Series 1956, No. 7

Issued April 1960

SOIL SURVEY

La Crosse County Wisconsin

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY
Soil Survey Division
and the
COLLEGE OF AGRICULTURE
University of Wisconsin

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of La Crosse County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; serve as a reference for students and teachers; help prospective farmers, land appraisers, bankers, and real estate agents to decide the worth of a particular farm; and will add to the soil scientist's fund of knowledge.

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

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

This soil survey is part of the technical assistance furnished by the Soil Conservation Service to the La Crosse County Soil Conservation District. Work on this survey was completed in 1956. Unless otherwise indicated, all statements refer to conditions at the time the survey was in progress.

Locating the soils

Turn to the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show what part of the county each sheet of the large map covers. To locate your farm on this index map, look for roads, streams, towns, and other familiar boundaries. When you have determined the correct sheet of the large map, you will note that boundaries of the soils are outlined and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil.

Suppose, for example, the area you have located on the map has a symbol BaB2. The legend for the detailed map shows that this symbol identifies Bertrand silt loam, 2 to 6 percent slopes, moderately eroded. This soil and all others mapped in the county are described in the section, Soil Series and Mapping Units. The mapping units and the capability units to which they belong are listed in the Guide to Mapping Units and Capability Units at the back of the report.

Finding information

Some readers will be more interested in one part of the report than another, for the report has special sections for different groups, as well as sections that may be of value to all.

Farmers and those who work with farmers will want to refer to the section, Soil Series and Mapping Units, to learn about the soils on their farm. They can then turn to the section, Management of the Soils, to find how these soils can be managed and what yields can be expected. The soils are placed in capability units, or groups of soils that need similar management and that respond in about the same way. For example, in the section in which soil series and mapping units are described, Arenzville silt loam is shown to be in capability unit I-1. The management this soil needs, therefore, will be stated under the heading, Management of Capability Unit I-1, in the section, Management of the Soils.

Engineers will want to refer to the section, Engineering Properties of the Soils. In the tables in that section are described the texture of the soils, drainage, and other characteristics that affect engineering.

Soil scientists will find information about how the soils were formed and how they were classified by reading the sections, Factors of Soil Formation, and Classification of Soils. They will find further information about the soils in the section, Descriptions of Soil Types.

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest. Those not familiar with the county may want to refer to the sections, Agriculture, and Additional Facts About the County, where information about transportation, industries, population, and agriculture are provided.

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SOIL SURVEY OF LA CROSSE COUNTY, WISCONSIN

REPORT BY MARVIN T. BEATTY,[1] SOIL CONSERVATION SERVICE

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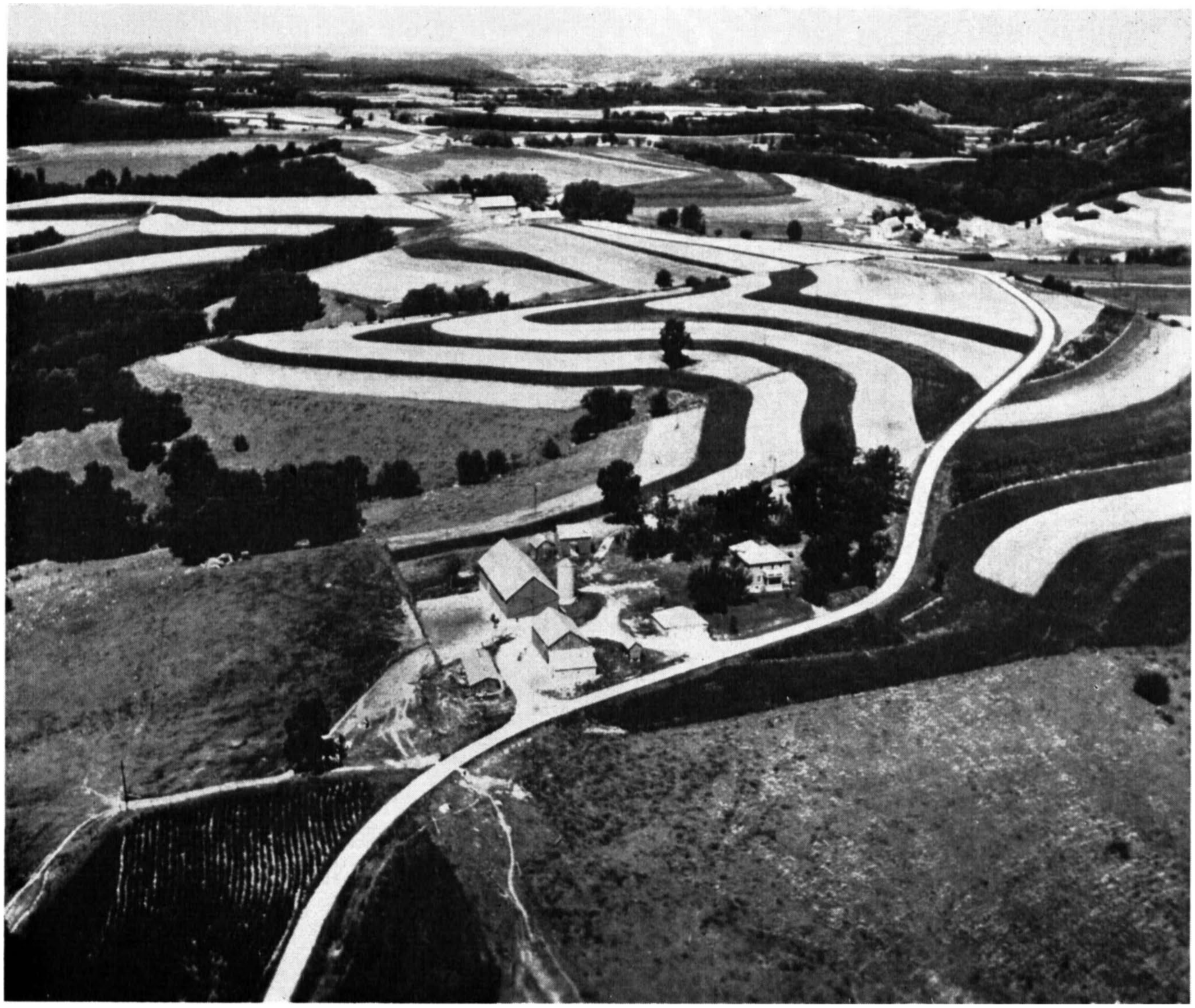

Figure 1.—A typical landscape in La Crosse County.

What soils are on my farm and how should I handle them? What can I expect from crops on my soils? What community facilities, such as roads, schools, and water, are in this county? This report and the map of the soils at the back of the report have been prepared to help answer these and other questions that you may have about the soils, crops, and agriculture of La Crosse County. Figure 1 shows a typical landscape in La Crosse County.

The county is on the western edge of Wisconsin (fig. 2). It is separated from Minnesota by the Mississippi River. The total land area is 469 square miles, or 300,160 acres. La Crosse, the county seat, is near the western edge of the county. It is about 105 miles by airline from Madison and 180 miles by airline from Milwaukee.

Management of the Soils

This section is a general guide to the use and management of soils in La Crosse County. It does not suggest specific management for individual soils and, therefore, is not a substitute for the detailed advice that can be provided by the county agent or a local representative of the Soil Conservation Service.

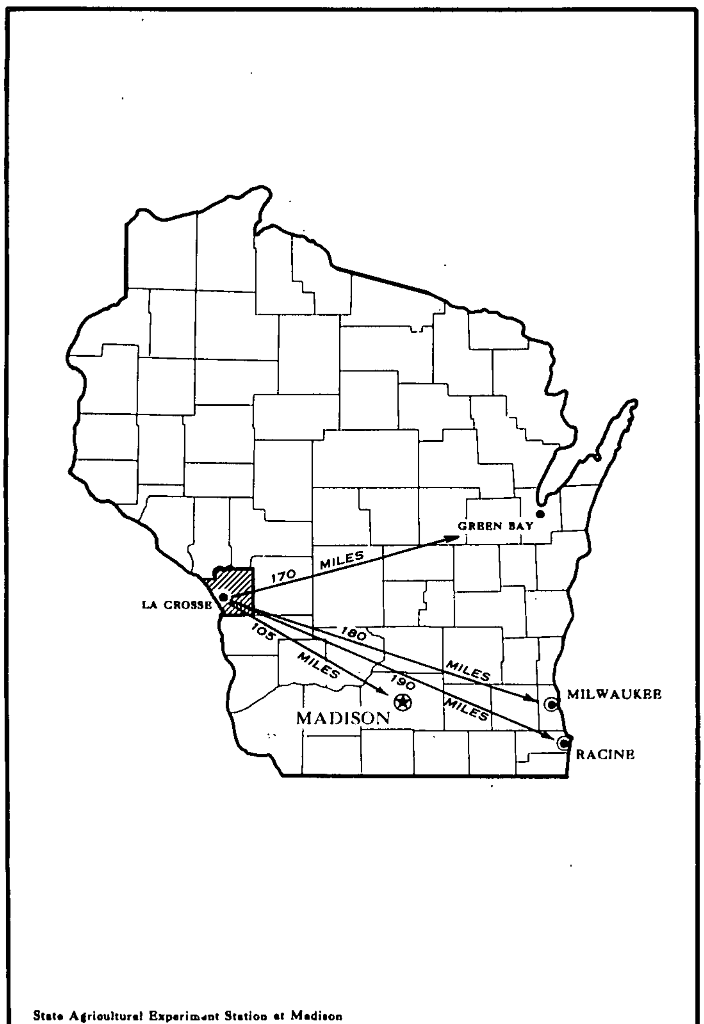

Figure 2.—**Location of La Crosse County in Wisconsin.**

The section has several parts. The first three—Soil Properties Influence Management; Basic Practices of Management; and Summary of the Conservation Station Program—provide background information about management that the farmer will want to keep in mind in planning the operations on his farm. The next part, Capability Grouping of Soils, groups the soils in capability classes, subclasses, and units. More specific management for the soils in each unit is given in the section, Management of Capability Units. In the next subsection, special management practices needed for irrigation and growing of special crops are mentioned. Finally, estimated yields under two levels of management, as well as a discussion of the productivity of the soils for crops and forests, are discussed.

Soil Properties Influence Management

The properties of the soil influence its management and the yields that are obtained. The entire profile is important. The suitability of a soil for crops ought not be judged only by the appearance of its surface layer. The entire soil, to a depth of 4 to 6 feet, is significant. In many of the soils of La Crosse County, the surface layer is similar but the lower layers are greatly different. This difference often determines whether a soil is well suited or poorly suited to crops.

The Bertrand and Zwingle soils, for example, both have a mellow, silty surface layer. But these soils differ greatly in the crops they will grow, because they have different lower layers. Bertrand soils have lower layers that are silty and permeable to water, roots, and air. The Zwingle soil, in contrast, has a subsoil of tough, dense, heavy, reddish clay. It is difficult for roots and water to penetrate this clay. Consequently, the Zwingle soil remains wet several days after rains, and plants growing on it have shallow root systems and become yellow from lack of nitrogen.

Many properties of the entire soil need consideration, but the following are some of those more significant.

Color and thickness of the surface layer.—Soils that have a thick, dark surface layer have always been prized by farmers because they work up into excellent seedbeds. Some soils in La Crosse County have a naturally dark surface layer, but others have a surface layer that is lighter colored and thinner. Originally, this difference was caused by the kind of vegetation that grew on the soils when they were forming. Soils formed under tall prairie grasses generally have a dark, thick surface layer, but the surface layer of soils formed under trees is thinner and lighter colored.

Although the dark soils were more fertile originally, now, after having been cropped for about 100 years, the light and dark soils are nearly equal in fertility. The soils that have dark surface layers and that are high in organic matter generally have better structure and are slightly more productive, even after many years of cropping, than the lighter colored soils. This is the result of the binding, or aggregating, effect of the dark organic matter. Both light- and dark-colored soils, however, need fresh supplies of organic matter. This can be supplied by turning under crop residues and barnyard manure or green manure.

Depth.—Many of the soils in La Crosse County are underlain by sand at depths between 20 and 40 inches. Other soils are silty to a depth of 4 feet or more. Although the shallower soils may have surface textures similar to those of the deeper soils, in dry seasons they do not hold enough water to supply moisture to crops. Crops such as corn and alfalfa have roots that penetrate to depths great enough so that they reach the moisture in the deep soils. Consequently, in dry years yields will be higher on the deep soils than on the shallow soils.

Texture.—The soils of La Crosse County generally have a silty or sandy texture, but the silty-textured soils are more common. The silty soils require only such management practices as careful use of tillage implements and the use of barnyard manure and sod crops in the rotation to keep them in good tilth. The sandy soils, however, need special management because they generally are droughty and are limited in their use for crops. Unless they are protected, they are likely to blow when they are seeded in spring. Alfalfa and other small-seeded crops are hard to seed in sandy soils.

Slope and erosion.—Most farmers in the county know how slope and erosion influence the management of their soils. Even the best of the steep soils are severely limited for crops. On many sloping soils the use of contour stripcropping, terracing, or diversion ditches is necessary to control runoff. If the soils have been severely eroded, special management must be used to restore them to productivity.

Basic Practices of Management

An efficient farmer applies the basic principles of good management. He knows that it is necessary to maintain good soil tilth; to replenish supplies of organic matter, lime, and plant nutrients; and to control erosion. In planning, he must determine to what degree these basic practices are needed on the different soils on his farm. To aid him in doing this, the basic practices of good management are discussed as they apply to the soils of La Crosse County.

Maintain good tilth.—It is always important to maintain good structure and good tilth in soils that are farmed. It is particularly important, however, where farming is done on steep slopes. Studies at the Upper Mississippi Conservation Experiment Station at La Crosse show that where good soil structure has been maintained, more water enters the soil and less runs off than where the structure has deteriorated. Where good structure is maintained, less erosion takes place and more water is available for crops.

Good tilth is required for a firm, fine, granular seedbed. Such a seedbed is especially needed for alfalfa, grass, and other small-seeded crops. Grass and other sod-forming crops improve the structure of the soil. This is partly because such crops require no tillage, which causes mechanical disturbance and compaction, and partly because soil bacteria act to decay the organic matter or residue from the roots of the sod crop. In addition, sod-forming crops keep a cover on the land, thus further helping to reduce erosion.

Supply organic matter.—The organic matter supplied to the soils as barnyard manure, green manure, or crop residues is effective in several ways. It causes crops to produce higher yields, improves the soil structure, increases the intake of water, decreases runoff, and reduces soil erosion. In addition, organic matter helps to reduce the damage from wind erosion on sandy soils. It also stores water and plant nutrients.

Management practices for this county need to be designed so that as much organic matter is returned to the soil as feasible, especially where the soils are sandy or steep. Some organic matter is supplied by decaying roots, but if the soils are to have an adequate supply of organic matter, it is essential to use all of the crop residues, barnyard manure, and green manure available. The Richwood and other dark-colored soils originally were high in organic matter. Such soils have been cropped for many years, however, and most of the original organic matter is now in a form that cannot be used by plants. Consequently, frequent additions of organic matter will benefit the dark-colored soils as well as the light-colored ones.

Lime and fertilize according to soil tests.—Most of the soils of La Crosse County have been farmed for about 100 years. Much of the natural supply of plant nutrients has been exhausted, and many of the soils are now more acid than they were originally. Consequently, lime and a commercial fertilizer that contains phosphorus, potassium, and sometimes nitrogen, are widely used. To determine whether lime and fertilizer are needed, it is best to have the soils tested once during the rotation, or about every 3 to 5 years. Then, apply lime and fertilizer according to the results of the soil tests.

For best yields, use other good management practices as well as adding lime and commercial fertilizer. Some good management practices are use of crop varieties suited to the particular soil; timely seeding and cultivating; and control of weeds and insects.

Use a suitable cropping system.—The key to good soil management is a good cropping system. When a suitable cropping system is used, the tilth of the soil is improved, organic matter is supplied, the fertility of the soil is kept high, and erosion is controlled. In addition, the use of a suitable cropping system provides the variety of crops needed in livestock farming.

In planning a cropping system and the accompanying practices to conserve the soil and to maintain fertility, the soils of the entire farm must be considered. The better soils in the level areas can be used for intensive cropping; that is, row crops can be grown frequently in relation to hay and small grains. Such soils respond well to fertilizer and give high yields of feed and forage. The poorer soils generally are steep, sandy, or wet. For these soils, choose a cropping system that will fit the limitations of the soil and that will protect it from damage. Suitable cropping systems for each soil in the county are discussed in the section, Capability Grouping of Soils.

Control erosion.—Practices to control erosion are needed throughout the county. They are needed especially on soils that are on steep slopes. Some of these practices have been used by farmers in the county for many years. A number of years ago, a few of the farm-

***Figure 3.*—The first field strips used in the county. These were laid out about 1870.**

ers in Mormon Coulee saw the need to protect their soils and started planting their crops in narrow strips across the slope. The first field strips were laid out by August Kramer on his farm in Mormon Coulee about 1870 (fig. 3). These are still in use today. It is only since 1939, however, when a soil conservation district was formed, that most of the farmers in the county began to use practices to control runoff and erosion.

Contour stripcropping has been the practice used the most widely. By 1955, contour stripcropping was used on about 30 percent of the cropland in the county. An additional 40 percent needs contour stripcropping and related practices to protect it from erosion. Other practices used to conserve the soil are the natural reforestation of wooded areas and the construction of diversions, grassed waterways, and terraces.

Studies made at the Upper Mississippi Valley Conservation Experiment Station [2] at La Crosse have added much to our knowledge of the need for control of erosion and of the best ways of bringing it about. The results of these studies are partly the basis for determining the suitability of most of the cropping systems suggested in this report. In addition, plans for contour strips, terraces, and diversion ditches that are suggested and that are laid out by technicians of the Soil Conservation Service in La Crosse County are based largely on findings of the experiment station. In the following pages a summary of the station program is given; figure 4 is a photograph of the station.

Summary of the Conservation Station Program

Among the best guides to efficient soil management are the results of tests made on an actual farm. This subsection summarizes the results of tests made on a farm in La Crosse County. In 1931, the State of Wisconsin obtained this farm for use as a research station. Here, problems of soil and water conservation could be studied. The station was named the Upper Mississippi Valley Conservation Experiment Station. It is operated by the Agricultural Research Service of the United States Department of Agriculture in cooperation with the College of Agriculture, University of Wisconsin.[3]

Effect of storms.—In the past 25 years, research studies have been made to determine the amount of erosion on experimental plots at the station. These indicate that most soil losses take place during the few intense rains that occur each year. Observations of plots of corn showed that each year 95 percent of the erosion and 84 percent of the runoff occurred during 4 rains. Although these critical storms may come at any time from April through October, inclusive, they are the most frequent in June, July, and August. The findings show further that the amount of runoff and erosion that occurs during one of these intense storms is influenced greatly by the condition of the soil and by the cover of plants it has on it. A soil is most resistant to the beating action of the rain when the surface is cloddy, or is covered with a mulch of crop residues, or has a dense stand of growing plants.

The studies show that less than 2 percent of the annual soil losses occur during the period from October to February, inclusive. The spring rains and the rapid thawing of snow in March cause high soil losses from fields of small grains in spring. The losses of soil from fields where corn has been planted after hay is relatively low. The greatest soil losses occur on fields of corn or small grains that were planted to corn the preceding year.

Effect of slope.—Runoff and erosion on different slopes were studied at the experiment station when corn, oats, and hay were grown in a 3-year rotation on Fayette silt loams having slopes of 3, 8, 13, and 18 percent, respectively. The amounts of soil lost on each soil are shown in figure 5.

It was found that the amount of runoff from these soils increased in proportion to the increase in the slope. The increase in the amount of runoff, however, was not nearly so great in proportion to the increase in slope as was the amount of soil lost. The amount of soil lost depends on the speed of the water as it runs off the soil more than it does on the total amount of runoff. A greater amount of soil is lost on steep slopes where the flow of runoff water is rapid than on more gradual slopes where the flow of water is slower. The length of slope also influences runoff and erosion. Long slopes allow the runoff water to accumulate, which increases the hazard of erosion.

Effect of cropping system.—To protect against erosion, cropping systems that include hay or other sod-forming crops are essential on most of the soils of La Crosse County. On most of the soils the maximum allowable soil loss for good farming is 4 tons per acre each year. Measurements of soil losses under various cropping systems were made at the station. In these experiments, the crops were grown in plots 72.6 feet long on Fayette silt loam, which had a slope of 16 percent. The value of growing hay in the cropping system is shown in the following data compiled from results of these experi-

[2] HAYES, O. E., MCCALL, A. G., and BELL, F. G. INVESTIGATIONS IN EROSION CONTROL AND THE RECLAMATION OF ERODED LAND AT THE UPPER MISSISSIPPI VALLEY CONSERVATION EXPERIMENT STATION NEAR LA CROSSE, WIS., 1933–43. U.S. Dept. Agr. Tech. Bul. No. 973.

[3] Information for this section was supplied by O. E. HAYS, project supervisor of the Upper Mississippi Valley Conservation Experiment Station at La Crosse.

