine sand, 6 to 20 percent slopes, eroded-----	76	VIIIs-9	26	4	33
CaA	Calamine silt loam, 0 to 2 percent slopes-----	76	IVw-3	23	7b	35
CaB	Calamine silt loam, 2 to 6 percent slopes-----	76	IVw-3	23	7b	35
CaC	Calamine silt loam, 6 to 12 percent slopes-----	76	IVw-3	23	7b	35
CaC2	Calamine silt loam, 6 to 12 percent slopes, moderately eroded-----	76	IVw-3	23	7b	35
ChA	Chaseburg silt loam, 0 to 2 percent slopes-----	77	I-1	14	1	31
ChB	Chaseburg silt loam, 2 to 6 percent slopes-----	77	IIe-5	15	1	31
DaA	Dakota loam, 0 to 2 percent slopes-----	77	IIIs-1	18	3	32
DaB	Dakota loam, 2 to 6 percent slopes-----	78	IIe-2	15	3	32
DbB	Dakota loam, mottled subsoil variant, 0 to 3 percent slopes-----	78	IIw-5	17	12	36
DdB2	Derinda silt loam, 2 to 6 percent slopes, moderately eroded-----	78	IIe-6	15	1	31
DdC	Derinda silt loam, 6 to 12 percent slopes-----	79	IIIe-6	19	1	31
DdC2	Derinda silt loam, 6 to 12 percent slopes, moderately eroded-----	79	IIIe-6	19	1	31
DdD2	Derinda silt loam, 12 to 20 percent slopes, eroded-----	79	IVe-6	22	1	31
DeB	Derinda silt loam, wet subsoil variant, 2 to 6 percent slopes-----	79	IIw-3	16	7a	35
DeC2	Derinda silt loam, wet subsoil variant, 6 to 12 percent slopes, eroded-----	80	IIIe-8	20	7a	35
DfD3	Derinda soils, 12 to 20 percent slopes, severely eroded-----	79	VIe-6	25	1	31
DgB2	Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded-----	80	IIe-2	15	12	36
DgC	Dodgeville silt loam, 6 to 12 percent slopes-----	80	IIIe-2	18	12	36
DgC2	Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded-----	80	IIIe-2	18	12	36
DgD	Dodgeville silt loam, 12 to 20 percent slopes-----	81	IVe-2	21	12	36
DgD2	Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded-----	81	IVe-2	21	12	36
DhC3	Dodgeville soils, 6 to 12 percent slopes, severely eroded-----	81	IVe-2	21	12	36
DhD3	Dodgeville soils, 12 to 20 percent slopes, severely eroded-----	81	VIe-2	24	12	36

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Woodland
Capability unit suitability group

Map symbol	Soil name	Page	Symbol	Page	Number	Page
DoB2	Downs silt loam, 2 to 6 percent slopes, moderately eroded----	81	IIE-1	14	1	31
DoC2	Downs silt loam, 6 to 12 percent slopes, moderately eroded---	81	IIIE-1	18	1	31
DsB	Dubuque silt loam, 2 to 6 percent slopes-----	82	IIE-2	15	1	31
DsB2	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded--	82	IIE-2	15	1	31
DsC	Dubuque silt loam, 6 to 12 percent slopes-----	82	IIIE-2	18	1	31
DsC2	Dubuque silt loam, 6 to 12 percent slopes, moderately eroded-	82	IIIE-2	18	1	31
DsD	Dubuque silt loam, 12 to 20 percent slopes-----	82	IVE-2	21	1	31
DsD2	Dubuque silt loam, 12 to 20 percent slopes, moderately eroded-----	82	IVE-2	21	1	31
DsE	Dubuque silt loam, 20 to 30 percent slopes-----	82	VIIE-2	24	1	31
DsE2	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded-----	82	VIIE-2	24	1	31