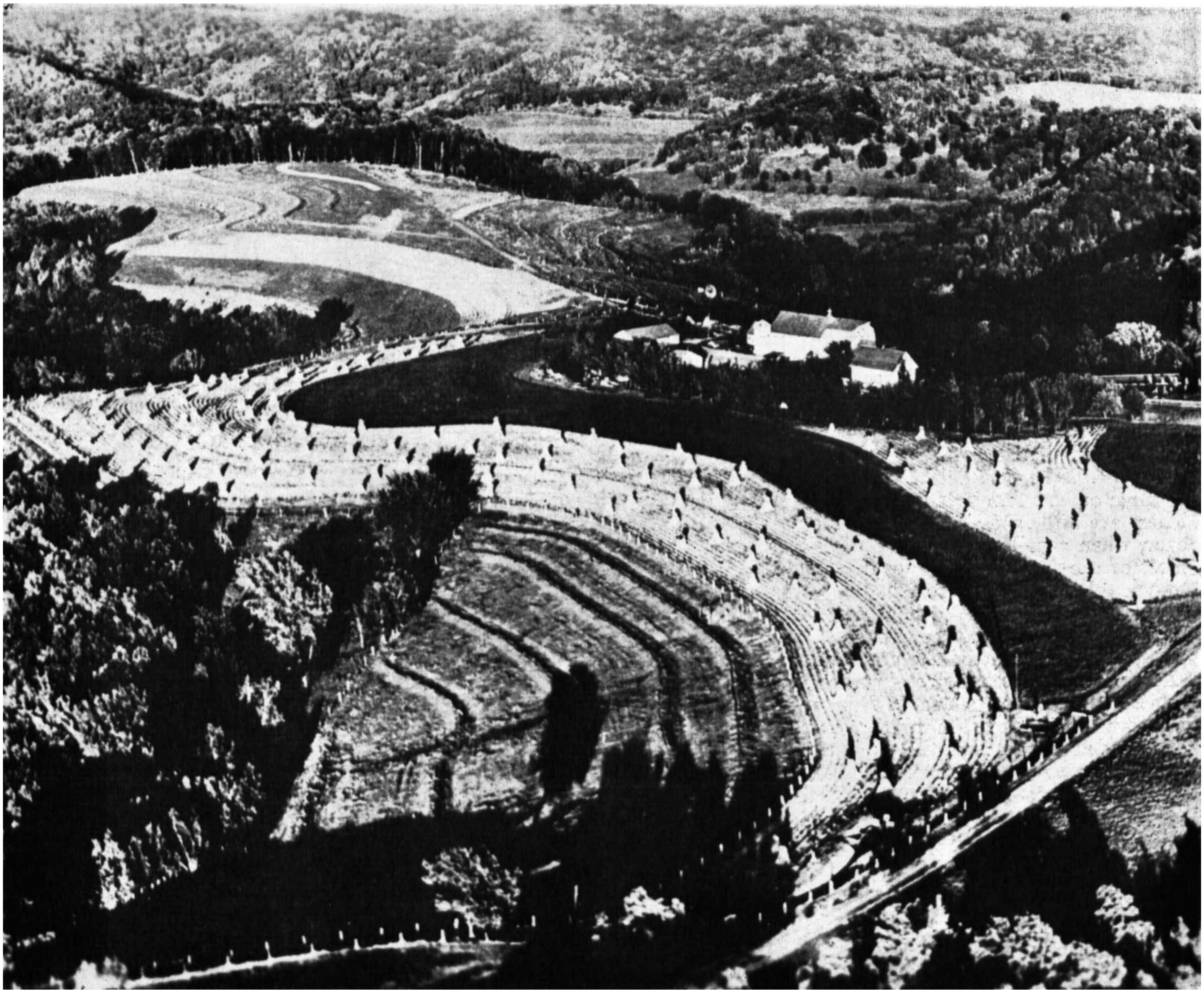

Figure 4.—View of the Upper Mississippi Valley Conservation Experiment Station at La Crosse. Photograph by courtesy of La Crosse Tribune.

ments. The figures show the average annual loss of soil per acre under various cropping systems:

Cropping system:	*Soil loss (tons)*
Corn grown continuously	111.67
Small grain grown continuously	16.76
Corn, small grain, and hay, each grown for 1 year	7.90
Corn and a small grain, each grown for 1 year, and hay grown for 3 years	4.27
A small grain grown for 1 year and hay grown for 3 years	.24

Effect of cropping practices.—Where corn is grown, an experimental practice that has proved to be effective in controlling erosion is to plow-plant and then interseed. Under this system the hay is plowed under at the time the corn is planted. The corn is then planted without preparing the seedbed in the usual way. In midsummer, legumes are seeded between the rows of corn. The soil is thus protected by a hay crop until late in spring. It is then in a rough-plowed state until after the corn has been cultivated for the first time and a hay crop is again established in the corn. Measurements made at the experimental station show that losses of soil are less than one-half as great when this system is used as when corn is grown in a seedbed prepared in the usual way.

When using this system, the following procedure is desirable on the soils of La Crosse County. Plow to depths of 8 to 10 inches with the plow adjusted so that the vegetation is well covered. Turn all the furrows uphill so that there will be no dead furrows or back furrows within the strip. Adjust the wheels of the tractor and cornplanter so that the corn is planted in 56- to 60-inch rows in the tracks made by the wheels of the tractor. The wheels prepare a suitable seedbed for the corn, and the soil between the tracks is left rough plowed and will

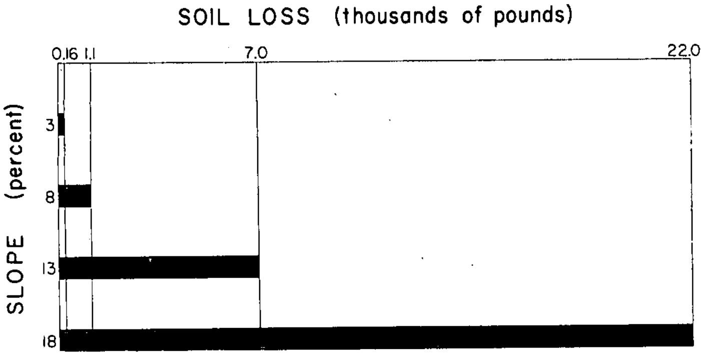

Figure 5.—**Chart showing the average annual loss of soil, in relation to the percent of slope, from Fayette silt loams planted to corn, oats, and hay grown in a 3-year rotation.**

absorb moisture well. Do not cultivate the corn until it is 6 to 8 inches high. One or two cultivations normally are sufficient for good control of weeds.

When the corn is between 15 and 30 inches high, interseed legumes between the rows. Use a high-clearance drill that is equipped with packing wheels and adjust it to straddle the row. The equipment used for seeding must be capable of packing the soil firmly around the shallow-planted seeds of the legumes, because the soil is frequently rather dry at this time of the year.

When this system was used, corn grown on good soils made about 110 bushels per acre in years of normal rainfall. Yields of corn planted in 60-inch rows were within 10 percent of yields made when the corn was planted in 40-inch rows. The stands of corn were nearly as good as where a small grain was used as a companion crop. Also, the yields of hay following the corn were nearly as good as when the hay crop was seeded in a small grain.

When a small grain is planted after corn, the amount of soil and water lost is greater than when corn is planted after a legume or other hay crop. In tests that were made, measurements showed that where a small grain followed corn, there was 2.4 times as much runoff and 5 times as much loss of soil as when the small grain followed hay. Also, yields of small grain averaged 9 bushels per acre more when the small grain followed a legume than when it followed corn.

Losses of soil can be reduced considerably by planting the small grain after legume hay. Plow the area in the fall or prepare a suitable seedbed for the small grain by using a field cultivator without plowing. When a field cultivator is used, cultivate the areas soon enough so that the legumes and grasses will be killed in the fall.

Small grains give only about one-third as much digestible nutrients per acre as corn or legumes. They have been grown mainly as a companion crop for legumes. When the legumes are seeded in corn, however, a small grain is not needed. Consequently, if legumes are seeded in corn, there will be less need for growing small grains in the county, particularly on sloping areas.

Contour stripcropping and terracing.—For stripcropping to be the most effective, a rotation is needed in which at least 50 percent of the field is in a hay crop grown in alternate strips with a row crop or small grain (fig. 6). When a hay crop is grown in the alternate strips, the runoff from the strips of corn or small grain spread out and the velocity of the water is slowed down. The use of contour stripcropping reduces losses of soil by 50 percent of the amount lost when crops in the same rotation are planted only on the contour. Strips that are laid out with a 2 or 3 percent grade toward a grassed waterway are more effective than strips laid out on the exact contour.

When strips are laid out with a slight grade toward low areas where grassed waterways have been established, each furrow and row tends to direct the runoff toward the waterway. Consequently, less water flows directly down the slope. Studies of runoff and erosion from the soils on two watersheds showed that the soil losses from the one with graded strips was about two-thirds of that from the watershed where strips were laid out on the exact contour.

If the terraces are designed and maintained correctly, terracing is the most effective way of controlling erosion on sloping areas, and the terraces will protect the soil indefinitely. Terraces constructed at the experiment station in 1932 are still giving satisfactory control of erosion. On terraced areas, the water flows for only a short distance before it comes to a terrace channel where it is safely guided from the field.

To maintain the terraces, plow so that there is a dead furrow in each channel and a back furrow on each terrace ridge. The plowing can be done with any type of plow, but it is easier to use a two-way plow than other types. When a two-way plow is used, all of the furrows are turned uphill and the dead furrows and back furrows can be placed where they will be the most effective. The results of experiments to show the effectiveness of using various farming practices in controlling erosion are summarized in figure 7.

Although contour stripcropping and terracing are practices that greatly reduce the losses of soil by erosion, they must be designed and used correctly. Terraces and diversion ditches both require some maintenance to keep them open and in good operating condition.

Pasture and woodland.—Pastures are important in La Crosse County. For 5 months of the year, dairy cattle obtain most or all of their feed from pastures. The pastures must be managed carefully if they are to make the best yields. On many of the farms, however, the pas-

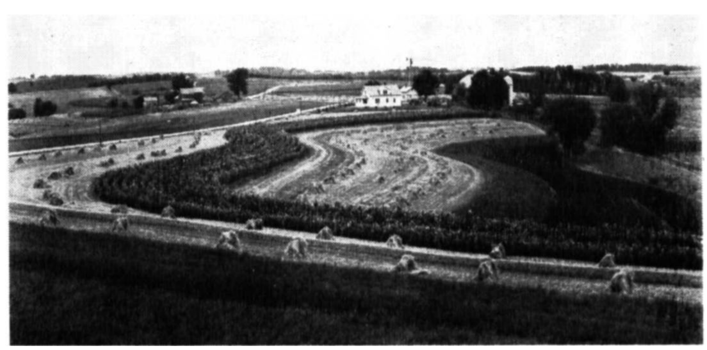

Figure 6.—**Contour stripcropping and terracing (note terrace between the shocks of corn in the foreground) are a desirable combination for conserving soil and water on many of the ridges in La Crosse County. Manske Ridge, shown here, is on the line between La Crosse and Vernon Counties.**

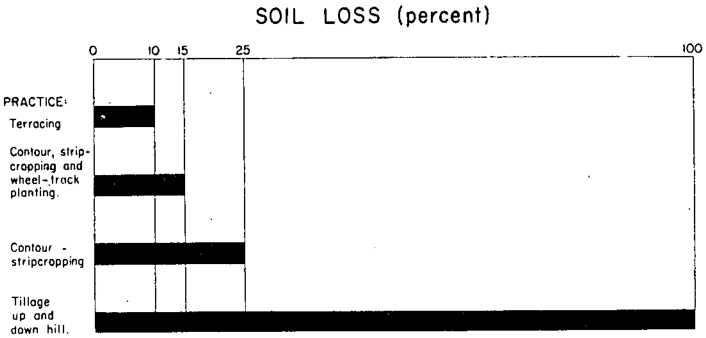

Figure 7.—**Chart showing relative soil losses on a 12 percent slope when various farming practices were used.**

tures are poorly managed and are, therefore, relatively unproductive.

Yields of pasture on many soils can be more than doubled through the use of a pasture-renovation program. To renovate a pasture, first have the soils tested to determine the specific amounts of lime needed and the amounts and kinds of fertilizer required. Then, graze the area heavily to remove the vegetation. Prepare the seedbed in August or early in September.

The slopes in most permanent pastures are too steep to be plowed without causing severe erosion. A heavy field cultivator can be used instead. Start cultivating in August or early in September after the lime and fertilizer have been applied. Continue cultivating, as needed, throughout the fall months to mix the lime and fertilizer into the soil and to kill the bluegrass and other grasses in the sod. In some places chemicals may be used. Consult your county agent for details on the materials to use and the method of applying them.

Seed a pasture mixture that has been recommended for this area early the following spring with a small grain as a nurse crop. Harvest the small grain for hay or silage in preference to allowing it to ripen for grain. To maintain the stand of legumes in renovated pastures, apply adequate amounts of fertilizer and manage grazing with care.

In experiments on renovated pastures, yields of dry forage average more than 3 tons per acre over a 5-year period. During the same period, bluegrass pastures, even though well fertilized, produced only 1.25 tons of dry forage per acre each year. Although the initial cost of renovating the pastures is high, the increased production soon pays for the cost of renovation.

Experiments on ungrazed woodlands, pastured woodlands, and open pasture showed that pastured woodlands produced little timber and were unproductive as pasture. Furthermore, there was more runoff and erosion on these areas than on ungrazed woodlands or open pastures. The most satisfactory means of managing woodlands is to fence the areas to prevent grazing. Then, new seedlings are allowed to grow and a protective cover of leaves can accumulate under the trees. If more pasture is needed, it is best to clear wooded areas before using them for grazing.

Not all of the erosion control practices studied at the experiment station are needed on any one farm. Nevertheless, on most of the farms in this county many of these practices are needed.

Capability Grouping of Soils

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, and wildlife. It is a practical grouping based on the needs and limitations of the soils, on the risk of damage to them, and also on their response to management. There are three levels above the soil mapping unit in this grouping. They are the capability unit, subclass, and class.

The capability unit, which can also be called a management group of soils, is the lowest level of capability grouping. A capability unit is made up of soils that are similar in kind of management needed, in risk of damage, and in general suitability for use. The capability unit is represented by the figures 1, 2, and 3 in the classification symbols IIIe-1, IIIs-2, and IIIw-3.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that the main limiting factor is risk of erosion if the plant cover is not maintained; "w" means excess water that retards plant growth or interferes with cultivation; and "s" shows that the soils are shallow, droughty, or unusually low in fertility. In some parts of the country, there is a subclass "c" for the soils that are limited chiefly by a climate that is too cold or too dry.

The broadest grouping, the land capability class, is identified by Roman numerals. All the soils in one class have limitations and management problems of about the same degree, but of different kinds, as shown by the subclass. All the land classes, except class I, may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly but do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping; consequently, they need moderate care to prevent erosion. Other soils in class II may be slightly droughty, slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly but have a narrower range of use than those in classes I and II. These need even more careful management.

In class IV are soils that have greater natural limitations than those in class III, but they can be cultivated for some crops under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops but that can be used for pasture or range, as woodland, or for wildlife.

Class V soils are nearly level and gently sloping but are droughty, wet, low in fertility, or otherwise unsuitable for cultivation.

Class VI soils are not suitable for crops, because they are steep, droughty, or otherwise limited, but they give fair yields of forage or forest products. Some soils in class VI can, without damage, be cultivated enough so that forest trees can be set out or pastures seeded.

Class VII soils provide only poor to fair yields of forage or forest products and have characteristics that limit them severely for these uses.

Class VIII consists of soils that have practically no agricultural use. The soils have value as parts of watersheds, and some have value as wildlife habitats or for scenery.

Management of Capability Units

A description of each capability class is given in the following pages. This is accompanied by a table that lists the soils in each capability unit within the class, along with suggested cropping systems and management practices to control erosion. With the table and the description of the capability class is a discussion of the management of the capability units within the class.

Within each table, the most intensive rotation is listed first. The management practices described have been discussed in the preceding section, Basic Practices of Management. Some of the practices described are fairly new and allow use of cropping systems that include more corn and small grains. These practices may require equipment such as field stalk shredders, heavy-duty field cultivators, or wide-row planters not now available on most farms. Where such equipment is not available, use the less intensive rotations listed.

Capability class I

The soils in this class are nearly level and are deep and silty. They are highly productive if they are well managed (fig. 8). These soils occur on terraces or stream bottoms. During spring thaws or after heavy storms, some of the areas receive runoff from the uplands. Normally, the water does not stand on the soil for long periods, and it may benefit crops by providing them with extra moisture. The Bertrand and Richwood soils are less likely to be flooded than the other soils in this class.

All of the soils in this class are easy to work. They have only a slight hazard of runoff and erosion, but care is needed to maintain good tilth. Originally, the soils were well supplied with plant nutrients. They now need manure and commercial fertilizer for high yields. Except for the Arenzville, which normally is not acid, the soils need lime. If lime is added, the yields of crops, especially of alfalfa and clover, will increase and these legumes will live longer.

Figure 8.—**Class I soils are in the foreground. These are deep, nearly level soils that are highly productive.**

The soils in class I are listed in table 1 along with suitable cropping systems and practices to control erosion.

MANAGEMENT OF CAPABILITY UNIT I-1

The soils in this capability unit can be cropped intensively. In the cropping systems shown in table 1, alfalfa can be interseeded in wide-row corn and the small grain can be omitted from the cropping system. If corn, peas, or similar row crops are grown frequently, barnyard manure, green manure, and crop residues are essential to maintain good tilth. If a large amount of manure is applied or crop residues are turned under, these soils can be used for row crops most of the time. When row crops are grown successively for several years, tillage must be kept to a minimum to prevent the soil from compacting. Insects and plant diseases are also more difficult to control when the same crop is grown on a field for several years.

Capability class II

The soils of class II are not so desirable for agriculture as those in class I. They are generally steeper and are more likely to erode; in places they are underlain by

TABLE 1.—*Suggested cropping systems and management practices for the soils of class I*

CAPABILITY UNIT I-1

Soil	Cropping systems	
	Crop residues removed	Crop residues left on the surface and plowed under
Arenzville silt loam. Bertrand silt loam, 0 to 2 percent slopes. Chaseburg silt loam, 0 to 2 percent slopes. Jackson silt loam. Judson silt loam, 0 to 2 percent slopes. Richwood silt loam, 0 to 2 percent slopes. Toddville silt loam.	Corn for 2 years, small grain, hay. Corn for 3 years, small grain, hay for 2 years. Corn for 2 years, small grain, hay for 2 years.	Corn for 2 years, small grain, sweetclover. (If corn is to be planted, plow under sweetclover in spring.) Corn for 4 years, small grain, hay.

TABLE 2.—*Suggested cropping systems and management practices for soils of class II*

Soil	Cropping systems			
	No erosion control practices	Contour stripcropping	Terracing	Terracing plus wheel-track planting [1]
CAPABILITY UNIT IIe-1				
Bertrand silt loam, 2 to 6 percent slopes. Bertrand silt loam, 2 to 6 percent slopes, moderately eroded. Dubuque silt loam, 2 to 6 percent slopes, moderately eroded. Dubuque silt loam, deep, 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. Gale silt loam, 2 to 6 percent slopes. Gale-Hixton complex, 2 to 6 percent slopes. Port Byron silt loam, 2 to 6 percent slopes. Port Byron silt loam, 2 to 6 percent slopes, moderately eroded. Richwood silt loam, 2 to 6 percent slopes. Richwood silt loam, 2 to 6 percent slopes, moderately eroded.	Corn, small grain, hay for 2 years.	Corn, small grain, hay for 2 years.	Small grain (sweetclover plowed under in spring), corn for 2 years. Corn for 3 years, small grain, hay for 2 years.	Corn for 4 years, small grain (sweetclover plowed under in spring). Corn for 5 years, small grain, hay for 2 years.
CAPABILITY UNIT IIe-2				
Chaseburg silt loam, 2 to 6 percent slopes. Judson silt loam, 2 to 6 percent slopes.	Corn, small grain, hay for 2 years.	Use ditches or waterways to control runoff; leave all crop residues on the field.		
CAPABILITY UNIT IIe-3				
Medary silt loam, 0 to 2 percent slopes. Medary silt loam, 2 to 7 percent slopes.	Corn, small grain, hay for 2 years.	Practices to control erosion normally are not needed on these soils; leave all crop residues on the field.		
CAPABILITY UNIT IIs-1				
Meridian-Waukegan complex, 0 to 2 percent slopes.[2] Meridian-Waukegan complex, 2 to 6 percent slopes. Meridian-Waukegan complex, 2 to 6 percent slopes, moderately eroded. Tell silt loam, 2 to 6 percent slopes. Tell silt loam, 0 to 2 percent slopes.[2] Trempealeau silt loam, 0 to 3 percent slopes. Waukegan silt loam, 2 to 6 percent slopes. Waukegan silt loam, 0 to 2 percent slopes. Waukegan silt loam, 2 to 6 percent slopes, moderately eroded.	Corn, small grain, hay for 3 years.	Corn, small grain, hay for 2 years.	Corn for 2 years, small grain, hay for 2 years.	Corn for 3 years, small grain (sweetclover plowed under in spring). Corn for 4 years, small grain, hay.
CAPABILITY UNIT IIw-1				
Rowley silt loam, 0 to 2 percent slopes. Rowley silt loam, 2 to 6 percent slopes.	Corn for 3 years, small grain, hay for 2 years. Corn for 2 years, small grain, hay. Corn, small grain, hay.	Erosion control practices not needed; can be tile drained.		

[1] Wheel-track planting consists of plowing the soil in spring and planting corn in wheel tracks of tractor without further seedbed preparation.

[2] Contour strips or terraces not needed on this soil, but this soil may be used for rotations listed under the columns, Contour stripcropping, and Terracing.

TABLE 2.—*Suggested cropping systems and management practices for soils of class II*—Continued

CAPABILITY UNIT IIw-2

Boaz silt loam. Lawson and Huntsville silt loams. Lawson and Huntsville silt loams, sandy substrata. Orion fine sandy loam. Orion silt loam.	Corn for 3 years, small grain, hay for 2 years. Corn for 2 years, small grain, hay. Corn, small grain, hay.	Erosion control practices not needed; protect from overflow where feasible; not generally suitable for tile drainage.

Figure 9.—**Soils in capability units IIe-1 and IIe-2 under cultivation. These soils are along United States Highway 16, east of La Crosse.**

sand and are slightly droughty. Some of the soils in this class are slightly wet in places or are flooded occasionally by overflow from the uplands. Generally, a moderately intensive cropping system can be used. The soils are as productive as soils in class I if they are protected from flooding and practices are used to control erosion.

The soils in class II are listed in table 2, by capability unit, along with suitable cropping systems and practices to control erosion. A discussion of each capability unit is also given. Figure 9 shows soils in capability units IIe-1 and IIe-2 under cultivation.

MANAGEMENT OF CAPABILITY UNIT IIe-1

The soils in this capability unit are deep and silty and are well drained. The slopes are from 2 to 6 percent. Consequently, there is enough runoff so that the soils are likely to erode. The moisture-storing capacity of all of the soils is high.

These soils are well suited to all of the crops commonly grown in the county. Yields will be high if adequate fertilizer is used and if the soils are well managed otherwise. If row crops are grown successively for several years, all of the crop residues must be left on the surface over winter to help keep the soil in good tilth. On the steeper slopes, contour stripcropping or terracing is needed. For further control of erosion, use the wheel-track method of planting corn and shred crop residues.

The Dubuque and Gale soils and the soils of the Gale-Hixton complex are slightly shallower than the other soils in this unit. Yields on these soils are, therefore, slightly lower than on the other soils, particularly in dry years. Alfalfa may be interseeded in wide-row corn.

MANAGEMENT OF CAPABILITY UNIT IIe-2

The soils in this capability unit are deep and silty and are well drained. They occupy gently sloping areas in fans and draws. Whenever feasible, diversion ditches or waterways should be used to protect them from runoff. The soils have a high moisture-storing capacity and are easy to work.

These soils respond well to good management. If they are properly fertilized, they can be cropped intensively and are highly productive. Alfalfa may be interseeded in wide-row corn, if desired.

MANAGEMENT OF CAPABILITY UNIT IIe-3

The Medary soils make up this capability unit. Because of the heavy texture of their subsoil, these soils have somewhat restricted drainage, but they are moderately well drained to well drained. These soils are not suitable for tiling, but land smoothing and surface drainage can be used to remove water from the low spots and thus improve the growth of crops. One area of Medary silt loam, 2 to 7 percent slopes, is located in Mormon Coulee where the surface drainage is good.

Liberal applications of barnyard manure, green manure, and crop residues will make the soils looser and more porous and will help them to dry out more rapidly. If the clay subsoil is not too thick, the growing of alfalfa, sweetclover, or other deep-rooted crops will open root channels in the clay and will help to improve the drainage in the subsoil.

MANAGEMENT OF CAPABILITY UNIT IIs-1

The soils in this capability unit are silty and loamy and are well drained. They are underlain by sand at depths between 20 and 42 inches. These soils are likely to erode. Unless they are protected carefully from erosion, they should be used less intensively than the soils in capability unit IIe-1.

The soils in this unit all have surface layers that work up into good seedbeds under good management. They are moderately to highly productive if adequate manure and commercial fertilizer are applied. Because the moisture-storing capacity of the subsoil is low, yields on most of these soils will be lower in dry years than on soils of class I. On the Trempealeau soil, however, yields are generally good even in dry years.

MANAGEMENT OF CAPABILITY UNIT IIw-1

The soils in this capability unit are somewhat poorly drained. They dry out and warm more slowly in spring than the soils in class I. When there are continuous heavy rains, they may be wet for short periods during the growing season.

These soils can be tile drained if there are suitable outlets. The flat or depressed areas will also need surface drainage. Because runoff from the adjoining uplands frequently ponds on them, these soils need to be protected by diversion ditches, waterways, or dikes.

If surface drained and well managed otherwise, these soils can be cropped intensively. They respond well to fertilizer. If desired, alfalfa can be interseeded in wide-row corn in rotations on these soils and the small grain can be omitted from the cropping system.

MANAGEMENT OF CAPABILITY UNIT IIw-2

These soils are on bottom lands. They have either a high water table or poor surface drainage. These soils should be protected from overflow by dikes or diversions. In some places, broad, shallow ditches will help to remove surface water from the low spots.

Lawson and Huntsville silt loams, sandy substrata, are on low bottoms adjacent to the Mississippi River. These soils have a high water table in spring when the river is at floodstage. Consequently, there is no outlet for deep drains on these soils because they are so close to areas flooded by the river.

Capability class III

The soils of class III are more seriously limited in their use for agriculture than the soils in classes I and II. Some of the class III soils on slopes of 6 to 12 percent are subject to water erosion; others are sandy and droughty; still others are flooded at times or need to be drained before they can be farmed. Because of these limitations, if class III soils are to be farmed over a period of years, the management must include corrective practices, wherever feasible.

Unless practices are used to control erosion, the soils on slopes of 6 to 12 percent are likely to become severely eroded. This is particularly true when row crops are grown on them. The sandy soils need to be protected from wind erosion. Yields on the sandy soils are lower than on deep, silty soils. Before high yields can be obtained on the wet soils or on soils that are flooded at times, the areas must be drained or protected from flooding.

The soils in class III are listed in table 3, by capability unit, along with suitable cropping systems and practices to control erosion. A discussion of each capability unit is also given.

MANAGEMENT OF CAPABILITY UNIT IIIe-1

The soils in this capability unit are deep and silty and are well drained. They are on slopes of 6 to 12 percent. These soils are slightly to moderately eroded, but they become seriously eroded if they are managed poorly. The hazard of water erosion is serious. Contour strip-cropping, wheel-track planting, subsurface tillage, terracing, and use of diversion ditches and waterways will help to control erosion (fig. 10). When such practices are applied, a cropping system that includes 1 or more years of corn may be used. If corn is grown without using measures to protect the soil, excessive erosion will occur.

The soils have a high moisture-storing capacity and are easy to work. Good tilth can be maintained if manure is

TABLE 3.—*Suggested cropping systems and management practices for soils of class III*

Soil	Cropping systems			
	No erosion control practices	Contour stripcropping	Terracing	Terracing and wheel-track planting [1]
CAPABILITY UNIT IIIe-1				
Bertrand silt loam, 6 to 12 percent slopes, moderately eroded. Dubuque silt loam, deep, 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, moderately eroded. Port Byron silt loam, 6 to 12 percent slopes, moderately eroded. Port Byron silt loam, 6 to 12 percent slopes.	Small grain, hay for 2 years.	Corn, small grain, hay for 2 years.	Corn for 2 years, small grain, hay for 2 years. Corn, small grain, hay.	Corn for 3 years, small grain, hay.
CAPABILITY UNIT IIIe-2				
Dubuque silt loam, 6 to 12 percent slopes, moderately eroded. [2] Gale silt loam, 6 to 12 percent slopes, moderately eroded. Gale-Hixton complex, 6 to 12 percent slopes, moderately eroded.	Small grain, hay for 3 years.	Corn, small grain, hay for 3 years. Small grain, hay for 2 years.	Corn, small grain, hay for 2 years.	Corn for 2 years, small grain, hay for 2 years.
CAPABILITY UNIT IIIe-3				
Chaseburg silt loam, 6 to 12 percent slopes. Judson silt loam, 6 to 12 percent slopes.	Corn, small grain, hay for 3 years.	To control overflow, use diversion ditches, waterways, and terraces where needed; leave all crop residues on the field.		

See footnotes at end of table.

TABLE 3.—*Suggested cropping systems and management practices for soils of class III*—Continued

Soil	Cropping systems: No erosion control practices	Cropping systems: Contour stripcropping	Cropping systems: Terracing	Cropping systems: Terracing and wheel-track planting [1]
CAPABILITY UNIT IIIs-1				
Dakota sandy loam, 0 to 2 percent slopes.[3] Dakota sandy loam, 2 to 6 percent slopes. Hesch sandy loam, 2 to 6 percent slopes, moderately eroded. Hixton sandy loam, 2 to 6 percent slopes. Hixton sandy loam, 2 to 6 percent slopes, moderately eroded. Meridian sandy loam, 2 to 6 percent slopes. Meridian sandy loam, 0 to 2 percent slopes.[3] Meridian sandy loam, 2 to 6 percent slopes, moderately eroded. Trempealeau fine sandy loam, 0 to 2 percent slopes.[3] Trempealeau fine sandy loam, 2 to 6 percent slopes.[3]	Corn, small grain, hay for 3 years.	Corn, small grain, hay for 2 years.	Corn for 2 years, small grain, hay for 2 years.	Corn for 3 years, small grain, hay. Corn for 3 years, small grain, hay for 2 years.
CAPABILITY UNIT IIIs-2				
Dakota sandy loam, 6 to 12 percent slopes, moderately eroded. Hesch sandy loam, 6 to 12 percent slopes, moderately eroded. Hixton sandy loam, 6 to 12 percent slopes, moderately eroded. Meridian sandy loam, 6 to 12 percent slopes, moderately eroded. Meridian-Waukegan complex, 6 to 12 percent slopes, moderately eroded. Tell silt loam, 6 to 12 percent slopes, moderately eroded.	Small grain, hay for 3 years.	Corn, small grain, hay for 3 years.	Corn, small grain, hay for 2 years.	Corn for 2 years, small grain, hay for 2 years.
CAPABILITY UNIT IIIw-1				
Muck and peat, drained.	Continuous corn or continuous corn with small grain and sweetclover grown as a green-manure crop every 5th year.			
CAPABILITY UNIT IIIw-2				
Alluvial land, moderately well drained.	Continuous corn, generally grown for silage.	Control overflow or flooding by dikes, ditches, or waterways, where feasible; leave all possible crop residues on the field.		
CAPABILITY UNIT IIIw-3				
Curran silt loam.[4] Zwingle silt loam.[4]	Corn, small grain, hay for 2 years.			

[1] Wheel-track planting consists of plowing in spring and planting corn in the wheel tracks of the tractor without further preparation of the seedbed.

[2] Not suitable for terracing unless the red clay is at depths of 18 inches or more.

[3] Stripcrop for control of wind erosion; use cropping systems listed under the columns, Contour stripcropping, and Terracing.

[4] Surface drainage generally needed; erosion control is not a problem on this soil.

applied and alfalfa and bromegrass, sown together, or other sod-forming crops are grown. If desired, alfalfa can be interseeded in wide-row corn and used in the cropping system in place of a small grain. If these soils receive adequate amounts of fertilizer, are used in a suitable cropping system, and are otherwise well managed, the yields are moderate to high.

MANAGEMENT OF CAPABILITY UNIT IIIe-2

This capability unit consists mostly of sloping, loamy to silty soils that are well drained. The soils are underlain by sand or red clay and dolomite at depths of 20 to 30 inches. Because of the underlying sand or clay, they have a greater hazard of erosion than the soils in capability unit IIIe-1. This underlying sand or clay is undesir-

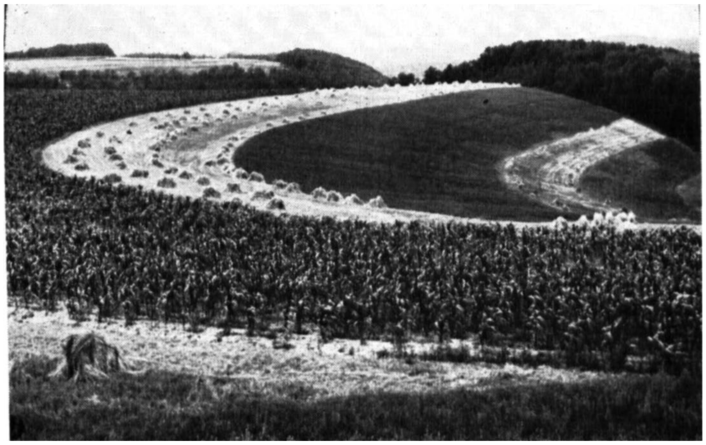

Figure 10.—**Soil in capability unit IIIe–1 farmed in contour strips to reduce erosion.**

able for crops if it is exposed through erosion. Stripcropping on the contour, using crop residues, interseeding a hay crop in corn, using the wheel-track method of planting, and constructing diversion ditches will aid in controlling erosion. If corn is grown on these soils, leave all crop residues on the surface and apply other necessary practices to prevent erosion.

The soils in this unit are lower in moisture-storing capacity than the deep, silty soils in class I. If rainfall is normal and is well distributed throughout the growing season, and if adequate fertilizer is used, high yields are obtained. During prolonged dry periods, however, crops may be damaged slightly by lack of moisture.

MANAGEMENT OF CAPABILITY UNIT IIIe–3

The soils in this capability unit are deep and silty and are well drained. They have formed from local alluvium or colluvium and are in long, narrow draws or on fans. These soils are on slopes of 6 to 12 percent. During heavy rains or spring thaws, they receive runoff from the uplands. Sometimes this runoff causes serious erosion.

Because of the hazard of erosion caused by overflow, these soils cannot be used so often for row crops or small grains as can the less sloping Chaseburg and Judson soils. If used for row crops, they need protection from overflow. This can be supplied by diversion ditches or waterways. A cover of crop residues or barnyard manure will help to control erosion. These soils are highly productive if they receive adequate fertilizer and are otherwise well managed.

MANAGEMENT OF CAPABILITY UNIT IIIs–1

This capability unit is made up of well-drained sandy loams. The soils are underlain by loose sand or sandstone at depths between 18 and 42 inches. Their moisture-storing capacity is limited, and, during prolonged dry spells, crops may be damaged by lack of moisture. The slopes are 6 percent or less, and water erosion is generally not a hazard. Unless they are protected, however, the soils are likely to be eroded by wind. Crop residues or barnyard manure kept on the surface will help to prevent erosion by wind. Crops on the soils in this capability unit do not respond so well to large amounts of fertilizer as do crops on the soils in capability unit I–1, IIe–1, or IIIe–1.

To keep a good stand of alfalfa on these soils for longer than 1 or 2 years, apply potash in the fall. For example, apply a commercial fertilizer such as 0–15–45 or 0–12–36 that also contains borax. The amounts of fertilizer needed should be determined by soil tests. In many places the borated fertilizer will be needed to prevent boron deficiency in the alfalfa. During periods of low rainfall, crops on these soils will respond to irrigation. When they are irrigated, however, larger amounts of fertilizer are needed.

MANAGEMENT OF CAPABILITY UNIT IIIs–2

These soils are steeper than the soils of capability unit IIIs–1, but like those soils they are mainly sandy loams. The limitations are similar except that these soils are also subject to water erosion. These soils can be managed about the same as the soils of capability unit IIIs–1, but the cropping system should include more hay crops and fewer row crops. Contour stripcropping and terracing will also be needed in places.

MANAGEMENT OF CAPABILITY UNIT IIIw–1

This capability unit consists of Muck and peat, drained. The drainage system controls the water table, but it needs to be maintained or improved so that excess water will be removed rapidly. These soils are highly productive when they receive adequate fertilizer. They generally require large amounts of phosphate and potash. The areas need protection from fire at all times and from blowing in spring. In places, diversion ditches or waterways are needed to intercept the runoff from the adjacent uplands and to prevent temporary flooding.

MANAGEMENT OF CAPABILITY UNIT IIIw–2

This capability unit consists of Alluvial land, moderately well drained. The soil is made up of highly variable, stratified layers of sand and silt. The areas generally occur along large streams where they are flooded frequently, particularly in the spring. After they are flooded in the spring, the areas generally are slow to dry out and warm up.

If the areas are not flooded severely during the growing season, they will produce good yields of corn grown for silage and other short-season crops. In some of the areas, where flooding is less severe, a cropping system such as that suggested for the soils of capability unit IIIe–3 can be used. The use of surface drains or dikes will prevent flooding or will minimize overflow in some places.

MANAGEMENT OF CAPABILITY UNIT IIIw–3

The soils in this capability unit have a dense subsoil that is impermeable to water. Consequently, the silty soil overlying the subsoil is frequently waterlogged. When this happens, plants on this soil become yellow and fail to grow well. These soils are not suited to tiling, but crops benefit if surface drainage is used to remove water from the low spots in the field. To improve the soils, add lime, commercial fertilizer, crop residues, and barnyard manure. Drainage of the subsoil sometimes improves when sweetclover or other deep-rooted crops are grown and the roots open channels into the subsoil.

Capability class IV

The soils of class IV are very steep, very sandy, or poorly drained. They are, therefore, severely limited in their use for agriculture. Not all crops can be grown safely on these soils. In addition, the yields on the sandy and poorly drained soils are generally low.

The soils of capability class IV are less desirable for farming than the soils of capability classes I, II, and III. Before corn can be grown safely on them, the steep soils need practices to control erosion. The sandy soils are droughty and are likely to blow. The wet soils require surface drainage and careful tillage.

The soils in class IV are listed in table 4, by capability unit, along with suitable cropping systems and practices to control erosion. A discussion of each capability unit is also given.

MANAGEMENT OF CAPABILITY UNIT IVe–1

The soils in this capability unit are deep and silty and are well drained. They have a high moisture-storing capacity. The slopes range from 12 to 20 percent. Runoff is rapid; if the soil is left bare, it erodes rapidly. Figure 11 shows soils of this capability unit that need to be protected from erosion.

Diversion ditches will help to control runoff on these soils, especially on the long slopes. If good management is used, corn can be grown safely. The management should include using the wheel-track method of planting corn, growing the corn in contour strips, and leaving all crop residues on the soil. On slopes of more than 16 percent, avoid the use of a cropping system in which a small grain follows corn. If corn is grown on slopes steeper than 16 percent, use the wheel-track method of planting and interseed to alfalfa and bromegrass or a similar hay mixture after the crop has been cultivated for the last time. If the soils are protected from erosion and adequate amounts of fertilizer are applied, crops on these soils will produce moderately high yields.

MANAGEMENT OF CAPABILITY UNIT IVe–2

Except that the soils in this capability unit are shallower over sand, sandstone, or red clay and dolomite, they are similar to the soils in capability unit IVe–1. If any of the silty surface layer is lost by erosion, the damage to the soil is serious. Consequently, it is best to keep these soils in hay or rotation pasture most of the time. If corn is grown on these soils, use the wheel-track method of planting and interseed to alfalfa after the corn has been cultivated the last time. Avoid the use of a cropping system in which a small grain follows corn.

TABLE 4.—*Suggested cropping systems and management practices for soils of class IV*

Soil	Cropping systems			
	No erosion control practices	Contour stripcropping	Contour stripcropping and residue management [1]	Contour stripcropping and wheel-track planting [2]
CAPABILITY UNIT IVe–1				
Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded. Dubuque silt loam, deep, 12 to 20 percent slopes. Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded. Fayette silt loam, uplands, 12 to 20 percent slopes. Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded. Port Byron silt loam, 12 to 20 percent slopes. Port Byron silt loam, 12 to 20 percent slopes, moderately eroded. Seaton silt loam, 12 to 20 percent slopes, moderately eroded.	Small grain, hay for 3 years.	Small grain, hay for 2 years.	Corn, small grain, hay for 4 years.	Corn, small grain, hay for 4 years.
CAPABILITY UNIT IVe–2				
Dubuque silt loam, 12 to 20 percent slopes. Dubuque silt loam, 12 to 20 percent slopes, moderately eroded. Gale silt loam, 12 to 20 percent slopes. Gale silt loam, 12 to 20 percent slopes, moderately eroded. Gale-Hixton complex, 12 to 20 percent slopes. Gale-Hixton complex, 12 to 20 percent slopes, moderately eroded. Waukegan silt loam, 12 to 20 percent slopes, moderately eroded.	Small grain, hay for 4 years.	Small grain, hay for 3 years.	Small grain, hay for 2 years.	

See footnotes at end of table.

TABLE 4.—*Suggested cropping systems and management practices for soils of class IV*—Continued

CAPABILITY UNIT IVs-1

Soil	Cropping systems			
	No erosion control practices	Contour stripcropping	Contour stripcropping and residue management [1]	Contour stripcropping and wheel-track planting [2]
Boone-Hixton loamy sands, 0 to 6 percent slopes.[3]	Small grain, hay for 3 years.	Corn, small grain, hay for 2 years.	Corn, small grain, hay for 2 years.	Corn, small grain, hay for 2 years.
Boone-Hixton loamy sands, 6 to 12 percent slopes.				
Boone-Hixton loamy sands, 6 to 12 percent slopes, eroded.				
Gotham loamy sand, 0 to 2 percent slopes.[3]				
Gotham loamy sand, 2 to 6 percent slopes.[3]				
Gotham loamy sand, 2 to 6 percent slopes, eroded.				
Gotham loamy sand, 6 to 12 percent slopes, eroded.				
Hesch sandy loam, 12 to 20 percent slopes, moderately eroded.				
Plainfield loamy fine sand, 2 to 6 percent slopes.[3]				
Plainfield loamy fine sand, 0 to 2 percent slopes.[3]				
Plainfield loamy fine sand, 2 to 6 percent slopes, eroded.				
Plainfield loamy fine sand, 6 to 12 percent slopes.				
Plainfield loamy fine sand, 6 to 12 percent slopes, eroded.				
Sparta loamy fine sand, 0 to 2 percent slopes.[3]				
Sparta loamy fine sand, 2 to 6 percent slopes.[3]				
Sparta loamy fine sand, 6 to 12 percent slopes, eroded.				
Trempe loamy fine sand, 0 to 2 percent slopes.[3]				
Trempe loamy fine sand, 2 to 12 percent slopes.				

[1] Residue management means leaving all crop residues, especially shredded cornstalks, on the soil over winter, and disking in spring before seeding grain.

[2] Wheel-track planting means plowing the soil in spring and planting corn in the wheel tracks of the tractor without further preparation of the seedbed.

[3] Stripcrop to control wind erosion rather than water erosion.

Diversion ditches are needed to control runoff and erosion, especially on long slopes.

MANAGEMENT OF CAPABILITY UNIT IVs-1

The soils in this capability unit are deep and sandy. Most of the slopes range up to 12 percent, but the Hesch soil is steeper. These soils are droughty and blow badly if left bare. Among the crops to which they are best suited are ones that mature early in the season or melons, cucumbers, and similar truck crops.

Yields on these soils are lower than yields on soils of capability classes I and II. They are especially low during dry years or during years when rainfall is distributed poorly throughout the growing season. These soils are benefited by adding barnyard manure or crop residues. To maintain alfalfa for more than 1 or 2 years, topdress the hayfields each fall with 8 to 10 tons of manure per acre or 200 to 300 pounds of a commercial fertilizer, such as 0-12-36, that also contains borax. Figure 12 shows a soil in capability unit IVs-1 on which alfalfa has been winterkilled because of lack of potash.

In places, gullies occur on these soils. Once gullies have formed they enlarge rapidly and are hard to control.

Capability class V

The soils in capability class V are either subject to flooding or are poorly drained. They are forming in alluvial materials or consist of muck and peat. These soils are listed in table 5, by capability unit, along with suggested land use and management practices.

MANAGEMENT OF CAPABILITY UNIT Vw-1

Alluvial land, poorly drained, and Muck and peat, undrained, make up this capability unit. Alluvial land, poorly drained, is on the flood plains of the Mississippi River. The areas are mostly timbered. Muck and peat, undrained, occurs throughout the county, generally in small, scattered areas.

It is not feasible to drain these soils. Most of the acreage is best used as woodland. The soils are not desirable for pasture because the vegetation consists mostly of sedges and marsh grass, but open areas can be pastured.

Figure 11.—Soils in capability unit IVe-1. These soils are on steep slopes and need to be protected from erosion.

Figure 12.—Alfalfa on a soil in capability unit IVs-1. On the light spots, the alfalfa has been winterkilled because of lack of potash.

Figure 13.—Soils in capability unit Vw-1 used for pasture.

Figure 13 shows an area of this capability unit used for pasture.