DsF	Dubuque silt loam, 30 to 45 percent slopes-----	82	VIIIE-2	25	1	31
DtC3	Dubuque soils, 6 to 12 percent slopes, severely eroded-----	83	IVE-2	21	1	31
DtD3	Dubuque soils, 12 to 20 percent slopes, severely eroded-----	83	VIIE-2	24	1	31
DuB	Dunbarton silt loam, 2 to 6 percent slopes-----	83	IIIE-3	19	5	34
DuC	Dunbarton silt loam, 6 to 12 percent slopes-----	83	IVE-3	22	5	34
DuC2	Dunbarton silt loam, 6 to 12 percent slopes, moderately eroded-----	83	IVE-3	22	5	34
DuD	Dunbarton silt loam, 12 to 20 percent slopes-----	83	VIIE-3	24	5	34
DuD2	Dunbarton silt loam, 12 to 20 percent slopes, moderately eroded-----	83	VIIE-3	24	5	34
DuE	Dunbarton silt loam, 20 to 30 percent slopes-----	83	VIIIE-3	26	5	34
DuE2	Dunbarton silt loam, 20 to 30 percent slopes, moderately eroded-----	83	VIIIE-3	26	5	34
DuF	Dunbarton silt loam, 30 to 45 percent slopes-----	84	VIIIE-3	26	5	34
EdB2	Edmund silt loam, 2 to 6 percent slopes, moderately eroded---	84	IIIE-3	19	12	36
EdC2	Edmund silt loam, 6 to 12 percent slopes, moderately eroded--	84	IVE-3	22	12	36
EdD	Edmund silt loam, 12 to 20 percent slopes-----	84	VIIE-3	24	12	36
ErB	Eleroy silt loam, 2 to 6 percent slopes-----	85	IIE-6	15	1	31
ErB2	Eleroy silt loam, 2 to 6 percent slopes, moderately eroded---	85	IIE-6	15	1	31
ErC	Eleroy silt loam, 6 to 12 percent slopes-----	85	IIIE-6	19	1	31
ErC2	Eleroy silt loam, 6 to 12 percent slopes, moderately eroded--	85	IIIE-6	19	1	31
ErD	Eleroy silt loam, 12 to 20 percent slopes-----	85	IVE-6	22	1	31
ErD2	Eleroy silt loam, 12 to 20 percent slopes, moderately eroded-	85	IVE-6	22	1	31
FaB	Fayette silt loam, benches, 2 to 6 percent slopes-----	86	IIE-1	14	1	31
FaB2	Fayette silt loam, benches, 2 to 6 percent slopes, moderately eroded-----	86	IIE-1	14	1	31
FaC2	Fayette silt loam, benches, 6 to 12 percent slopes, moder- ately eroded-----	86	IIIE-1	18	1	31
FdB	Fayette silt loam, uplands, 2 to 6 percent slopes-----	86	IIE-1	14	1	31
FdB2	Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded-----	86	IIE-1	14	1	31
FdC	Fayette silt loam, uplands, 6 to 12 percent slopes-----	86	IIIE-1	18	1	31
FdC2	Fayette silt loam, uplands, 6 to 12 percent slopes, moder- ately eroded-----	86	IIIE-1	18	1	31
FdC3	Fayette silt loam, uplands, 6 to 12 percent slopes, severely eroded-----	86	IVE-1	20	1	31
FdD	Fayette silt loam, uplands, 12 to 20 percent slopes-----	87	IVE-1	20	1	31
FdD2	Fayette silt loam, uplands, 12 to 20 percent slopes, moder- ately eroded-----	87	IVE-1	20	1	31
FdE	Fayette silt loam, uplands, 20 to 30 percent slopes-----	87	VIIE-1	24	1	31
FeB	Fayette silt loam, valleys, 2 to 6 percent slopes-----	87	IIE-1	14	1	31
FeB2	Fayette silt loam, valleys, 2 to 6 percent slopes, moderately eroded-----	87	IIE-1	14	1	31
FeC	Fayette silt loam, valleys, 6 to 12 percent slopes-----	87	IIIE-1	18	1	31
FeC2	Fayette silt loam, valleys, 6 to 12 percent slopes, moder- ately eroded-----	87	IIIE-1	18	1	31

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Map symbol	Soil name	Page	Woodland suitability group			
			Capability unit	Page	Number	Page
FeD	Fayette silt loam, valleys, 12 to 20 percent slopes-----	87	IVe-1	20	1	31
FeD2	Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded-----	87	IVe-1	20	1	31
FpB2	Fayette and Dubuque soils and Pits, gently sloping, eroded-- Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded-----	88 --	IIe-1	14	1	31
	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded-----	--	IIe-2	15	1	31
	Mine pits and dumps-----	--	VIIIIs-10	27	13	36
FpC2	Fayette and Dubuque soils and Pits, moderately sloping, eroded-----	88				
	Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded-----	--	IIIe-1	18	1	31
	Dubuque silt loam, 6 to 12 percent slopes, moderately eroded-----	--	IIIe-2	18	1	31
	Mine pits and dumps-----	--	VIIIIs-10	27	13	36
FpD2	Fayette and Dubuque soils and Pits, moderately steep, eroded-----	88				
	Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded-----	--	IVe-1	20	1	31
	Dubuque silt loam, 12 to 20 percent slopes, moderately eroded-----	--	IVe-2	21	1	31
	Mine pits and dumps-----	--	VIIIIs-10	27	13	36
GaC2	Gale silt loam, 6 to 12 percent slopes, eroded-----	88	IIIe-2	18	1	31
GaD2	Gale silt loam, 12 to 20 percent slopes, eroded-----	89	IVe-2	21	1	31
GaE2	Gale silt loam, 20 to 30 percent slopes, eroded-----	89	VIe-2	24	1	31
GoB2	Gotham loamy fine sand, 2 to 6 percent slopes, eroded-----	89	IVs-3	23	4	33
GoC2	Gotham loamy fine sand, 6 to 20 percent slopes, moderately eroded-----	89	VIe-9	25	4	33
HmB2	Hixton loam, 2 to 6 percent slopes, eroded-----	90	IIe-2	15	3	32
HmC2	Hixton loam, 6 to 12 percent slopes, eroded-----	90	IIIe-2	18	3	32
HmD	Hixton loam, 12 to 20 percent slopes-----	90	IVe-2	21	3	32
HmD2	Hixton loam, 12 to 20 percent slopes, moderately eroded----	90	IVe-2	21	3	32
HmE2	Hixton loam, 20 to 30 percent slopes, eroded-----	90	VIe-2	24	3	32
HtB2	Hixton sandy loam, 2 to 6 percent slopes, eroded-----	90	IIIe-4	19	3	32
HtC2	Hixton sandy loam, 6 to 12 percent slopes, eroded-----	90	IVe-4	22	3	32
HtD2	Hixton sandy loam, 12 to 20 percent slopes, eroded-----	91	VIe-4	25	3	32
HtD3	Hixton sandy loam, 12 to 20 percent slopes, severely eroded--	91	VIIe-4	26	3	32
HtE	Hixton sandy loam, 20 to 30 percent slopes-----	91	VIIe-4	26	3	32
Hu	Houghton mucky peat-----	91	IIIw-9	20	10	36
HvA	Huntsville silt loam, 0 to 2 percent slopes-----	91	IIw-11	17	12	36
HvB	Huntsville silt loam, 2 to 6 percent slopes-----	91	IIw-11	17	12	36
KeB	Keltner silt loam, 2 to 6 percent slopes-----	92	IIe-6	15	12	36
KeB2	Keltner silt loam, 6 to 12 percent slopes, moderately eroded-----	92	IIIe-6	19	12	36
La	Lawson silt loam-----	92	IIw-13	17	12	36
LsB	Lindstrom silt loam, 2 to 6 percent slopes-----	93	IIe-1	14	12	36
LsC2	Lindstrom silt loam, 6 to 12 percent slopes, eroded-----	93	IIIe-1	18	12	36