Capability class VI

In this capability class are steep, silty soils, moderately steep sandy loams, bottom-land soils subject to severe overflow, and very stony soils. These soils are not suited to permanent cultivation, but some of the steep soils can be renovated and used as rotation pasture (fig. 14). The soils are used largely as pastures and as woodland.

The soils in class VI are listed in table 5, by capability units, along with suggested land use and management practices.

MANAGEMENT OF CAPABILITY UNIT VIe-1

The soils in this capability unit have 20 inches or more of silt over sand, red clay, or sandstone. They are too steep to be cultivated permanently.

In many places the soils are used for pasture. The productivity of the pastured areas can be increased by renovation or by applying fertilizer as a topdressing without renovation. For renovation, use narrow contour strips on the long slopes, starting at the top of the slope. To obtain high yields of pasture, combine periodic renovation with other good management practices.

Many areas of these soils are partly in timber and are used for pasture. On these areas the yields of timber and pasture are poor. It is best to fence these areas to protect them from grazing and to use them entirely for producing timber. If more pasture is needed, clear a wooded area, renovate, and seed it to a legume-grass mixture for pasture.

In addition to protecting them from grazing, areas in woodland should be well managed otherwise. When woodlands are well managed, there is less runoff. Thus, flood damage is reduced in the coulees below the timbered areas. Over a period of years, the time and money invested in fencing and in other good woodland management will be repaid through the increase in yields of timber.

MANAGEMENT OF CAPABILITY UNIT VIs-1

The soils in this capability unit are sandy or stony. They are too steep to be cultivated. Except on the stony areas, pastures on these soils can be limed and fertilized, with or without renovation, to increase their

Figure 14.—Soils in capability class VI in permanent pasture.

Table 5.—*Suggested land use and management practices for soils in capability classes V, VI, VII, and VIII*

Soil	Management practices suggested for—		
	Permanent hay crops or pasture	Woodland	Land used for wildlife
Capability Unit Vw–1			
Alluvial land, poorly drained. Muck and peat, undrained.	Reseed if feasible.	Plant open areas; protect from fire and grazing; harvest mature timber.	Maintain ground cover; level ditching for use of muskrats may be feasible in places.
Capability Unit VIe–1			
Dubuque 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 silt loam, deep, 20 to 30 percent slopes. Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded. Dubuque soils, deep, 12 to 20 percent slopes, severely eroded. Fayette silt loam, uplands, 20 to 30 percent slopes. Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded. Fayette soils, uplands, 12 to 20 percent slopes, severely eroded. Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded. Fayette silt loam, valleys, 20 to 30 percent slopes. Fayette soils, valleys, 12 to 20 percent slopes, severely eroded. Gale silt loam, 20 to 30 percent slopes, moderately eroded. Gale silt loam, 20 to 30 percent slopes. Gale-Hixton complex, 20 to 30 percent slopes. Gale-Hixton complex, 20 to 30 percent slopes, moderately eroded. Port Byron silt loam, 12 to 20 percent slopes, severely eroded. Port Byron silt loam, 20 to 30 percent slopes, moderately eroded. Seaton silt loam, 12 to 20 percent slopes, severely eroded. Seaton silt loam, 20 to 30 percent slopes. Seaton silt loam, 20 to 30 percent slopes, moderately eroded.	If feasible, lime, fertilize, and renovate regularly in narrow strips; seed to a legume-grass mixture; use rotational grazing and proper stocking; lime and fertilize where renovation is impractical; if fields are renovated, plan to renovate about every fifth year.	Keep livestock out of woods; cut poorly formed and other undesirable trees; plant open areas to suitable hardwoods or conifers; harvest mature trees.	Leave trees and shrubs along fence rows; plant shrubs and conifers between cropped areas and woods.
Capability Unit VIs–1			
Hesch sandy loam, 20 to 30 percent slopes, moderately eroded. Hixton sandy loam, 12 to 20 percent slopes. Hixton sandy loam, 12 to 20 percent slopes, moderately eroded. Hixton sandy loam, 12 to 20 percent slopes, severely eroded. Hixton sandy loam, 20 to 30 percent slopes. Hixton sandy loam, 20 to 30 percent slopes, moderately eroded. Stony colluvial land.	Lime and fertilize as needed; renovate and reseed to a legume-grass mixture where feasible; do not overgraze.	Keep livestock out of woods; plant open areas to suitable conifers; cut poorly formed and other undesirable trees; harvest mature trees.	Leave trees and shrubs along fence rows; plant shrubs and conifers between cropped areas and woods.
Capability Unit VIw–1			
Arenzville, Orion, and Huntsville soils. Chaseburg and Judson silt loams, 0 to 2 percent slopes. Chaseburg and Judson silt loams, 2 to 6 percent slopes.	Control grazing, especially after overflow, to prevent trampling of turf; spray or clip weeds; apply complete fertilizer for greater production; keep cattle out of gullies.	Protect from fire and livestock; remove poorly formed, crowded, and other undesirable trees; plant suitable hardwoods.	Plant willows where banks are cutting; protect existing vegetation and ground cover.

TABLE 5.—*Suggested land use and management practices for soils in capability classes V, VI, VII, and VIII*—Continued

CAPABILITY UNIT VIIe-1

Soil	Management practices suggested for—		
	Permanent hay crops or pasture	Woodland	Land used for wildlife
Dubuque silt loam, 30 to 45 percent slopes. Dubuque soils, 20 to 30 percent slopes, severely eroded. Dubuque soils, deep, 20 to 45 percent slopes, severely eroded. Fayette silt loam, uplands, 30 to 40 percent slopes. Fayette soils, uplands, 20 to 30 percent slopes, severely eroded. Fayette silt loam, valleys, 30 to 40 percent slopes, moderately eroded. Fayette soils, valleys, 20 to 30 percent slopes, severely eroded. Gale silt loam, 20 to 30 percent slopes, severely eroded. Gale silt loam, 30 to 60 percent slopes. Gale silt loam, 30 to 60 percent slopes, moderately eroded. Gale-Hixton complex, 30 to 60 percent slopes. Gale-Hixton complex, 20 to 30 percent slopes, severely eroded. Gale-Hixton complex, 30 to 60 percent slopes, moderately eroded. Gale-Hixton complex, 30 to 60 percent slopes, severely eroded. Gullied land. Riverwash. Rough broken land and rock land. Seaton silt loam, 20 to 30 percent slopes, severely eroded. Seaton silt loam, 30 to 50 percent slopes, moderately eroded. Terrace escarpments.	Have limited use for pasture if not timbered; too steep for pasture renovation or reseeding.	Fence out livestock; cut out poorly formed and other undesirable trees; harvest mature trees; plant open areas to hardwoods or conifers.	Leave trees and shrubs along fence rows; plant shrubs and conifers between cropped areas and woods.

CAPABILITY UNIT VIIs-1

Soil	Permanent hay crops or pasture	Woodland	Land used for wildlife
Boone sand, 6 to 12 percent slopes, eroded. Boone sand, 2 to 6 percent slopes, eroded. Boone sand, 12 to 60 percent slopes, eroded. Boone-Hixton loamy sands, 12 to 60 percent slopes, eroded. Hixton sandy loam, 30 to 60 percent slopes. Hixton sandy loam, 20 to 30 percent slopes, severely eroded. Hixton sandy loam, 30 to 60 percent slopes, moderately eroded. Hixton sandy loam, 30 to 60 percent slopes, severely eroded. Plainfield fine sand, 2 to 6 percent slopes, eroded. Plainfield fine sand, 0 to 2 percent slopes, eroded. Plainfield fine sand, 6 to 12 percent slopes, eroded. Plainfield fine sand, 12 to 20 percent slopes, eroded. Plainfield loamy fine sand, 12 to 20 percent slopes, eroded. Plainfield-Sparta complex. Sparta sand, 0 to 2 percent slopes. Sparta sand, 2 to 6 percent slopes. Sparta sand, 6 to 12 percent slopes, eroded. Stabilized dunes.	May have limited use for pasture; do not overgraze.	Plant open areas to pine trees for timber or for use as Christmas trees; where hardwoods grow protect from livestock and harvest mature trees.	Leave trees and shrubs along fence rows.

CAPABILITY UNIT VIIIw-1

Soil	Permanent hay crops or pasture	Woodland	Land used for wildlife
Marsh.	Not suitable for pasture.	Not suitable as woodland.	Improve for wildlife.

Figure 15.—**Soils in capability units VIe-1 and VIs-1 eroded as the result of cattle walking to and from the barn.**

productivity. The soils used for timber need to be managed the same as the soils in capability unit VIe-1. Figure 15 shows soils in capability units VIe-1 and VIs-1 that have become eroded as the result of cattle walking to and from the barn.

MANAGEMENT OF CAPABILITY UNIT VIw-1

The soils in this capability unit are on fans, in narrow draws, or on the bottoms along streams. They occur on both sides of the streams and are flooded frequently by rapidly flowing water. In some places they are subject to streambank cutting. Figure 16 shows a typical soil in this capability unit.

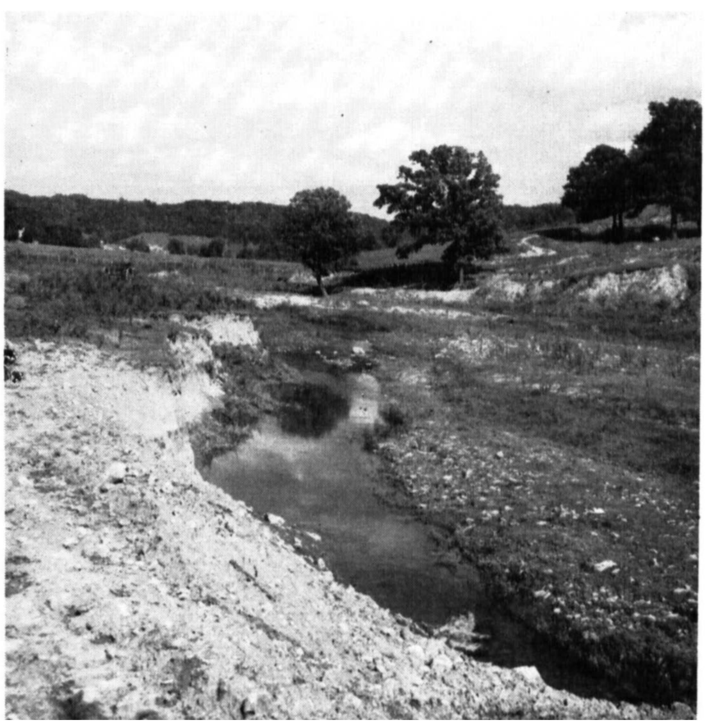

Figure 16.—**Typical soil in capability unit VIw-1. This soil is along Mormon Creek.**

These soils are suited to pasture, and they respond well to good management. The soils can be used also for producing timber. Special practices are needed in some places along tributary streams to control streambank or gully cutting.

Capability class VII

The soils in this capability class are either very steep or are very sandy. They are suited mainly to timber. In areas where the timber has been removed, the silty soils have a limited use for pasture.

The soils in class VII are listed in table 5, by capability unit, along with suggested land use and management practices.

MANAGEMENT OF CAPABILITY UNIT VIIe-1

The soils in this capability unit occupy many of the rough, steep areas of La Crosse County. Although some of the open areas have a limited use for early summer pasture, the soils in this group generally are best used as woodland. If they are used as woodland, the areas need to be fenced to protect them from grazing. Then, timber can be improved by cutting out diseased and poorly formed trees and trees that are undesirable otherwise. Harvest desirable trees as they mature with the same care used in harvesting other crops. Limit cutting to mature trees, and protect young trees and seedlings.

MANAGEMENT OF CAPABILITY UNIT VIIs-1

This capability unit is made up of loose, sandy soils that are level to steep. The soils are too sandy and droughty for cultivated crops and are best suited to timber or to growing Christmas trees. When planting large areas to trees, leave lanes for fire protection. Figure 17 shows areas of soils of this capability unit that are cultivated and others that are planted to trees.

Capability class VIII

In La Crosse County this capability class consists of marshland that is too wet for pasture or trees. The only mapping unit in the county, Marsh, is listed in table 5, by capability unit, along with suggested land use and management practices.

MANAGEMENT OF CAPABILITY UNIT VIIIw-1

The only soil in this capability unit is Marsh. Most of the areas are on the flood plain of the Mississippi River. Although the areas have a limited use for production of muskrats for fur, they also provide nesting and feeding sites for migratory waterfowl and are much used by hunters. Figure 18 shows an area of this capability unit.

Special Soil Management

A discussion of special management practices needed when the soils are irrigated follows. Also discussed are special management practices needed when tobacco, certain vegetables, or other special crops are grown.

Irrigation

To successfully irrigate the soils in this county, several steps must be taken. Some of these steps are discussed here.

Check the water supply.—Be sure there is an adequate and dependable supply of water. The source may be a natural lake or stream, a pit, a sand point that taps the water table, a well, or a pond that stores surface runoff. The use of water from natural lakes, streams, and large wells is limited by law. Therefore, before investing time and money in irrigation, be sure you have the legal right to proceed.

Consider the soil.—Before you purchase irrigation equipment, determine whether the soil is suitable. In La Crosse County the capability units that have soils that are potentially responsive to irrigation are grouped as follows: (1) In capability units I–1, IIe–1, IIIe–1, IIIe–2, IVe–1, and IVe–2 are deep, well-drained, silty soils that have adequate moisture-storing capacity in most years. Most of the soils in these units are on high ridges where it would be expensive to develop a water supply for irrigation. (2) In capability units IIs–1, IIIs–1, IIIs–2, and IVs–1 are the soils that are limited in moisture-storing capacity because they are sandy or shallow.

The soils in capability units IIIe–1, IIIe–2, IVe–1, and IVe–2 are on slopes that may limit them for irrigation. Those in capability units IIs–1 and IIIs–1 are on slopes of 6 percent or less. The soils of capability units IIs–1 and IIIs–1 are droughty, but they have a supply of water more readily available under them and are probably the most desirable soils for irrigation. The soils of capability unit IVs–1 are generally nearly level and are suited to irrigation, but they have a few steeper areas that are not so well suited. In addition, they have a very sandy texture. Consequently, the soils of this capability unit need to have water and fertilizer applied with more careful timing than is necessary for the other soils discussed in this section.

Give the soils extra care.—Irrigated soils, and especially sandy soils, need large amounts of fertilizer, which must be applied carefully. They must be well managed otherwise. The crops irrigated the most successfully are generally those that give a high return per acre, for example, shallow-rooted truck crops, potatoes, and small fruits.

Get expert advice.—The services of a competent agricultural engineer are needed to help in deciding whether or not to invest in an irrigation system. Such help can be obtained from the county agent or from technicians of the Soil Conservation Service who assist the La Crosse County Soil Conservation District.

Special crops

The special crops in this county are mainly canning crops such as peas, beans, and sweet corn, but some tobacco and cabbage are grown. Some of the soils are well suited to special crops. The soils in capability units I–1, IIe–1, and IIs–1 are especially well suited to cabbage and to crops grown for canning, and in addition they are well suited to tobacco. Tobacco also grows well on well-drained areas of the Rowley and Judson soils in capability units IIw–1 and IIw–2, respectively.

All of the special crops require special management for the control of insects and diseases. They also need large

Figure 17.—Soils in capability unit VIIs–1. In the field in the upper picture, the crop has failed because the soil was sandy and droughty. In the lower picture, the soils have been planted to conifers.

Figure 18.—Area in capability unit VIIIw–1 showing dense natural growth of plants that tolerate water; this is an important feeding and nesting area for migratory waterfowl.

amounts of fertilizer, which must be applied carefully. Test the soils to determine the need for fertilizer. Consult your county agent for the latest information about the management needs of special crops.

Estimated Yields

Field crops and forest products are both sources of farm income in La Crosse County. The first part of this section, therefore, deals with estimated average acre yields of principal crops on the different soils and with the general productivity of the soils, as measured by their response to good management. The second part estimates the potential of the soils when used for forest.

Expected yields of principal crops

In table 6 are estimated, long-term, average acre yields for the principal crops grown in the county. Yields are given for each soil under two levels of management. In the columns marked "average" on this table are yields to be obtained under the system of management most farmers in the county were practicing in 1955. The yields in the columns marked "high" are those to be expected under improved management.

TABLE 6.—*Estimated, long-term, average acre yields of principal crops under 2 levels of management*

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

Soil	Corn		Oats		Alfalfa-brome hay	
	Average	High	Average	High	Average	High
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*
Alluvial land, moderately well drained	----	----	----	----	----	----
Alluvial land, poorly drained	----	----	----	----	----	----
Arenzville silt loam	65	95	55	70	2.5	4.0
Arenzville, Orion, and Huntsville soils	----	----	----	----	----	----
Bertrand silt loam, 2 to 6 percent slopes	63	100	52	75	2.8	4.5
Bertrand silt loam, 0 to 2 percent slopes	65	100	55	75	3.0	4.5
Bertrand silt loam, 2 to 6 percent slopes, moderately eroded	58	95	50	70	2.7	4.0
Bertrand silt loam, 6 to 12 percent slopes, moderately eroded	55	90	48	55	2.5	3.2
Boaz silt loam	50	75	45	50	1.5	2.5
Boone sand, 6 to 12 percent slopes, eroded	----	----	----	----	----	----
Boone sand, 2 to 6 percent slopes, eroded	----	----	----	----	----	----
Boone sand, 12 to 60 percent slopes, eroded	----	----	----	----	----	----
Boone-Hixton loamy sands, 0 to 6 percent slopes	25	36	20	26	1.0	1.5
Boone-Hixton loamy sands, 6 to 12 percent slopes	20	30	17	21	.8	1.2
Boone-Hixton loamy sands, 6 to 12 percent slopes, eroded	18	27	16	20	.7	1.1
Boone-Hixton loamy sands, 12 to 60 percent slopes, eroded	----	----	----	----	----	----
Chaseburg silt loam, 2 to 6 percent slopes	70	100	50	65	3.0	4.0
Chaseburg silt loam, 0 to 2 percent slopes	70	100	50	65	3.0	4.0
Chaseburg silt loam, 6 to 12 percent slopes	65	95	45	55	2.8	3.8
Chaseburg and Judson silt loams, 0 to 2 percent slopes	----	----	----	----	----	----
Chaseburg and Judson silt loams, 2 to 6 percent slopes	----	----	----	----	----	----
Curran silt loam	50	90	40	55	1.5	3.0
Dakota sandy loam, 0 to 2 percent slopes	50	70	40	55	2.0	3.0
Dakota sandy loam, 2 to 6 percent slopes	45	55	35	45	2.0	3.0
Dakota sandy loam, 6 to 12 percent slopes, moderately eroded	40	50	30	40	1.5	2.5
Dubuque silt loam, 20 to 30 percent slopes	----	----	----	----	1.8	2.3
Dubuque silt loam, 2 to 6 percent slopes, moderately eroded	50	70	48	57	2.4	3.0
Dubuque silt loam, 6 to 12 percent slopes, moderately eroded	45	56	40	45	2.0	2.5
Dubuque silt loam, 12 to 20 percent slopes	45	58	40	45	2.0	2.6
Dubuque silt loam, 12 to 20 percent slopes, moderately eroded	43	52	38	43	1.8	2.2
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded	----	----	----	----	1.7	2.1
Dubuque silt loam, 30 to 45 percent slopes	----	----	----	----	----	----
Dubuque soils, 12 to 20 percent slopes, severely eroded	----	----	----	----	1.5	2.0
Dubuque soils, 20 to 30 percent slopes, severely eroded	----	----	----	----	----	----
Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded	45	70	40	48	2.3	2.9
Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded	55	85	48	62	2.8	3.2
Dubuque silt loam, deep, 6 to 12 percent slopes, moderately eroded	48	80	43	54	2.6	3.0
Dubuque silt loam, deep, 12 to 20 percent slopes	48	80	43	55	2.6	3.0
Dubuque silt loam, deep, 20 to 30 percent slopes	----	----	----	----	2.3	2.8
Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded	----	----	----	----	2.0	2.5
Dubuque soils, deep, 12 to 20 percent slopes, severely eroded	----	----	----	----	1.6	2.2
Dubuque soils, deep, 20 to 45 percent slopes, severely eroded	----	----	----	----	----	----
Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded	50	83	42	60	2.2	3.6
Fayette silt loam, uplands, 2 to 6 percent slopes	65	100	55	75	2.8	4.5
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	60	95	50	70	2.7	4.2
Fayette silt loam, uplands, 6 to 12 percent slopes	60	95	50	70	2.7	4.5
Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded	55	85	45	65	2.6	4.0
Fayette silt loam, uplands, 12 to 20 percent slopes	55	85	45	65	2.4	3.8
Fayette silt loam, uplands, 20 to 30 percent slopes	----	----	----	----	2.2	3.6
Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded	----	----	----	----	2.0	3.2
Fayette silt loam, uplands, 30 to 40 percent slopes	----	----	----	----	----	----
Fayette soils, uplands, 12 to 20 percent slopes, severely eroded	----	----	----	----	1.8	2.8
Fayette soils, uplands, 20 to 30 percent slopes, severely eroded	----	----	----	----	----	----

TABLE 6.—*Estimated, long-term, average acre yields of principal crops under 2 levels of management*—Continued