LsD2	Lindstrom silt loam, 12 to 20 percent slopes, eroded-----	93	IVe-1	20	12	36
Ma	Marsh-----	93	VIIw-15	26	10	36
Mb	Marshan silt loam-----	93	IIw-5	17	7b	35
MdA	Meridian loam, 0 to 2 percent slopes-----	94	IIIs-1	18	3	32
MdB	Meridian loam, 2 to 6 percent slopes-----	94	IIe-2	15	3	32
MeA	Meridian sandy loam, 0 to 2 percent slopes-----	94	IIIIs-2	20	3	32
MeB	Meridian sandy loam, 2 to 6 percent slopes-----	94	IIIe-4	19	3	32
MfB2	Mifflin soils, 2 to 6 percent slopes, eroded-----	95	IIe-2	15	1	31
MfC2	Mifflin soils, 6 to 12 percent slopes, eroded-----	95	IIIe-2	18	1	31

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Map symbol	Soil name	Page	Capability unit		Woodland suitability group	
			Symbol	Page	Number	Page
MFD2	Mifflin soils, 12 to 20 percent slopes, eroded-----	95	IVe-2	21	1	31
MFE2	Mifflin soils, 20 to 30 percent slopes, eroded-----	95	VIe-2	24	1	31
Mp	Mine pits and dumps-----	95	VIIIIs-10	27	13	36
MsA	Muscatine silt loam, 0 to 2 percent slopes-----	96	I-1	14	12	36
MsB	Muscatine silt loam, 2 to 6 percent slopes-----	96	IIe-1	14	12	36
MsB2	Muscatine silt loam, 2 to 6 percent slopes, moderately eroded-----	96	IIe-1	14	7a	35
MuA	Muscatine silt loam, benches, 0 to 2 percent slopes-----	96	I-1	14	12	36
MuB	Muscatine silt loam, benches, 2 to 6 percent slopes-----	96	IIe-1	14	12	36
NfC	Northfield loam, 6 to 12 percent slopes-----	97	IVe-3	22	5	34
NfC2	Northfield loam, 6 to 12 percent slopes, moderately eroded--	97	IVe-3	22	5	34
NfD	Northfield loam, 12 to 20 percent slopes-----	97	VIe-3	24	5	34
NfD2	Northfield loam, 12 to 20 percent slopes, moderately eroded-	97	VIe-3	24	5	34
NfE	Northfield loam, 20 to 30 percent slopes-----	97	VIIe-3	26	5	34
NfE2	Northfield loam, 20 to 30 percent slopes, moderately eroded-	97	VIIe-3	26	5	34
NoB2	Northfield sandy loam, 2 to 6 percent slopes, moderately eroded-----	97	IIIe-3	19	5	34
NoC	Northfield sandy loam, 6 to 12 percent slopes-----	97	IVe-3	22	5	34
NoC2	Northfield sandy loam, 6 to 12 percent slopes, moderately eroded-----	97	IVe-3	22	5	34
NoD	Northfield sandy loam, 12 to 20 percent slopes-----	97	VIe-3	24	5	34
NoD2	Northfield sandy loam, 12 to 20 percent slopes, moderately eroded-----	97	VIe-3	24	5	34
NoE	Northfield sandy loam, 20 to 30 percent slopes-----	98	VIIe-3	26	5	34
NoE2	Northfield sandy loam, 20 to 30 percent slopes, moderately eroded-----	98	VIIe-3	26	5	34
NoF	Northfield sandy loam, 30 to 45 percent slopes-----	98	VIIe-3	26	5	34
On	Orion silt loam-----	98	IIw-13	17	9	35
Ow	Orion silt loam, wet variant-----	99	Vw-14	24	9	35
PaB	Palsgrove silt loam, 2 to 6 percent slopes-----	99	IIe-1	14	1	31
PaB2	Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded-----	99	IIe-1	14	1	31
PaC	Palsgrove silt loam, 6 to 12 percent slopes-----	99	IIIe-1	18	1	31
PaC2	Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded-----	99	IIIe-1	18	1	31