Soil	Corn		Oats		Alfalfa-brome hay	
	Average	High	Average	High	Average	High
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*
Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded					2.0	3.2
Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded	60	88	52	65	2.5	4.0
Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded	55	80	45	60	2.2	3.8
Fayette silt loam, valleys, 20 to 30 percent slopes					2.2	3.6
Fayette silt loam, valleys, 30 to 40 percent slopes, moderately eroded						
Fayette soils, valleys, 12 to 20 percent slopes, severely eroded					1.8	2.8
Fayette soils, valleys, 20 to 30 percent slopes, severely eroded						
Gale silt loam, 20 to 30 percent slopes, moderately eroded					1.3	1.8
Gale silt loam, 2 to 6 percent slopes	55	80	45	60	2.2	3.0
Gale silt loam, 6 to 12 percent slopes, moderately eroded	45	65	40	50	2.0	2.5
Gale silt loam, 12 to 20 percent slopes	45	70	38	55	2.0	2.8
Gale silt loam, 12 to 20 percent slopes, moderately eroded	40	60	35	45	1.5	2.2
Gale silt loam, 20 to 30 percent slopes					1.5	2.0
Gale silt loam, 20 to 30 percent slopes, severely eroded						
Gale silt loam, 30 to 60 percent slopes						
Gale silt loam, 30 to 60 percent slopes, moderately eroded						
Gale-Hixton complex, 30 to 60 percent slopes						
Gale-Hixton complex, 2 to 6 percent slopes	50	65	40	55	2.0	2.5
Gale-Hixton complex, 6 to 12 percent slopes, moderately eroded	42	55	37	42	1.6	2.2
Gale-Hixton complex, 12 to 20 percent slopes	42	55	37	42	1.6	2.0
Gale-Hixton complex, 12 to 20 percent slopes, moderately eroded	38	50	32	37	1.3	1.8
Gale-Hixton complex, 20 to 30 percent slopes					1.5	1.8
Gale-Hixton complex, 20 to 30 percent slopes, moderately eroded					1.1	1.6
Gale-Hixton complex, 20 to 30 percent slopes, severely eroded						
Gale-Hixton complex, 30 to 60 percent slopes, moderately eroded						
Gale-Hixton complex, 30 to 60 percent slopes, severely eroded						
Gotham loamy sand, 0 to 2 percent slopes	33	45	30	40	1.3	2.5
Gotham loamy sand, 2 to 6 percent slopes	32	43	28	35	1.2	2.5
Gotham loamy sand, 2 to 6 percent slopes, eroded	30	39	24	31	1.1	2.0
Gotham loamy sand, 6 to 12 percent slopes, eroded	25	30	20	25	1.0	1.5
Gullied land						
Hesch sandy loam, 6 to 12 percent slopes, moderately eroded	45	65	40	50	2.2	3.0
Hesch sandy loam, 2 to 6 percent slopes, moderately eroded	50	70	45	55	2.5	3.2
Hesch sandy loam, 12 to 20 percent slopes, moderately eroded	35	55	32	45	2.0	2.5
Hesch sandy loam, 20 to 30 percent slopes, moderately eroded					1.8	2.2
Hixton sandy loam, 30 to 60 percent slopes						
Hixton sandy loam, 2 to 6 percent slopes	40	50	34	50	1.6	2.5
Hixton sandy loam, 2 to 6 percent slopes, moderately eroded	35	45	30	45	1.3	2.2
Hixton sandy loam, 6 to 12 percent slopes, moderately eroded	30	40	25	40	1.1	2.0
Hixton sandy loam, 12 to 20 percent slopes	30	40	25	40	1.1	2.0
Hixton sandy loam, 12 to 20 percent slopes, moderately eroded	25	32	22	35	.9	1.5
Hixton sandy loam, 12 to 20 percent slopes, severely eroded					.7	1.2
Hixton sandy loam, 20 to 30 percent slopes					1.0	1.8
Hixton sandy loam, 20 to 30 percent slopes, moderately eroded					.8	1.3
Hixton sandy loam, 20 to 30 percent slopes, severely eroded						
Hixton sandy loam, 30 to 60 percent slopes, moderately eroded						
Hixton sandy loam, 30 to 60 percent slopes, severely eroded						
Jackson silt loam	65	105	50	65	3.0	4.5
Judson silt loam, 2 to 6 percent slopes	75	100	50	65	3.0	4.0
Judson silt loam, 0 to 2 percent slopes	75	100	50	65	3.0	4.0
Judson silt loam, 6 to 12 percent slopes	65	95	45	55	2.8	3.6
Lawson and Huntsville silt loams	65	100	50	60	2.9	3.5
Lawson and Huntsville silt loams, sandy substrata	70	95	50	60	2.5	3.0
Marsh						
Medary silt loam, 0 to 2 percent slopes	50	60	40	55	2.0	2.8
Medary silt loam, 2 to 7 percent slopes	45	55	38	50	1.8	2.5
Meridian sandy loam, 2 to 6 percent slopes	37	65	33	55	1.7	3.0
Meridian sandy loam, 0 to 2 percent slopes	40	65	35	55	1.8	3.0
Meridian sandy loam, 2 to 6 percent slopes, moderately eroded	35	60	30	45	1.5	2.5
Meridian sandy loam, 6 to 12 percent slopes, moderately eroded	30	50	25	35	1.2	2.0
Meridian-Waukegan complex, 0 to 2 percent slopes	55	75	45	60	2.2	3.5
Meridian-Waukegan complex, 2 to 6 percent slopes	50	75	40	60	2.0	3.2
Meridian-Waukegan complex, 2 to 6 percent slopes, moderately eroded	45	65	37	55	1.7	3.0
Meridian-Waukegan complex, 6 to 12 percent slopes, moderately eroded	37	60	32	45	1.5	2.5
Muck and peat, drained	60	95	30	45		
Muck and peat, undrained						
Orion fine sandy loam	60	85	50	60	2.2	3.5
Orion silt loam	60	90	50	60	2.2	3.5
Plainfield fine sand, 2 to 6 percent slopes, eroded						
Plainfield fine sand, 0 to 2 percent slopes, eroded						
Plainfield fine sand, 6 to 12 percent slopes, eroded						

TABLE 6.—*Estimated, long-term, average acre yields of principal crops under 2 levels of management*—Continued

Soil	Corn		Oats		Alfalfa-brome hay	
	Average	High	Average	High	Average	High
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*
Plainfield fine sand, 12 to 20 percent slopes, eroded						
Plainfield loamy fine sand, 2 to 6 percent slopes	28	35	20	26	.9	2.0
Plainfield loamy fine sand, 0 to 2 percent slopes	30	40	25	30	1.0	2.0
Plainfield loamy fine sand, 2 to 6 percent slopes, eroded	25	32	17	22	.8	1.5
Plainfield loamy fine sand, 6 to 12 percent slopes	25	32	17	22	.8	1.2
Plainfield loamy fine sand, 6 to 12 percent slopes, eroded	20	25	16	20	.7	.9
Plainfield loamy fine sand, 12 to 20 percent slopes, eroded						
Plainfield-Sparta complex						
Port Byron silt loam, 6 to 12 percent slopes, moderately eroded	60	90	50	57	2.5	4.0
Port Byron silt loam, 2 to 6 percent slopes	70	100	55	70	2.4	4.5
Port Byron silt loam, 2 to 6 percent slopes, moderately eroded	65	95	50	65	2.9	4.2
Port Byron silt loam, 6 to 12 percent slopes	65	95	52	57	2.7	4.3
Port Byron silt loam, 12 to 20 percent slopes	60	90	50	55	2.4	4.0
Port Byron silt loam, 12 to 20 percent slopes, moderately eroded	55	80	40	50	2.2	3.5
Port Byron silt loam, 12 to 20 percent slopes, severely eroded	50	80	40	60	2.2	3.5
Port Byron silt loam, 20 to 30 percent slopes, moderately eroded					2.2	3.5
Richwood silt loam, 0 to 2 percent slopes	75	110	55	75	3.0	4.5
Richwood silt loam, 2 to 6 percent slopes	70	110	55	75	2.9	4.5
Richwood silt loam, 2 to 6 percent slopes, moderately eroded	66	100	50	70	2.8	4.2
Riverwash						
Rough broken land and rock land						
Rowley silt loam, 0 to 2 percent slopes	65	105	45	55	2.0	3.0
Rowley silt loam, 2 to 6 percent slopes	65	105	45	55	2.0	3.0
Seaton silt loam, 12 to 20 percent slopes, moderately eroded	50	80	40	60	2.2	3.5
Seaton silt loam, 12 to 20 percent slopes, severely eroded					1.8	2.5
Seaton silt loam, 20 to 30 percent slopes					2.0	3.2
Seaton silt loam, 20 to 30 percent slopes, moderately eroded					1.8	3.0
Seaton silt loam, 20 to 30 percent slopes, severely eroded						
Seaton silt loam, 30 to 50 percent slopes, moderately eroded						
Sparta loamy fine sand, 0 to 2 percent slopes	33	42	27	32	1.0	2.0
Sparta loamy fine sand, 2 to 6 percent slopes	30	37	22	26	.9	2.0
Sparta loamy fine sand, 6 to 12 percent slopes, eroded	22	25	17	22	.7	1.4
Sparta sand, 0 to 2 percent slopes						
Sparta sand, 2 to 6 percent slopes						
Sparta sand, 6 to 12 percent slopes, eroded						
Stabilized dunes						
Stony colluvial land						
Tell silt loam, 2 to 6 percent slopes	55	70	45	55	2.0	3.5
Tell silt loam, 0 to 2 percent slopes	60	75	50	60	2.2	3.5
Tell silt loam, 6 to 12 percent slopes, moderately eroded	50	65	40	50	1.8	3.0
Terrace escarpments						
Toddville silt loam	70	115	55	70	3.0	4.5
Trempe loamy fine sand, 0 to 2 percent slopes	30	38	25	30	1.0	2.2
Trempe loamy fine sand, 2 to 12 percent slopes	28	35	22	27	.9	2.0
Trempealeau fine sandy loam, 0 to 2 percent slopes	45	65	40	50	2.0	3.0
Trempealeau fine sandy loam, 2 to 6 percent slopes	37	52	32	40	1.7	3.0
Trempealeau silt loam, 0 to 3 percent slopes	65	100	50	75	2.8	4.5
Waukegan silt loam, 2 to 6 percent slopes	63	85	48	60	2.5	3.7
Waukegan silt loam, 0 to 2 percent slopes	65	90	50	70	2.7	3.7
Waukegan silt loam, 2 to 6 percent slopes, moderately eroded	55	80	45	55	2.4	3.0
Waukegan silt loam, 12 to 20 percent slopes, moderately eroded	46	65	38	50	2.0	2.5
Zwingle silt loam	45	55	38	50		

For corn, average management consists of growing about 11,000 plants per acre of a variety suited to the soil and of applying 3 or 4 tons of manure and 100 to 200 pounds of commercial fertilizer as a starter. The seedbed is prepared and cultivated in the usual manner. For oats, average management consists of using a fairly high rate of seeding of a variety that is suited to the soil and of also seeding an alfalfa-grass mixture. It may include addition of 100 to 200 pounds of a fertilizer high in phosphate and potash. For alfalfa, average management means applying a minimum amount of lime and little or no commercial fertilizer and of cutting the alfalfa for hay twice a year and grazing it in the fall.

The management used to obtain the yields in the columns marked "High" is the level that is now being used by a few farmers in the county. For corn, this includes (1) having the soils tested; (2) manuring heavily; (3) fertilizing according to soil test, using enough nitrogen, phosphate, and potash so that yields will not be limited by lack of plant nutrients; (4) liming to pH 6.5 or 7.0; (5) growing 18,000 to 20,000 corn plants per acre on the best soils, and fewer plants on the more droughty soils; and (6) seeding, spraying, and cultivating at the right time.

For oats, this level of management means planting good seed of a variety suited to the soil and using heavy applications of phosphate and potash. For alfalfa, especially in long rotations, it means (1) liming the soil to a pH of 6.5 or 7.0; (2) using varieties that are suited to the soil and that are resistant to wilt and to winterkill; (3) cutting the crop at the right time so that three crops can be harvested during an average growing season; (4) allowing no grazing from early in September to the middle of October; and (5) topdressing with manure or a commercial fertilizer such as 0–15–45 or 0–12–36 that also contains borax, each fall.

The yield estimates were based on information obtained from the following sources: (1) Records of measured yields obtained by experiments made on specific soils; (2) records of yields and soil management practices reported by farmers for crops on specific soils; (3) observations of crops and interviews with farmers during the course of the survey; (4) knowledge of soil properties that are known to affect crop growth; and (5) average yield figures from agricultural census data.

The use of improved varieties of seed, of new and improved farming practices, and of larger amounts of fertilizer may make it possible to obtain higher average yields than the estimates given here. On the other hand, new plant diseases or insect pests may cause the yields to become lower than the averages shown here.

Estimates of yields can be used to check the adequacy of your system of management. If your average yields over the past 5 or 10 years are lower on a particular soil than those listed as average for the county, you should examine your management and cropping practices carefully. Suggested practices for individual soils are given in the section, Management of Capability Units. By changing your management practices, you may increase your yields to the levels listed as "High." Furthermore, a study of yield estimates can help you determine if it will pay you to use extra fertilizer or lime, and to use other improved management practices on your farm. When making such a decision, use figures for average yields obtained during the past 5 years or more. Yields fluctuate so much because of variations in the weather that figures for a period of more than 2 or 3 years are needed for an accurate comparison.

Productivity.—The productivity of the soils in La Crosse County has been estimated for those who need a quick comparison of the different soils, rather than the more detailed information on yields provided in table 6. The soils have been placed in four groups, according to their response under good management. The soils in any one group will vary somewhat in productivity, but all are generally similar in this respect.

Soils rated *very high* in productivity are among the best in the county. Those in the remaining three groups are rated in relation to the soils that have very high productivity. Soils with a *high* rating are 70 to 90 percent as productive as those with the very high rating; those with a rating of *moderate*, 50 to 70 percent as productive; and *low*, less than 50 percent as productive. The soils are listed as follows:

Very high—
- Arenzville silt loam.
- Bertrand silt loam.
- Chaseburg silt loam.
- Fayette silt loam.
- Jackson silt loam.
- Judson silt loam.
- Lawson and Huntsville silt loams.
- Richwood silt loam.
- Toddville silt loam.
- Trempealeau silt loam.

High—
- Curran silt loam.
- Dubuque silt loam, deep.
- Muck and peat, drained.
- Orion fine sandy loam.
- Orion silt loam.
- Port Byron silt loam.
- Rowley silt loam.
- Tell silt loam.
- Waukegan silt loam.

Moderate—
- Boaz silt loam.
- Dakota sandy loam.
- Dubuque silt loam.
- Gale silt loam.
- Gale-Hixton complex.
- Hesch sandy loam.
- Medary silt loam.
- Meridian sandy loam.
- Meridian-Waukegan complex.
- Seaton silt loam.
- Trempealeau fine sandy loam.
- Zwingle silt loam.

Low—
- Boone-Hixton loamy sands.
- Gotham loamy sand.
- Hixton sandy loam.
- Plainfield fine sand.
- Plainfield loamy fine sand.
- Plainfield-Sparta complex.
- Sparta loamy fine sand.
- Sparta sand.
- Trempe loamy fine sand.

Potential yields of forests

The productivity of most of the forested areas in La Crosse County is much lower than their potential productivity. Table 7 gives the estimated potential yields of timber from well-managed stands of deciduous and coniferous trees that have good tree density. To get yields such as these from most of the timber stands in the county will require considerable time. Because of logging and grazing, most stands of hardwoods now have a low tree density. They need to be protected from grazing for many years before new seedlings can become established and develop into dense stands of salable timber.

The board feet and cord figures given in table 7 are for salable timber produced and not for total production per acre. The data are based on production estimates made by the Lake States Forest Experiment Station,[4] with interpolations for individual soil types.

[4] WILDE, S. A., WILSON, F. G., and WHITE, D. P. SOILS OF WISCONSIN IN RELATION TO SILVICULTURE. No. 525–49. 171 pp., illus. Madison, Wis. 1949.

TABLE 7.—*Estimated potential annual-acre yields of salable timber produced from well-managed stands that have good tree density*

[Data not given where site condition does not exist or where trees are not suited; board feet according to Scribner decimal C log rule; cords are standard]

Soil	North- and east-facing sites—				South- and west-facing sites—			
	Hardwoods		Conifers		Hardwoods		Conifers	
	Bd. ft.	*Cords*	*Bd. ft.*	*Cords*	*Bd. ft.*	*Cords*	*Bd. ft.*	*Cords*
Alluvial land, poorly drained	150	0.5						
Alluvial land, moderately well drained	250	.8	250	0.8				
Arenzville silt loam	200	.7	250	.8				
Arenzville, Orion, and Huntsville soils	250	.8	250	.8				
Bertrand silt loam	250	.8	250	.8				
Boaz silt loam	150	.5						
Boone sand		.2	175	.6			100	0.3
Boone-Hixton loamy sands		.3	250	.8			150	.5
Chaseburg silt loam	275	1.0						
Chaseburg and Judson silt loams	250	.8						
Curran silt loam	150	.5						
Dakota sandy loam								
Dubuque silt loam	150	.5			100	0.3		
Dubuque silt loam, deep	200	.7			125	.4		
Fayette silt loam, uplands	225	.7	300	1.0	150	.5	250	.8
Fayette silt loam, valleys	275	.9	300	1.0	175	.6	250	.8
Gale silt loam	175	.6	300	1.0	100	.3	200	.7
Gale-Hixton complex	150	.5	300	1.0	75	.3	200	.7
Gotham loamy sand			250	.8				
Gullied land								
Hesch sandy loam	150	.5	250	.8	75	.2	200	.7
Hixton sandy loam	150	.5	300	1.0	75	.3	200	.7
Jackson silt loam	200	.7						
Judson silt loam								
Lawson and Huntsville silt loams								
Lawson and Huntsville silt loams, sandy substrata								
Marsh								
Medary silt loam	200	.7	200	.7				
Meridian sandy loam	150	.5	275	.9				
Meridian-Waukegan complex								
Muck and peat, drained								
Muck and peat, undrained								
Orion fine sandy loam	200	.7	200	.7				
Orion silt loam	200	.7	200	.7				
Plainfield fine sand			175	.6				
Plainfield loamy fine sand			175	.6				
Plainfield-Sparta complex			150	.5				
Port Byron silt loam								
Richwood silt loam								
Riverwash								
Rough broken land and rock land	175	.6			100	.3		
Rowley silt loam								
Seaton silt loam	225	.8			150	.5		
Sparta loamy fine sand				.5				
Sparta sand				.5				
Stabilized dunes				.5				
Stony colluvial land								
Tell silt loam	175	.6	250	.8				
Terrace escarpments			200	.7				.3
Toddville silt loam								
Trempe loamy fine sand	150	.5	250	.8				
Trempealeau fine sandy loam	200	.7	250	.8				
Trempealeau silt loam								
Waukegan silt loam								
Zwingle silt loam	150	.5						

Engineering Properties of the Soils

The information in this section will help engineers to select sites for buildings for residential, industrial, and other purposes; to choose locations for highways; to determine the trafficability of soils; and to locate sand and gravel for use in construction. It also will help in planning dams, ponds, and other structures to control floods and conserve soil and water.

Even though the soil maps and the accompanying report are too generalized for some engineering purposes, they provide information valuable in planning detailed field surveys and tests to determine the in place condition of soils at proposed sites for construction. After testing the soil materials and observing their behavior in place and under varying conditions, the engineer can anticipate, to some extent, the properties of individual soils wherever they are mapped.

Some of the terms used by the soil scientist may not be familiar to the engineer; other terms, though familiar, have special meanings in soil science. The terms used in the three tables and other special terms used are defined in the section, Meanings of Technical Terms, at the end of this report.

Soil Test Data

Engineers who work with foundations and embankments constantly need to know more about soils. Information about soils that cover a large area is especially valuable in the construction of highways. This is obtained partly by sampling the principal soils and testing them in the laboratory and partly by observing soils in the field and by studying the interpretations made by soil scientists.

Table 8 describes properties of the soils that are significant to engineering. The information about many of the soils is estimated, because samples were taken from only seven soils in the county (see table 10). The estimates were made by comparing the soil with one that had been tested.

Table 9 describes the erodibility hazard of each soil; the suitability of each as a source of topping material, of sand, or of fill material for earthen embankments; and the suitability of each as a pond site, for drainage, for irrigation, and for terraces or diversions.

TABLE 8.—*Brief descriptions of the soils of La Crosse*

Map symbol	Soil	Soil description	Depth to bedrock
			Feet
Aa	Alluvial land, poorly drained.	Poorly drained, mixed sandy and silty soils on the nearly level flood plains of streams; 40 inches or more thick.	5 or more
Ab	Alluvial land, moderately well drained.	Moderately well drained, mixed sandy and silty soils on the nearly level flood plains of streams; 40 inches or more thick.	5 or more
Ac	Arenzville silt loam.	Moderately well drained to well drained, deep, silty, alluvial soils on the nearly level flood plains of streams; the surface soil is friable silt loam that has granular structure; the underlying material is friable, massive silt loam with some thin lenses of sand in the substratum.	5 or more
Ad	Arenzville, Orion, and Huntsville soils.	Poorly drained to well-drained soils formed from stream-bottom deposits; the soils are mostly silty but have some lenses of sand; they are frequently dissected by streams and are subject to overflow.	5 or more
BaB BaA BaB2 BaC2	Bertrand silt loam, 2 to 6 percent slopes. Bertrand silt loam, 0 to 2 percent slopes. Bertrand silt loam, 2 to 6 percent slopes, moderately eroded. Bertrand silt loam, 6 to 12 percent slopes, moderately eroded.	Well-drained, silty soils on stream terraces; slopes of 0 to 12 percent; the surface soil is friable silt loam with platy structure but breaks to angular blocks; the subsoil is firm silty clay loam with blocky structure; in places friable, stratified silt and sand is at depths below 42 inches.	5 or more
Bb	Boaz silt loam.	Somewhat poorly drained, silty, alluvial soils on the nearly level flood plains of streams; the surface soil is friable silt loam that has subangular blocky structure; the underlying material is friable to firm, massive, heavy silt loam to silty clay loam over silty clay.	5 or more
BcC1 BcB1 BcD1	Boone sand, 6 to 12 percent slopes, eroded. Boone sand, 2 to 6 percent slopes, eroded. Boone sand, 12 to 60 percent slopes, eroded.	Excessively drained upland soils on slopes of 2 to 60 percent; the surface soil is loose, single-grained sand underlain by similar material.	1 to 5
BdB BdC BdC1 BdD1	Boone-Hixton loamy sands, 0 to 6 percent slopes. Boone-Hixton loamy sands, 6 to 12 percent slopes. Boone-Hixton loamy sands, 6 to 12 percent slopes, eroded. Boone-Hixton loamy sands, 12 to 60 percent slopes, eroded.	Excessively drained upland soils that vary widely in slope; the surface soil is single-grained loamy sand; in places there is a weakly developed subsoil of sandy loam; the substratum is loose, single-grained sand.	1 to 5
CaB CaA CaC	Chaseburg silt loam, 2 to 6 percent slopes. Chaseburg silt loam, 0 to 2 percent slopes. Chaseburg silt loam, 6 to 12 percent slopes.	Well-drained, silty, alluvial soils in narrow valleys and on fans; slopes of 0 to 12 percent; the surface soil is friable silt loam with platy structure; the underlying material is friable loam that ranges in structure from platy to structureless; strata of fine sand occur in some places in the profile.	4 or more
CbA CbB	Chaseburg and Judson silt loams, 0 to 2 percent slopes. Chaseburg and Judson silt loams, 2 to 6 percent slopes.	See descriptions of Chaseburg and Judson soils.	
Cc	Curran silt loam.	Somewhat poorly drained, silty soils on nearly level stream terraces; the surface soil is friable silt loam with angular blocky structure; the subsoil is firm silt loam with blocky structure; and the substratum is firm, massive silty clay loam; in some places stratified sand and silt occur at depths below 40 inches.	5 or more

See footnotes at end of table.

County and estimates for properties significant to engineering

Kind of bedrock	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
(5)	Moderate	Moderate	1 to 5	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
(5)	Moderate	Moderate	5 to 10	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
(5)	Moderate	Moderate	5 to 10	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
(5)	Moderate	Moderate	2 to 10	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
(5)	Moderate	Moderate	10 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
(5)	Moderate	Moderate	2 to 5	Slightly sticky and slightly plastic.	Plastic	Slightly acid to neutral.
Sandstone of Cambrian period.	Very rapid	Very rapid	20 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Medium to strongly acid.
Sandstone of Cambrian period.	Very rapid	Rapid	20 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Medium acid to strongly acid.
(5)	Moderate	Moderate	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Medium acid to neutral.
(5)	Moderately slow.	Moderate	3 to 6	Slightly sticky and slightly plastic.	Slightly sticky and slightly plastic.	Slightly acid to strongly acid.

TABLE 8.—*Brief descriptions of the soils of La Crosse County*

Map symbol	Soil	Soil description	Depth to bedrock
DaA	Dakota sandy loam, 0 to 2 percent slopes.	Well-drained soils formed in coarse-textured outwash on stream terraces; slopes of 0 to 12 percent; surface soil is very friable sandy loam with weak, coarse, subangular blocky structure; subsoil ranges from friable loam to very friable sandy loam with moderate to weak, medium to coarse, subangular blocky structure; substratum is stratified, loose, single-grained sand that contains some gravel.	5 or more
DaB	Dakota sandy loam, 2 to 6 percent slopes.		
DaC2	Dakota sandy loam, 6 to 12 percent slopes, moderately eroded.		
DbE	Dubuque silt loam, 20 to 30 percent slopes.	Well-drained soils formed on upland ridges in a thin layer of silt over reddish clay; slopes of 2 to 45 percent; the surface soil is friable silt loam with subangular blocky structure; the subsoil is firm silty clay loam or gritty silty clay with angular blocky structure; and the substratum is clay with angular blocky structure; the clay contains many angular fragments of chert.	1 to 5
DbB2	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.		
DbC2	Dubuque silt loam, 6 to 12 percent slopes, moderately eroded.		
DbD	Dubuque silt loam, 12 to 20 percent slopes.		
DbD2	Dubuque silt loam, 12 to 20 percent slopes, moderately eroded.		
DbE2	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.		
DbF	Dubuque silt loam, 30 to 45 percent slopes.		
DcD3	Dubuque soils, 12 to 20 percent slopes, severely eroded.		
DcE3	Dubuque soils, 20 to 30 percent slopes, severely eroded.		
DdD2	Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded.	Well-drained soils formed on upland ridges in a moderately deep layer of silt over reddish clay; slopes of 2 to 45 percent; the surface soil is friable silt loam with subangular blocky structure; the subsoil is firm silty clay loam with blocky structure; the substratum is gritty clay that has angular blocky structure; the gritty clay contains many fragments of chert.	3 to 6
DdB2	Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded.		
DdC2	Dubuque silt loam, deep, 6 to 12 percent slopes, moderately eroded.		
DdD	Dubuque silt loam, deep, 12 to 20 percent slopes.		
DdE	Dubuque silt loam, deep, 20 to 30 percent slopes.		
DdE2	Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded.		
DeD3	Dubuque soils, deep, 12 to 20 percent slopes, severely eroded.		
DeF3	Dubuque soils, deep, 20 to 45 percent slopes, severely eroded.		
FaD2	Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded.	Well-drained, deep, silty soils on upland ridges with slopes of 2 to 40 percent; the surface soil is friable, granular silt loam; the subsoil is firm silty clay loam with subangular blocky structure; and the substratum is firm heavy silt loam or silt loam with subangular blocky structure.	4 or more
FaB	Fayette silt loam, uplands, 2 to 6 percent slopes.		
FaB2	Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.		
FaC	Fayette silt loam, uplands, 6 to 12 percent slopes.		
FaC2	Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded.		
FaD	Fayette silt loam, uplands, 12 to 20 percent slopes.		
FaE	Fayette silt loam, uplands, 20 to 30 percent slopes.		
FaE2	Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded.		
FaF	Fayette silt loam, uplands, 30 to 40 percent slopes.		
FbD3	Fayette soils, uplands, 12 to 20 percent slopes, severely eroded.		
FbE3	Fayette soils, uplands, 20 to 30 percent slopes, severely eroded.		
FcE2	Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded.	Well-drained, deep, silty soils on the valley slopes of uplands; slopes of 6 to 40 percent; the surface soil is a friable, granular silt loam; the subsoil is firm, heavy silt loam or silty clay loam with subangular blocky structure; the substratum is firm silt loam with subangular blocky structure; in places fragments of weathered sandstone occur in the profile.	4 or more
FcC2	Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded.		
FcD2	Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded.		
FcE	Fayette silt loam, valleys, 20 to 30 percent slopes.		
FcF2	Fayette silt loam, valleys, 30 to 40 percent slopes, moderately eroded.		
FdD3	Fayette soils, valleys, 12 to 20 percent slopes, severely eroded.		
FdE3	Fayette soils, valleys, 20 to 30 percent slopes, severely eroded.		

See footnotes at end of table.

and estimates for properties significant to engineering—Continued

Kind of bedrock	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
(5)	Moderately rapid.	Rapid	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
Prairie du Chien dolomite.	Moderately slow.	Moderate	20 or more	Slightly sticky and slightly plastic.	Sticky and plastic	Slightly acid to neutral.
Prairie du Chien dolomite.	Moderate	Moderate	20 or more	Slightly sticky and slightly plastic.	Sticky and plastic	Slightly acid to medium acid.
Prairie du Chien dolomite.	Moderate	Moderate	20 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Sandstone of Cambrian period.	Moderate	Moderate	20 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.

TABLE 8.—*Brief descriptions of the soils of La Crosse County*

Map symbol	Soil	Soil description	Depth to bedrock
GaE2	Gale silt loam, 20 to 30 percent slopes, moderately eroded.	Well-drained, moderately deep, silty soils on valley slopes of 2 to 60 percent; in the uplands the surface soil is friable silt loam with subangular blocky structure; the subsoil is friable to firm silt loam or loam that grades to loose, single-grained fine sand; the sand overlies sandstone bedrock.	2 to 4
GaB	Gale silt loam, 2 to 6 percent slopes.		
GaC2	Gale silt loam, 6 to 12 percent slopes, moderately eroded.		
GaD	Gale silt loam, 12 to 20 percent slopes.		
GaD2	Gale silt loam, 12 to 20 percent slopes, moderately eroded.		
GaE	Gale silt loam, 20 to 30 percent slopes.		
GaE3	Gale silt loam, 20 to 30 percent slopes, severely eroded.		
GaF	Gale silt loam, 30 to 60 percent slopes.		
GaF2	Gale silt loam, 30 to 60 percent slopes, moderately eroded.		
GbF	Gale-Hixton complex, 30 to 60 percent slopes.	Well-drained sandy loams on nearly level to steep slopes in the uplands; in places the soils have a thin mantle of silt; the sandy subsoil material grades to weathered sandstone.	2 to 4
GbB	Gale-Hixton complex, 2 to 6 percent slopes.		
GbC2	Gale-Hixton complex, 6 to 12 percent slopes, moderately eroded.		
GbD	Gale-Hixton complex, 12 to 20 percent slopes.		
GbD2	Gale-Hixton complex, 12 to 20 percent slopes, moderately eroded.		
GbE	Gale-Hixton complex, 20 to 30 percent slopes.		
GbE2	Gale-Hixton complex, 20 to 30 percent slopes, moderately eroded.		
GbE3	Gale-Hixton complex, 20 to 30 percent slopes, severely eroded.		
GbF2	Gale-Hixton complex, 30 to 60 percent slopes, moderately eroded.		
GbF3	Gale-Hixton complex, 30 to 60 percent slopes, severely eroded.		
GcA	Gotham loamy sand, 0 to 2 percent slopes.	Somewhat excessively drained sandy soils on stream terraces; slopes of 0 to 12 percent; the surface soil is very friable, single-grained loamy sand or heavy loamy sand; the subsoil is very friable, heavy loamy sand with subangular blocky structure; and the substratum is loose, single-grained sand that occurs at depths of 2 feet or more.	5 or more
GcB	Gotham loamy sand, 2 to 6 percent slopes.		
GcB1	Gotham loamy sand, 2 to 6 percent slopes, eroded.		
GcC1	Gotham loamy sand, 6 to 12 percent slopes, eroded.		
HaC2	Hesch sandy loam, 6 to 12 percent slopes, moderately eroded.	Well-drained sandy soils on foot slopes of 2 to 30 percent; the surface soil is very friable, heavy sandy loam; the subsoil is friable sandy loam or loam with angular blocky structure and grades to weathered sandstone.	34 inches to several feet.
HaB2	Hesch sandy loam, 2 to 6 percent slopes, moderately eroded.		
HaD2	Hesch sandy loam, 12 to 20 percent slopes, moderately eroded.		
HaE2	Hesch sandy loam, 20 to 30 percent slopes, moderately eroded.		
HbF	Hixton sandy loam, 30 to 60 percent slopes.	Well-drained sandy soils on valley slopes of 2 to 60 percent; the surface soil is loose, granular sandy loam; the subsoil is friable, heavy fine sandy loam to loamy sand and is massive in the upper part and single grained in the lower part; the substratum is single-grained sand that grades to sandstone.	20 inches to several feet
HbB	Hixton sandy loam, 2 to 6 percent slopes.		
HbB2	Hixton sandy loam, 2 to 6 percent slopes, moderately eroded.		
HbC2	Hixton sandy loam, 6 to 12 percent slopes, moderately eroded.		
HbD	Hixton sandy loam, 12 to 20 percent slopes.		
HbD2	Hixton sandy loam, 12 to 20 percent slopes, moderately eroded.		
HbD3	Hixton sandy loam, 12 to 20 percent slopes, severely eroded.		
HbE	Hixton sandy loam, 20 to 30 percent slopes.		
HbE2	Hixton sandy loam, 20 to 30 percent slopes, moderately eroded.		
HbE3	Hixton sandy loam, 20 to 30 percent slopes, severely eroded.		
HbF2	Hixton sandy loam, 30 to 60 percent slopes, moderately eroded.		
HbF3	Hixton sandy loam, 30 to 60 percent slopes, severely eroded.		

See footnotes at end of table.

and estimates for properties significant to engineering—Continued

Kind of bedrock	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
Sandstone of Cambrian period.	Moderate	Moderate	20 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Sandstone of Cambrian period.	Moderate	Moderately rapid.	20 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
(5)	Moderately rapid.	Rapid	10 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Strongly acid to neutral.
Sandstone of Cambrian period.	Moderately rapid.	Rapid	20 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
Sandstone of Cambrian period.	Moderately rapid.	Rapid	20 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.

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TABLE 8.—*Brief descriptions of the soils of La Crosse County*

Map symbol	Soil	Soil description.	Depth to bedrock
Ja	Jackson silt loam.	Moderately well drained, deep, silty soils in slight depressions and on nearly level areas on stream terraces; the surface soil is friable silt loam with subangular blocky structure; the subsoil is friable to firm silt loam or silty clay loam with subangular blocky structure; and the substratum is prominently mottled, massive silt loam.	5 or more
JbB JbA JbC	Judson silt loam, 2 to 6 percent slopes. Judson silt loam, 0 to 2 percent slopes. Judson silt loam, 6 to 12 percent slopes.	Well-drained, silty, alluvial soils in drainageways and on fans; slopes of 0 to 12 percent; the surface soil is friable silt loam with platy structure but breaks to angular blocks with some granular aggregates; the underlying material is friable, massive silt loam over loam; in places thin lenses of sandy material occur in the profile.	4 or more
La Lb	Lawson and Huntsville silt loams. Lawson and Huntsville silt loams, sandy substrata.	Moderately well drained to somewhat poorly drained, deep, silty, alluvial soils on the nearly level flood plains of streams; the surface soil is friable to firm, granular silt loam, 1 to 3 feet thick, and overlies friable, massive silt loam or loam; in places the substratum is stratified silt loam, sandy loam, or gravelly loam.	5 or more
MbA MbB	Medary silt loam, 0 to 2 percent slopes. Medary silt loam, 2 to 7 percent slopes.	Moderately well drained to well drained soils that occupy small areas on high stream terraces; the surface soil is heavy silt loam and is underlain by subsoil of reddish silty clay; the substratum is brownish silty clay and extends to depths of 10 feet or more.	5 or more
McB McA McB2 McC2	Meridian sandy loam, 2 to 6 percent slopes. Meridian sandy loam, 0 to 2 percent slopes. Meridian sandy loam, 2 to 6 percent slopes, moderately eroded. Meridian sandy loam, 6 to 12 percent slopes, moderately eroded.	Well-drained soils on stream terraces; slopes of 0 to 12 percent; the surface soil is very friable to loose, single-grained sandy loam; the subsoil is friable sandy loam or loam that has a subangular blocky structure; the substratum is loose, single-grained sand; in places thin lenses of sandy loam occur in the substratum.	5 or more
MdA MdB MdB2 MdC2	Meridian-Waukegan complex, 0 to 2 percent slopes. Meridian-Waukegan complex, 2 to 6 percent slopes. Meridian-Waukegan complex, 2 to 6 percent slopes, moderately eroded. Meridian-Waukegan complex, 6 to 12 percent slopes, moderately eroded.	Well-drained silt loams or sandy loams that have a medium-textured subsoil; sand is at depths of 2 to 3 feet.	5 or more
Me Mf	Muck and peat, drained. Muck and peat, undrained	Organic soils in small depressions in stream bottoms; the underlying material is friable, massive silt loam.	5 or more
Oa Ob	Orion fine sandy loam. Orion silt loam.	Somewhat poorly drained, deep, silty alluvial soils on the nearly level flood plains of streams; the surface soil is friable fine sandy loam or silt loam that overlies stratified fine sandy loam, sandy loam, or loam.	5 or more
PaB1 PaA1 PaC1 PaD1 PbB PbA PbB1 PbC PbC1 PbD1	Plainfield fine sand, 2 to 6 percent slopes, eroded. Plainfield fine sand, 0 to 2 percent slopes, eroded. Plainfield fine sand, 6 to 12 percent slopes, eroded. Plainfield fine sand, 12 to 20 percent slopes, eroded. Plainfield loamy fine sand, 2 to 6 percent slopes. Plainfield loamy fine sand, 0 to 2 percent slopes. Plainfield loamy fine sand, 2 to 6 percent slopes, eroded. Plainfield loamy fine sand, 6 to 12 percent slopes. Plainfield loamy fine sand, 6 to 12 percent slopes, eroded. Plainfield loamy fine sand, 12 to 20 percent slopes, eroded.	Excessively drained, deep, sandy soils on nearly level to gently sloping stream terraces; the surface soil is loose fine sand or loamy fine sand over loose to friable fine sand; the substratum is loose fine sand or sand that in places contains thin bands of sandy loam or sandy clay loam.	5 or more
Pc	Plainfield-Sparta complex.	Excessively drained, deep, sandy soils on stream terraces that have undulating relief.	5 or more

See footnotes at end of table.

and estimates for properties significant to engineering—Continued

Kind of bedrock	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
(5)	Moderate	Moderate	5 to 10	Slightly sticky and slightly plastic.	Slightly sticky and slightly plastic.	Medium acid to strongly acid.
Sandstone of Cambrian period.	Moderate	Moderately rapid.	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Neutral.
(5)	Moderate	Moderately rapid.	2 to 5	Nonsticky and nonplastic.	Slightly sticky and slightly plastic.	Slightly acid to neutral.
(5)	Slow	Moderate	20 or more	Sticky and plastic	Very sticky and plastic.	Slightly acid to strongly acid.
(5)	Moderate	Rapid	10 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid to neutral.
(5)	Moderate	Moderate	10 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
(5)	Rapid	Rapid	0 to 3	Nonsticky and nonplastic.	Slightly sticky and slightly plastic.	Neutral.
(5)	Moderate	Moderate	3 to 5	Nonsticky and nonplastic.	Slightly sticky and slightly plastic.	Slightly acid to neutral.
(5)	Very rapid	Very rapid	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
(5)	Very rapid	Very rapid	10 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.

TABLE 8.—*Brief descriptions of the soils of La Crosse County*

Map symbol	Soil	Soil description	Depth to bedrock
PdC2	Port Byron silt loam, 6 to 12 percent slopes, moderately eroded.	Well-drained, deep, silty soils on low, irregular hills and gentle to steep valley slopes that border on the terraces of the larger streams; both the subsoil and substratum are silty; the subsoil is very friable; the upper part has a subangular blocky structure, and the lower part is massive; the underlying material is very friable, massive, coarse silt.	3½ feet or more.
PdB	Port Byron silt loam, 2 to 6 percent slopes.		
PdB2	Port Byron silt loam, 2 to 6 percent slopes, moderately eroded.		
PdC	Port Byron silt loam, 6 to 12 percent slopes.		
PdD	Port Byron silt loam, 12 to 20 percent slopes.		
PdD2	Port Byron silt loam, 12 to 20 percent slopes, moderately eroded.		
PdD3	Port Byron silt loam, 12 to 20 percent slopes, severely eroded.		
PdE2	Port Byron silt loam, 20 to 30 percent slopes, moderately eroded.		
RaA	Richwood silt loam, 0 to 2 percent slopes.	Well-drained, deep, silty soils that have formed on stream terraces; slopes of 0 to 12 percent; the surface soil is friable silt loam that has a platy structure but breaks readily to granules; the subsoil is firm silty clay loam with subangular blocky structure; the substratum is friable, massive silty clay loam and is at depths of 42 inches or more.	5 or more
RaB	Richwood silt loam, 2 to 6 percent slopes.		
RaB2	Richwood silt loam, 2 to 6 percent slopes, moderately eroded.		
Rb	Riverwash.	Excessively drained, mixed sandy and gravelly stream deposits on nearly level flood plains.	5 or more
RdA	Rowley silt loam, 0 to 2 percent slopes.	Somewhat poorly drained, deep, silty soils on nearly level stream terraces; the surface soil is friable, granular silt loam; the subsoil is firm, light silty clay loam that has a subangular blocky or blocky structure; the underlying material is massive silt loam that is prominently mottled.	5 or more
RdB	Rowley silt loam, 2 to 6 percent slopes.		
SaD2	Seaton silt loam, 12 to 20 percent slopes, moderately eroded.	Well-drained, deep, silty soils on steep uplands; the subsoil is friable to firm silt loam with subangular blocky structure; the substratum is friable, massive, coarse silt.	3½ feet or more.
SaD3	Seaton silt loam, 12 to 20 percent slopes, severely eroded.		
SaE	Seaton silt loam, 20 to 30 percent slopes.		
SaE2	Seaton silt loam, 20 to 30 percent slopes, moderately eroded.		
SaE3	Seaton silt loam, 20 to 30 percent slopes, severely eroded.		
SaF2	Seaton silt loam, 30 to 50 percent slopes, moderately eroded.		
SbA	Sparta loamy fine sand, 0 to 2 percent slopes.	Excessively drained, deep sandy soils on nearly level stream terraces; the surface soil is loose, granular loamy fine sand or sand that grades to loose, single-grained sand with increasing depth.	5 or more
SbB	Sparta loamy fine sand, 2 to 6 percent slopes.		
SbC1	Sparta loamy fine sand, 6 to 12 percent slopes, eroded.		
ScA	Sparta sand, 0 to 2 percent slopes.		
ScB	Sparta sand, 2 to 6 percent slopes.		
ScC1	Sparta sand, 6 to 12 percent slopes, eroded.		
Sd	Stabilized dunes.		
Se	Stony colluvial land.	Well-drained stony land on nearly level to sloping fans and drainageways.	4 or more feet
TaB	Tell silt loam, 2 to 6 percent slopes.	Well-drained silty soils that are 2 to 3 feet thick over the sandy outwash on stream terraces; the surface soil is friable silt loam that has a subangular blocky structure; the subsoil ranges from silt loam to sandy loam in texture, is friable, and has a subangular blocky structure; the underlying material ranges from loose, single-grained loamy sand to loose, single-grained sand.	5 or more
TaA	Tell silt loam, 0 to 2 percent slopes.		
TaC2	Tell silt loam, 6 to 12 percent slopes, moderately eroded		
Tb	Terrace escarpments.	Well-drained to somewhat excessively drained silty to sandy soils on stream terraces that have long, narrow, steep slopes.	5 or more

See footnotes at end of table.

and estimates for properties significant to engineering—Continued

Kind of bedrock	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
Sandstone of Cambrian period.	Moderate	Moderately rapid.	20 or more	Slightly sticky and slightly plastic.	Slightly sticky and slightly plastic.	Medium acid to slightly acid.
(5)	Moderate	Moderate	10 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid to neutral.
(5)	Very rapid	Very rapid	1 to 5	Nonsticky and nonplastic.	Nonsticky and nonplastic.	
(5)	Moderate	Moderately rapid.	2 to 4	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Sandstone of Cambrian period or Prairie du Chien dolomite.	Moderate	Moderate	20 or more	Slightly sticky and slightly plastic.	Slightly sticky and slightly plastic.	Strongly acid to slightly acid.
(5)	Very rapid	Very rapid	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Sandstone of Cambrian period.	Moderate	Moderately rapid.	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Medium acid to neutral.
(5)	Moderate	Moderate	10 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
(5)	Moderate	Moderate	Very deep	(5)	Nonsticky and nonplastic.	Slightly acid to strongly acid.