PaC3	Palsgrove silt loam, 6 to 12 percent slopes, severely eroded-----	99	IVe-1	20	1	31
PaD	Palsgrove silt loam, 12 to 20 percent slopes-----	99	IVe-1	20	1	31
PaD2	Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded-----	99	IVe-1	20	1	31
PaD3	Palsgrove silt loam, 12 to 20 percent slopes, severely eroded-----	100	VIe-1	24	1	31
RzA	Rozetta silt loam, benches, 0 to 2 percent slopes-----	100	I-1	14	1	31
RzB	Rozetta silt loam, benches, 2 to 6 percent slopes-----	100	IIe-1	14	1	31
RzB2	Rozetta silt loam, benches, 2 to 6 percent slopes, moderately eroded-----	100	IIe-1	14	1	31
RzC2	Rozetta silt loam, benches, 6 to 12 percent slopes, moderately eroded-----	100	IIIe-1	18	1	31
Sa	Sable silt loam-----	101	IIw-1	16	7b	35
Sb	Sable silt loam, benches-----	101	IIw-1	16	7b	35
ScC2	Schapville silt loam, 6 to 12 percent slopes, moderately eroded-----	101	IIIe-6	19	12	36
ShC3	Schapville soils, 6 to 12 percent slopes, severely eroded---	102	IVe-6	22	12	36
SmB	Schapville silt loam, wet subsoil variant, 2 to 6 percent slopes-----	102	IIw-3	16	12	36
SoC2	Sogn silt loam, 2 to 12 percent slopes, eroded-----	102	VIIs-5	25	6	34

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Map symbol	Soil name	Page	Capability unit		Woodland suitability group	
			Symbol	Page	Number	Page
SoD	Sogn silt loam, 12 to 20 percent slopes-----	103	VI s-5	25	6	34
SoD2	Sogn silt loam, 12 to 20 percent slopes, moderately eroded---	103	VI s-5	25	6	34
SoE	Sogn silt loam, 20 to 30 percent slopes-----	103	VII s-5	26	6	34
SoF	Sogn silt loam, 30 to 45 percent slopes-----	103	VII s-5	26	6	34
SrE	Stony and rocky land, moderately steep-----	103	VII s-5	26	13	36
SrF	Stony and rocky land, steep-----	104	VII s-5	26	13	36
SsA	Stronghurst silt loam, 0 to 2 percent slopes-----	105	II w-2	16	7a	35
SsB	Stronghurst silt loam, 2 to 6 percent slopes-----	105	II w-2	16	7a	35
SsB2	Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded-----	105	II w-2	16	7a	35
StA	Stronghurst silt loam, benches, 0 to 2 percent slopes-----	105	II w-2	16	7a	35
StB	Stronghurst silt loam, benches, 2 to 6 percent slopes-----	105	II w-2	16	7a	35
TaA	Tama silt loam, 0 to 2 percent slopes-----	106	I-1	14	12	36
TaB	Tama silt loam, 2 to 6 percent slopes-----	106	II e-1	14	12	36
TaB2	Tama silt loam, 2 to 6 percent slopes, moderately eroded----	106	II e-1	14	12	36
TaC2	Tama silt loam, 6 to 12 percent slopes, moderately eroded----	106	III e-1	18	12	36
TaC3	Tama silt loam, 6 to 12 percent slopes, severely eroded----	106	IV e-1	20	12	36
TbA	Tama silt loam, benches, 0 to 2 percent slopes-----	106	I-1	14	12	36
TbB	Tama silt loam, benches, 2 to 6 percent slopes-----	106	II e-1	14	12	36
WoA	Worthen silt loam, 0 to 2 percent slopes-----	107	I-1	14	12	36
WoB	Worthen silt loam, 2 to 6 percent slopes-----	107	II e-5	15	12	36

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