TABLE 8.—*Brief descriptions of the soils of La Crosse County*

Map symbol	Soil	Soil description	Depth to bedrock
Tc	Toddville silt loam.	Well-drained, deep silty soils on nearly level stream terraces; the surface soil is friable, granular silt loam; the subsoil is friable to firm silt loam or light silty clay loam; and the substratum is friable, massive silt loam, 1 to several feet thick.	5 or more
TdA TdB	Trempe loamy fine sand, 0 to 2 percent slopes. Trempe loamy fine sand, 2 to 12 percent slopes.	Excessively drained sandy soils formed in deep deposits of reddish sand; the surface soil is very friable, granular loamy fine sand over loose, loamy fine sand that has a subangular blocky structure; the substratum is loose, single-grained, yellowish-red to light-gray or white sand.	5 or more
TeA TeB TfA	Trempealeau fine sandy loam, 0 to 2 percent slopes. Trempealeau fine sandy loam, 2 to 6 percent slopes. Trempealeau silt loam, 0 to 3 percent slopes.	Well-drained silty or sandy soils underlain by strong-brown or light grayish-brown sand; the surface soil is very friable and has a granular structure; the subsoil is very friable to firm sandy loam that has a subangular blocky structure; and the substratum is single-grained, loose sand.	5 or more
WaB WaA WaB2 WaD2	Waukegan silt loam, 2 to 6 percent slopes. Waukegan silt loam, 0 to 2 percent slopes. Waukegan silt loam, 2 to 6 percent slopes, moderately eroded. Waukegan silt loam, 12 to 20 percent slopes, moderately eroded.	Well-drained, silty prairie soils underlain by loose sand at depths between 20 and 42 inches; the subsoil has a subangular blocky structure and is friable, light silty clay loam that overlies friable, heavy loam.	5 or more
Za	Zwingle silt loam.	Somewhat poorly drained silty soils underlain by dense, reddish clay; occurs on stream terraces, in nearly level areas, or in depressions.	5 or more

[1] The relative classes of soil permeability given refer to estimated rates of movement of water in inches per hour through saturated undisturbed cores under a ½-inch head of water:

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	More than 10.00

[2] The infiltration rates describing the movement of water in inches per hour into a nonsaturated surface soil are as follows:

Slow	Less than 0.20
Moderate	0.20 to 2.50
Moderately rapid	2.50 to 5.00
Rapid	5.00 to 10.00
Very rapid	More than 10.00

and estimates for properties significant to engineering—Continued

Kind of bedrock	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
([5])	Moderate	Moderately rapid.	5 to 10	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
([5])	Very rapid	Very rapid	8 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
([5])	Moderate	Moderately rapid.	5 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
([5])	Moderate	Moderately rapid.	5 or more	Nonsticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
([5])	Very slow	Moderate	3 to 6	Sticky and plastic	Very sticky and plastic.	Strongly acid to slightly acid.

[3] Refers to both seasonal and relatively stable high water tables. In some soils the water table is fairly constant at a given depth throughout the year; in others, the depth to the water table varies according to seasonal precipitation.

[4] Reaction refers to soil acidity or alkalinity and is expressed in pH—the logarithm of the reciprocal of the H—ion concentration.

	pH
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8

[5] Does not apply or is variable.

TABLE 9.—*Estimated soil properties*

Soil name [1] and mapping symbol	Erodibility hazard [2]			Suitability	
	Surface soil	Subsoil	Substratum	Topsoil [3]	Sand [4]
Alluvial land (Aa, Ab)	Moderate	(9)	Severe	Good	None
Arenzville silt loam (Ac)	Moderate	(10)	Moderate	Good	None
Arenzville, Orion, and Huntsville soils (Ad).	Moderate	(10)	Severe	Good	None
Bertrand silt loam (BaA, BaB, BaB2, BaC2).	Moderate	Moderate	Moderate	Good	Questionable
Boaz silt loam (Bb)	Moderate	Moderate	Moderate	Good	None
Boone sand (BcB1, BcC1, BcD1)	Severe	(10)	(13)	Poor	Questionable
Boone-Hixton loamy sands (BdB, BdC, BdC1, BdD1).	Severe	(10)	(13)	Poor	Questionable
Chaseburg silt loam (CaA, CaB, CaC)	Moderate	(10)	Moderate	Good	None
Chaseburg and Judson silt loams (CbA, CbB).	Moderate	(10)	Moderate	Good	None
Curran silt loam (Cc)	Moderate	Slight	Moderate	Good	None
Dakota sandy loam (DaA, DaB, (DaC2)	Moderate	Moderate	Severe	Fair	Yes
Dubuque silt loam (DbB2, DbC2, Dbd, DbD2, DbE, DbE2, DbF).	Moderate	Slight	Slight	Good	None
Dubuque soils (DcD3, DcE3)	Moderate	Slight	Slight	Fair	None
Dubuque silt loam, deep (DdB2, DdC2, DdD, DdD2, DdE, DdE2).	Moderate	Moderate	Slight	Good	None
Dubuque soils, deep (DeD3, DeF3)	Moderate	Moderate	Slight	Good	None
Fayette silt loam, uplands (FaB, FaB2, FaC, FaC2, FaD, FaD2, FaE, FaE2, FaF).	Moderate	Moderate	Moderate	Good	Not suitable
Fayette soils, uplands (FbD3, FbE3)	Moderate	Moderate	Moderate	Fair	Not suitable
Fayette silt loam, valleys (FcC2, FcD2, FcE, FcE2, FcF2).	Moderate	Moderate	Moderate	Good	Not suitable
Fayette soils, valleys (FdD3, FdE3)	Moderate	Moderate	Moderate	Fair	Not suitable
Gale silt loam (GaB, GaC2, GaD, GaD2, GaE, GaE2, GaE3, GaF, GaF2).	Moderate	Moderate	Severe	Good	Questionable
Gale-Hixton complex (GbB, GbC2, GbD, GbD2, GbE, GbE2, GbE3, GbF, GbF2, GbF3).	Moderate to severe.	Moderate	Severe	Fair to poor	Questionable
Gotham loamy sand (GcA, GcB, GcB1, GcC1).	Severe	Severe	Severe	Poor	Suitable
Gullied land (Gd)	Severe		Severe	Poor	Not suitable
Hesch sandy loam (HaB2, HaC2, HaD2, HaE2).	Moderate	Moderate	Severe	Fair	Questionable
Hixton sandy loam (HbB, HbB2, HbC2, HbD, HbD2, HbD3, HbE, HbE2, HbE3, HbF, HbF2, HbF3).	Severe	Moderate	Severe	Poor	Questionable
Jackson silt loam (Ja)	Moderate	Moderate	Moderate	Good	Not suitable
Judson silt loam (JbA, JbB, JbC)	Moderate	(9)	Moderate	Good	Not suitable
Lawson and Huntsville silt loams (La, Lb)	Moderate	(9)	Slight	Good	Not suitable
Marsh (Ma)	(9)	(9)	(9)	(9)	(9)
Medary silt loam (MbA, MbB)	Moderate	Moderate	Slight	Good	Not Suitable
Meridian sandy loam (McA, McB, McB2, McC2).	Severe	Moderate	Severe	Poor	Suitable
Meridian-Waukegan complex (MdA, MdB, MdB2, MdC2).	Moderate	Moderate	Severe	Poor to good	Not suitable
Muck and peat, drained (Me)	Severe [14]	(9)	(9)	Poor	Not suitable
Muck and peat, undrained (Mf)	Severe [14]	(9)	(9)	Poor	Not suitable
Orion fine sandy loam (Oa)	Severe	(9)	Moderate to severe.	Fair	Questionable
Orion silt loam (Ob)	Moderate	(9)	Moderate	Good	Not suitable

See footnotes at end of table.

that affect engineering

as source of—			Suitability for—				Remarks
Fill material for earth embankments [5]			Pond sites [6]	Drainage [7]	Irrigation [8]	Terraces or diversions	
Surface soil	Subsoil	Substratum					
Fair	[10]	Fair	Questionable	Surface	[11]	Suitable	Subject to flooding.
Fair	[10]	Fair	Questionable	[9]	Good	Suitable	Subject to flooding.
Fair	[10]	Fair	Questionable	Surface	[12]	Suitable	Subject to flooding.
Fair	Fair	Fair	Questionable	Surface	Good	Suitable	Subject to flooding.
Fair	[10]	Fair	Questionable	Surface	Poor	Suitable	Subject to flooding.
Good	[10]	[13]	Unsuitable	[9]	Poor	Not suitable	Very droughty.
Good	[10]	[13]	Unsuitable	[9]	Poor	Not suitable	Very droughty.
Fair		Fair	Questionable	[9]	Good	Suitable	Subject to flooding.
Fair		Fair	Questionable	[9]	Good	Suitable	Subject to flooding.
Fair	Fair	Fair	Questionable	Surface	Poor	Suitable.	
Good	Good	Good	Unsuitable	[9]	Fair	Suitable	Droughty.
Fair	Fair	Poor	Questionable	[9]	Good	Questionable.	
Fair	Poor	Poor	Questionable		Fair	Questionable.	
Fair	Fair	Poor	Suitable	[9]	Good	Suitable.	
Fair	Fair	Poor	Suitable	[9]	Good	Suitable.	
Fair	Fair	Fair	Suitable	[9]	Good	Suitable.	
Fair	Fair	Fair	Suitable	[9]	Fair	Suitable.	
Fair	Fair	Fair	Suitable	[9]	Good	Suitable.	
Fair	Fair	Fair	Suitable	[9]	Fair.		
Fair	Fair	Good	Not suitable	[9]	Good	Suitable.	
Fair to good	Fair to good.	Good	Not suitable	[9]	Fair to poor	Suitable.	
Good	Good	Good	Not suitable	[9]	Good	Not suitable	Droughty.
Fair	Fair	Fair	Not suitable	[9]	Poor	Not suitable.	
Good	Good	Good	Not suitable	[9]	Fair	Suitable	Droughty.
Good	Good	Good	Not suitable	[9]	Fair	Suitable	Droughty.
Fair	Fair	Fair	Questionable	Surface	Good	Suitable.	
Fair	[10]	Fair	Questionable	[9]	Good	Suitable	Subject to flooding.
Fair	[10]	Fair	Questionable	Subsurface	Good to fair	Suitable	Subject to flooding.
[9]	Variable	Variable	[9]	[9]	[9]	Not suitable	Very high water table.
Fair	Fair	Poor	Suitable	Surface	Fair	Suitable.	
Good	Good	Good	Not suitable	[9]	Fair	Suitable	Droughty.
Good	Good	Good	Not suitable	[9]	Good	Suitable.	
Not suitable	Not suitable.	Fair to poor.	Not suitable	Subsurface	[9]	Not suitable.	
Not suitable	Not suitable.	Fair to poor.	Not suitable	Questionable	[9]	Not suitable	Wet.
Good	Fair	Fair	Not suitable	Subsurface or surface.	Good	Suitable	Subject to flooding.
Fair	Fair	Poor	Questionable	Subsurface	Good	Suitable	Subject to flooding.

TABLE 9.—*Estimated soil properties*

Soil name [1] and mapping symbol	Erodibility hazard [2]			Suitability	
	Surface soil	Subsoil	Substratum	Topsoil [3]	Sand [4]
Plainfield fine sand (PaA1, PaB1, PaC1, PaD1)	Severe	(9)	Severe	Poor	Suitable
Plainfield loamy fine sand (PbA, PbB, PbB1, PbC, PbC1, PbD1).	Severe	(9)	Severe	Poor	Suitable
Plainfield-Sparta complex (Pc)	Severe	(9)	Severe	Poor	Suitable
Port Byron silt loam (PdB, PdB2, PdC, PdC2, PdD, PdD2, PdD3, PdE2).	Severe	Severe	Severe	Fair	Not suitable
Richwood silt loam (RaA, RaB, RaB2)	Moderate	Moderate	Moderate	Good	Questionable
Riverwash (Rb)	Moderate	(9)	(9)	Poor	Suitable
Rough broken land and rock land (RcF)	Moderate	(9)	Moderate	Variable	Not suitable
Rowley silt loam (RdA, RdB)	Moderate	Moderate	Moderate	Good	Questionable
Seaton silt loam (SaD2, SaD3, SaE, SaE2, SaE3, SaF2).	Severe	Moderate	Severe	Fair	Not suitable
Sparta loamy fine sand (SbA, SbB, SbC1)	Severe	(9)	Severe	Poor	Suitable
Sparta sand (ScA, ScB, ScC1)	Severe	(9)	Severe	Poor	Suitable
Stabilized dunes (Sd)	Severe	(9)	Severe	Poor	Suitable
Stony colluvial land (Se)	Moderate	(9)	Moderate	Fair	Not suitable
Tell silt loam (TaA, TaB, TaC2)	Moderate	Moderate	Severe	Good	Suitable
Terrace escarpments (Tb)	Severe	(9)	Severe	Poor	Suitable
Toddville silt loam (Tc)	Moderate	Moderate	Moderate	Good	Questionable
Trempe loamy fine sand (TdA, TdB)	Severe	(9)	Severe	Poor	Suitable
Trempealeau fine sandy loam (TeA, TeB)	Severe	Moderate	Severe	Poor	Suitable
Trempealeau silt loam (TfA)	Moderate	Moderate	Moderate	Good	Not suitable
Waukegan silt loam (WaA, WaB, WaB2, WaD2).	Moderate	Moderate	Moderate	Good	Suitable
Zwingle silt loam (Za)	Moderate	Moderate	Slight	Good	Not suitable

[1] Consists of soil types and miscellaneous land types mapped in the county; when a mapping unit is made up of 2 or more soils, the characteristics of both soils should be considered.

[2] The susceptibility of soil materials to erosion by wind or water after the cover of plants has been removed.

[3] Ratings are for use on embankments and cut slopes, and in ditches, to promote the growth of vegetation.

[4] Principally, the substrata or underlying material of soils; does not indicate which deposits are suitable as a source of sand for use in concrete; includes particles with diameters ranging from 0.05 to 2.0 millimeters.

[5] Rating is for use in embankments or for replacement of unsuitable material.

[6] Refers to the suitability of the soil material for construction of ponds for permanent storage of water; the compactability of the soils and the porosity of the underlying material were both considered in this rating; questionable soils should be checked in the field.

that affect engineering—Continued

as source of—			Suitability for—				Remarks
Fill material for earth embankments [5]			Pond sites [6]	Drainage [7]	Irrigation [8]	Terraces or diversions	
Surface soil	Subsoil	Substratum					
Good	[9]	Good	Not suitable	[9]	Poor	Not suitable	Very droughty.
Good	[9]	Good	Not suitable	[9]	Fair to good	Not suitable	Droughty.
Good	Good	Good	Not suitable	[9]	Fair to poor	Not suitable	Droughty.
Good	Good	Good	Not suitable	[9]	Fair	Suitable	Easily eroded by water.
Fair	Fair	Fair	Questionable	[9]	Good	Suitable.	
Good	[10]	Variable	Not suitable	[9]	[9]	Not suitable	Very droughty.
Fair	Variable	Variable	Questionable	[9]	Poor	Not suitable	Very steep and stony.
Fair	Fair	Fair	Questionable	Subsurface	Fair	Suitable.	
Good	Good	Good	Questionable	[9]	Fair	Suitable	Easily eroded.
Good	[10]	Good	Not suitable	[9]	Fair to good	Not suitable	Droughty.
Good	[10]	Good	Not suitable	[9]	Poor	Not suitable	Very droughty.
Good	[10]	Good	Not suitable	[9]	Poor	Not suitable	Steep and droughty.
Fair	[10]	Fair	Questionable	[9]	Poor	Suitable	Very stony.
Fair	Fair	Good	Not suitable	[9]	Good	Suitable.	
Good	Good	Good	Not suitable	[9]	Poor	Not suitable	Droughty and steep.
Fair	Fair	Fair	Questionable	Surface	Good	Suitable.	
Good	Good	Good	Not suitable	[9]	Fair	Not suitable	Droughty.
Good	Good	Good	Not suitable	[9]	Good	Suitable.	
Fair	Fair	Fair	Questionable	[9]	Good	Suitable.	
Fair	Fair	Good	Not suitable	[9]	Good	Suitable.	
Fair	Fair	Poor	Suitable	Surface	Fair	Suitable.	

[7] Rating indicates suitability for surface drainage, or subsurface drainage when needed; dashes indicate drainage not needed.

[8] Suitability of soils for irrigation, based chiefly on available moisture-holding capacity and infiltration rate; does not consider slope or the economic feasibility of providing water for irrigation.

[9] Does not apply.

[10] Lacks a subsoil.

[11] Alluvial land, moderately well drained, may in some places be suited to irrigation, but Alluvial land, poorly drained, is not suited.

[12] Does not apply; soils are wet, or exceedingly stony, or occur on steep slopes.

[13] Underlain by bedrock.

[14] When water table is lowered or soil is drained.

TABLE 10.—*Engineering test data for soil samples taken from the profiles of 7 soil types*

[Dashes indicate does not apply or information is not available]

Soil type and laboratory number	Depth	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture content	Mechanical analysis — Percentage passing sieve: No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	Percentage smaller than—: 0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.	Liquid limit	Plasticity index	Classification: A.A.S.H.O.[1]	Classification: Unified[2]
	Inches	*Lb. per cu. ft.*	*Percent*													
Bertrand silt loam:[3]																
Wis–2–46	0–7	------	------	------	100	97	96	91	90	50	18	12	------	------	A–4	ML–CL
Wis–2–49	20–40	------	------	------	100	99	99	96	95	60	37	31	------	------	A–7–6	CL
Wis–2–50	40–54	------	------	------	100	99	98	96	94	57	33	28	------	------	A–7–6	CL
Dubuque silt loam:[3]																
Wis–2–18	0–5	------	------	------	100	99	99	98	96	60	27	16	------	------	A–4	ML–CL
Wis–2–20	10–15	------	------	------	100	99	99	99	98	74	51	39	------	------	A–7–6	CH
Wis–2–22	24–30	------	------	------	100	99	98	97	96	89	71	55	------	------	A–7–5	CH
C97	0–7	------	------	------	100	99	99	98	94	63	20	13	------	------	A–4	ML–CL
C99	14–23	------	------	------	100	99	99	97	93	67	28	24	------	------	A–6	CL
C101	30+	------	------	------	100	89	84	68	64	58	51	47	------	------	A–7–5	CH
Fayette silt loam:[4]																
S31386	0–11	103	17	------	------	------	100	99	90	58	20	14	29	5	A–4 (8)	ML–CL
S31387	26–33	105	19	------	------	------	------	100	97	64	36	30	44	20	A–7–6 (13)	CL
S31388	48–60	107	18	------	------	------	------	100	96	60	30	25	38	16	A–6 (10)	CL
S31389	0–7	96	21	------	100	99	98	96	94	58	22	15	36	7	A–4 (8)	ML
S31390	24–35	108	18	------	100	99	98	96	93	61	32	26	38	16	A–6 (10)	CL
S31391	45–50	113	15	100	99	96	91	84	81	52	27	24	34	14	A–6 (10)	CL
Meridian sandy loam:[3]																
5574	0–8	------	------	------	100	80	58	30	29	17	9	6	------	------	A–2–4	SM
5576	11–19	------	------	------	100	82	66	45	43	29	17	11	------	------	A–4	SM
5578	28–34	------	------	------	100	73	48	9	8	5	4	3	------	------	A–2–4	SP–SM
Port Byron silt loam:[4]																
S31380	0–12	96	22	------	------	100	97	97	92	57	27	20	40	12	A–6 (9)	ML
S31381	27–36	108	17	------	------	------	100	98	92	57	30	15	37	13	A–6 (9)	ML–CL
S31382	44–60	114	15	------	100	99	97	85	78	38	23	19	31	11	A–6 (8)	CL
S31383	0–10	86	28	------	------	------	100	99	96	66	34	24	48	14	A–7–5 (11)	ML
S31384	28–37	107	18	------	------	------	100	99	97	63	32	27	40	17	A–6 (11)	CL
S31385	46–60	106	18	------	------	------	100	99	95	60	32	27	43	20	A–7–6 (13)	CL
Richwood silt loam:[3]																
5330	0–8	------	------	------	100	99	99	95	93	50	22	16	------	------	A–4	ML–CL
5334	23–30	------	------	------	100	99	99	97	95	50	31	25	------	------	A–6	CL
5336	37–60	------	------	------	100	99	99	97	93	46	28	23	------	------	A–6	CL
Sparta fine sand:[3]																
Wis–3–42	0–7	------	------	------	100	72	45	13	12	8	5	4	------	------	A–2–4 (0)	SM
Wis–3–43	7–16	------	------	------	100	63	41	15	13	10	9	6	------	------	A–2–4 (0)	SM
Wis–3–44	16–45	------	------	------	100	69	45	13	11	6	5	4	------	------	A–2–4 (0)	SM

[1] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1; ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, A.A.S.H.O. Designation: M 145–49. Classification for soil types represented by SCS test data are estimated.

[2] Based on the Unified Soil Classification System, Tech. Memo. No. 3–357, v. 1, Waterways Expt. Sta., Corps of Engin. March 1953. Classification for soil types represented by SCS test data are estimated.

[3] Test data from U.S. Soil Conservation Service.

[4] Test data from U.S. Bureau of Public Roads.

Table 10 gives moisture-density data, results of mechanical analysis, liquid limit, and plasticity index for some of the principal soils. Some of the soil samples described in table 10 were collected by the Soil Conservation Service and tested by the Bureau of Public Roads, and the rest were collected and tested by the Soil Conservation Service. For the samples tested by the Bureau of Public Roads, the engineering soil classifications given in this table are based on data obtained by mechanical analysis and by tests to determine the liquid limits and plasticity index. The mechanical analyses by the Bureau of Public Roads were determined by combined sieve and hydrometer methods. Percentages of clay obtained by the hydrometer method should not be used in naming the textural classes of 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 dry state, the material changes from a solid to a semisolid or plastic state. As the moisture content is further increased, the material changes from the plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Tests to show liquid limit and plastic limit were not run in the samples obtained by the Soil Conservation Service. For the SCS samples, the data shown in table 10 under the columns for liquid limit and plasticity index are estimates based on comparisons with other soils. The American Association of State Highway Officials (A.A.S.H.O.) and Unified Classification ratings for these samples are also estimates based on comparisons with similar soils.

Problems in Engineering

Soils that erode easily or that are poorly drained present special engineering problems. For example, the soils that have clean sands in their profile and a deep water table are easily eroded by wind when they are exposed in roadways.

In soils that are poorly drained, seepage along the backslope of cuts may cause slumping or sliding of the overlying material. A perched water table beneath a pavement may result in freezing and thawing in the saturated foundation material. This, in turn, causes differential volume change and differences in bearing capacity. Consequently, before beginning the construction of a road, it is important to know the location of poorly drained areas. The poorly drained areas should be inspected in greater detail than other areas to determine the need for interceptor drains and underdrains.

Only a few small areas of poorly drained soils occur in the uplands. Extensive areas of poorly drained soils occur on the benches and bottoms along streams throughout the county. Adequate drainage must be provided for roads through poorly drained areas.

Some of the lower parts of the bottom lands are flooded each year. In these areas embankments may be needed to protect the structures. By constructing drainage ditches before the earthwork is begun, some of the sandy soils that have a high water table may be made more suitable as a source of borrow material as well as for excavation for roads.

Factors of Soil Formation

Everyone who has worked with soils has noticed that they differ from place to place. In one end of a field, there may be deep, productive soils, and in the other, shallow, droughty soils. On the ridges in La Crosse County, for example, are deep, silty Fayette soils. These occur in association with the shallower Dubuque soils that are underlain by red clay and dolomite lime rock. In other parts of the county, deep, silty soils occur in association with sandy soils or with silty soils underlain by sand.

Differences in soils do not occur at random. Soils differ because the five factors of soil formation—parent material, relief, climate, living organisms, and time—vary from place to place. For example, some soils are sandy because their parent material was weathered sandstone, and others are silty because their parent material was loess. Some soils differ from those of other places because the climate differs from place to place and thus causes regional differences in the soils; as a result of differences in climate, the soils of Wisconsin differ from those of another area or State, such as North Dakota.

Differences in natural vegetation cause differences in the soils; for example, some soils are dark colored because they have formed under grasses, and others are light colored because they have formed under timber. Relief also causes differences—some soils are shallow because they have formed on steep slopes, and others are deeper; some are wet because they occur in low areas where water does not drain away. Time likewise affects the soils. The soils along streams, for example, are said to be young because sediments are still being deposited.

Parent Materials

The soils of this county have formed largely from three kinds of parent material—(1) weathered sandstone bedrock; (2) wind-laid silts, also called loess; and (3) water-laid silts or sands deposited on the stream terraces and bottoms. Because the properties of many of the soils were influenced by rocks, it is helpful to know something of the geology of the county before studying the soils.

The uplands of La Crosse County are part of the area of Wisconsin described[5] as the Western Upland. This upland is part of the large, unglaciated, or driftless, region of southwestern Wisconsin and adjacent parts of Illinois, Iowa, and Minnesota. Because this region was not glaciated, the type of bedrock is important in determining the land forms and the types of soils that have formed in the county.

[5] MARTIN, LAWRENCE. THE PHYSICAL GEOGRAPHY OF WISCONSIN. Wis. Geol. and Nat. Hist. Surv. Bul. 36. 1932.

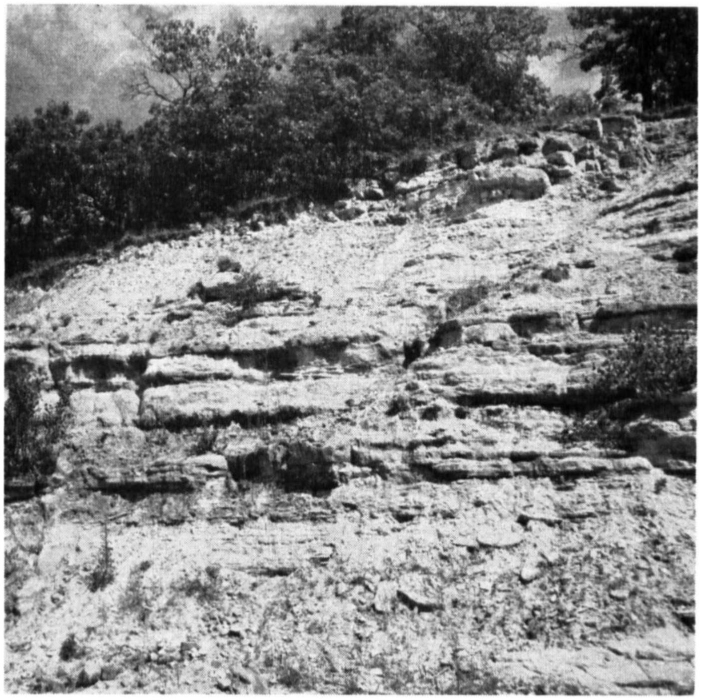

Figure 19.—Sandstone of Upper Cambrian age. Sandstone such as this forms the bedrock in large areas of La Crosse County.

The bedrock in La Crosse County is of two types (1) Prairie du Chien (Lower Magnesian) dolomite and (2) sandstone of Upper Cambrian age (fig. 19). These were both laid down originally as sediments in the ancient seas. In the northern part of the county, geologic erosion has removed the dolomite almost entirely. In the southern part, the dolomite is still present under the high, rounded ridges, the largest of which is St. Joseph Ridge. The distribution of the bedrock in the county is shown in figure 20.

Throughout the county, wherever the dolomite has been removed, the bedrock is sandstone, which is softer than the dolomite. There are three main formations of the sandstone—the Dresbach, Trempealeau, and Franconia. Of these, the topography of the Dresbach and Trempealeau is generally steeper than that of the Franconia. The Franconia has topography that is less steep than that of the other two formations because this formation contains layers of soft shale and siltstone, which erode more rapidly than the sandstone.

The dolomite underlying the ridges is responsible for differences in the landforms. It has level bedding planes, and, therefore, the ridgetops are fairly level. The dolomite is hard and is resistant to erosion. As a result, steep escarpments and deep, narrow valleys have formed. Only as the dolomite cracks and falls into the valleys or is dissolved by the ground water can streams and gullies move farther back into the uplands.

North of the La Crosse River, most of the dolomite has been removed by erosion. Here, erosion has cut into the sandstone, which is much softer than the dolomite, and has been the basis for differences in the landforms. The hills are low and irregular, the crests of the hilltops and ridges are generally too narrow to be farmed, and the escarpments are much less steep than those south of the river. Because the sandstone has eroded unevenly, the slopes on the hills and escarpments are irregular and there are many knobs underlain by sandstone throughout the area. The valleys of the streams in this area are much wider than those south of the river.

In most parts of the county, windblown silt, or loess, was blown onto the uplands from the valley of the Missis-

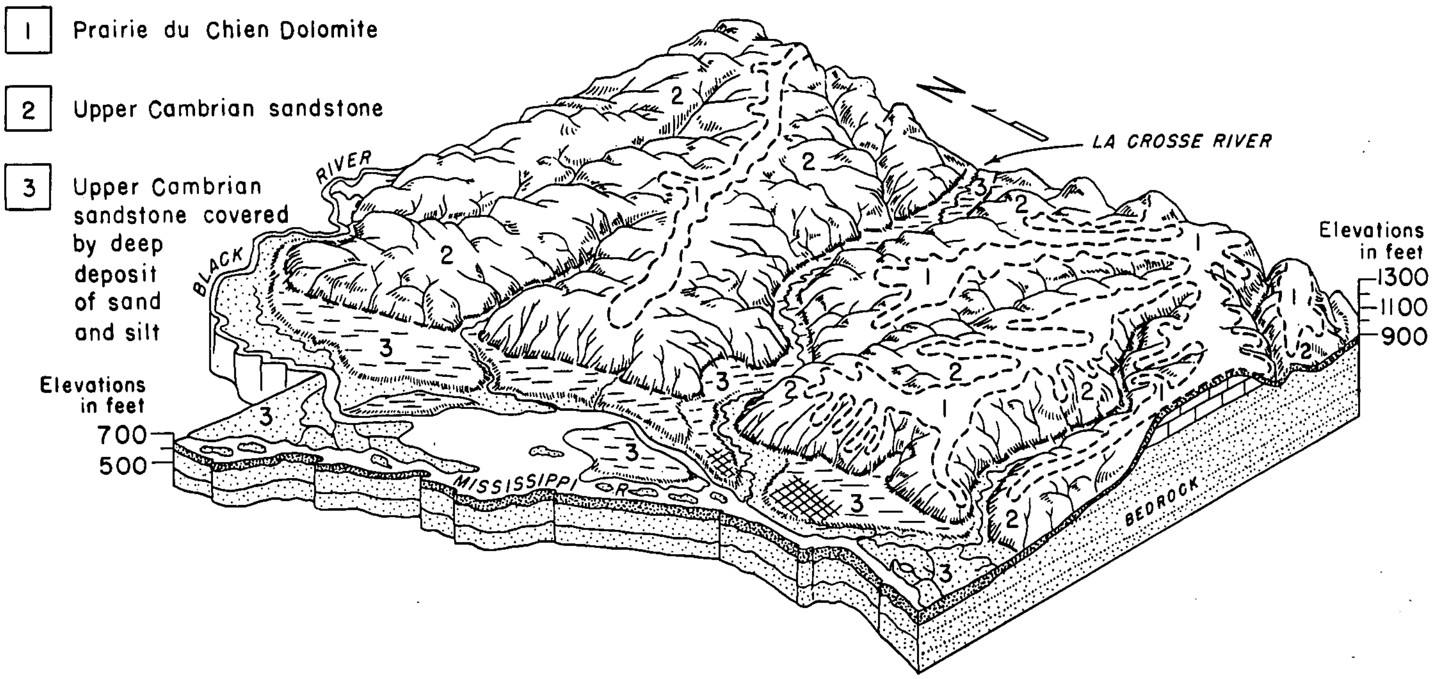

Figure 20.—Map showing the kinds of bedrock in La Crosse County.

sippi River during and after periods of glaciation. The deep, silty soils that cover much of the uplands have formed from this loess. In some small areas near the river, the loess is more than 30 feet thick. Farther back from the river, the loess becomes thinner. In the northern part of the county, the loess is fairly thin, or is absent, and the parent material of the soils is sandstone. Here, the underlying bedrock has influenced the development of the soils to a great extent. In many places in the uplands, where the layer of loess is thick, the upland soils are not closely related to the bedrock.

Throughout the county, some of the soils of the valley slopes, stream terraces, and bottom lands have also been influenced by loess. In some places the loess has remained in the same place where it was laid down by wind, but in most places it has been carried from the uplands by runoff water. On the lower valley slopes, the loess that has been carried by water occurs as alluvial or colluvial material. On the stream terraces and flood plains, it occurs as valley fill. In some places on the flood plains, the silt has been deposited as natural levees adjacent to the stream channels.

In areas where the weathered sandstone has no cover of loess, the soils on the stream terraces and bottoms have formed from sandy materials washed from the uplands. In places these sandy materials have been reworked by wind.

The relationship of some of the soils to their parent materials and their general position on the landscape are shown in figure 21. This figure also shows the relationship of the soils to each other. For example, in the uplands underlain by dolomite lime rock, the Fayette soils generally occur on the tops of the ridges, and the Dubuque soils, on the side slopes. In the areas underlain by sandstone, the Gale and Hixton soils are adjacent to each other and the Sparta and Plainfield soils generally occur adjacent to each other on the sandy terraces.

Other factors that have affected the relationship of the soils are the depth and texture of the loessal parent material and the vegetation under which the soils have formed. On the broad, silt-covered upland ridges where the Fayette soils have formed, for example, the loess is thicker than on the side slopes occupied by the Dubuque soils. The loess in which the Fayette soils has formed is finer textured and farther back from the Mississippi River than that from which the Seaton soils have formed; therefore, the Seaton soils differ from the Fayette. The soils of the Sparta and Plainfield series differ because, although the soils of both series have formed from sand, they have formed under different types of vegetation.

Relief

The relief of the county is perhaps easier to understand if it is described in terms of landforms. Throughout long periods of geologic time, erosion of the sandstone and dolomite bedrock has occurred in this unglaciated region. The erosion has cut many deep valleys into what was once a fairly level plateau and has formed a dissected upland with steep relief. In some parts of the county, the difference in elevation between the valley bottoms and the adjacent ridgetops is as much as 500 feet. The elevation at the crest of the ridge east of St. Joseph is approximately 700 feet higher than that of the Mississippi River at La Crosse.

Landforms typical of those in La Crosse County are shown in figure 22. These landforms are closely related to the type of underlying bedrock. The areas in which the two main types of bedrock occur are separated by the La Crosse River. South of the river the bedrock is sandstone capped with dolomite lime rock. North of the river the bedrock is mostly sandstone of Upper Cambrian age. The landforms in the two areas differ greatly.

The uplands south of the river consist mainly of (1) long, narrow ridges, most of which are farmed; (2) steep escarpments of Rough broken land and rock land that surround the ridges and separate them from the valleys; and (3) narrow, steep-sided valleys, or coulees, the side slopes of which generally have an accumulation of silt. The escarpments are made up of dolomite and sandstone. They have a covering of silt that is as much as 24 inches thick, and dominantly their slopes are about 50 percent.

The soils are closely related to the landforms of an area. Where the slopes are steep, the soil materials were removed by runoff water almost as fast as they were deposited and the soils are shallow and poorly developed. The steep areas of Rough broken land and rock land that form the steep escarpments between the ridges and valleys in La Crosse County are of this type. In the more nearly level areas, there is less runoff and the soils have had time to form characteristic layers, or horizons.

Climate

The climate of La Crosse County is marked by wide variations in temperature. The average growing season is 163 days and extends from April 29 to October 9. Precipitation in the county is generally adequate for crops to produce good yields. Rainfall is such that the soil is saturated at least once a year. As a result, the lime naturally present in the soil has been leached to a depth of several feet. Consequently, unless lime has been added, the soils are generally acid.

A more detailed account of the climate of La Crosse County, as it affects agriculture, is given in the section, Additional Facts About the County.

Living Organisms

Native vegetation has been the principal living influence in the formation of the soils in this county, but earthworms and other forms of life in and on the soil have also contributed. The plants, bacteria, earthworms, and other forms of life form organic matter, or humus, which gives the dark color to the surface soil.

The native vegetation in La Crosse County was mainly timber, but some areas were covered by prairie grasses. The areas covered by prairie grasses were generally on the stream terraces in the valleys of the Mississippi and La Crosse Rivers. Timber was so extensive that when the county was first settled, lumbering was the principal industry. Little agriculture was carried on until after much of the timber had been cleared.

Timber covered most of the uplands. The trees were deciduous and were largely oak or hickory. Some coni-

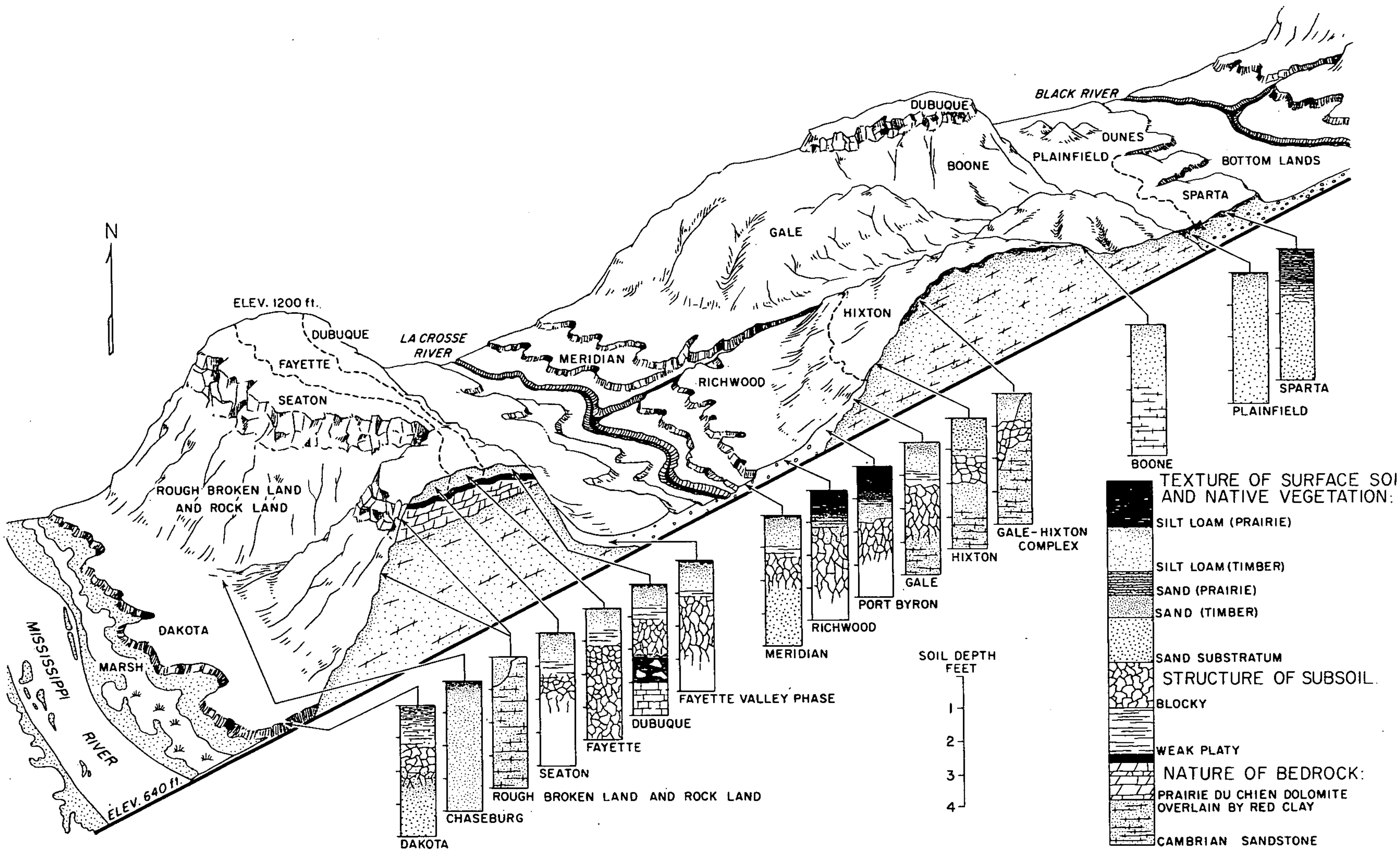

Figure 21.—**Schematic diagram showing the soil-landscape-parent material relationships of the soils of La Crosse County.**

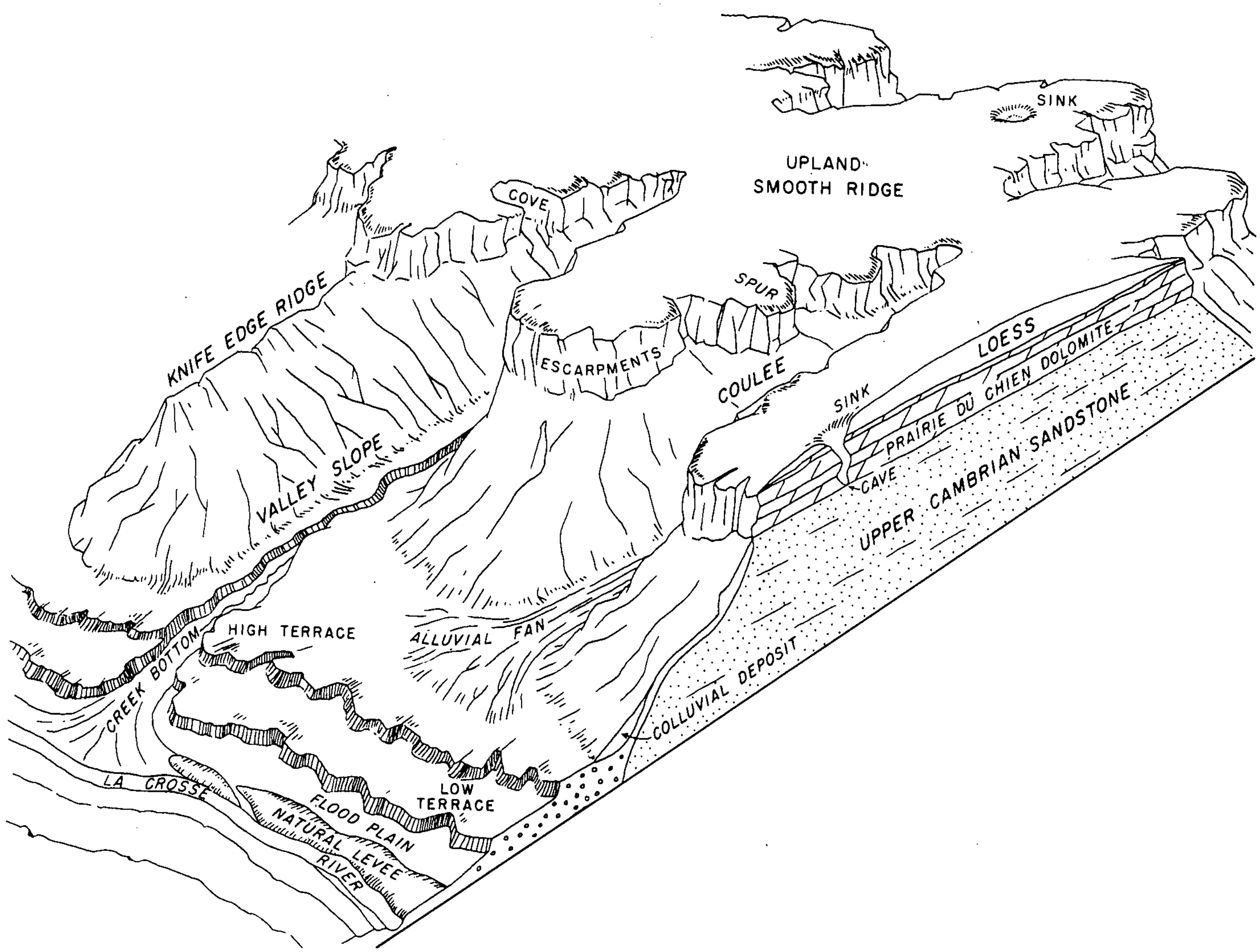

Figure 22.—**Diagram showing typical landforms of La Crosse County.**

fers, mostly white pine, grew on the sandy soils in the northern part of the county. The tall grasses on the prairies consisted mainly of bluestems (*Andropogon* sp.) and needlegrasses (*Stipa* sp.).

Soils are affected greatly by the type of vegetation under which they have formed. Because grasses have many roots and tops that have decayed on and in the soil, soils formed under prairie have a thick, dark surface layer. In contrast, soils formed under timber have a thinner, lighter colored surface layer because the organic matter, which was derived principally from leaves, was deposited only on the surface of the soil.

Time

Some of the soils in this county are old. They have formed in loess or from weathered rock and have been in place long enough for well-defined horizons to have developed. Other soils are young, because they are forming near streams where fresh deposits are added from time to time, and they have not had time to develop distinct horizons. Some soils are young because they are on steep slopes and the soil materials wash away before distinct horizons have had time to form.

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General Soil Areas

The soils of La Crosse County have been placed in six areas to show the general pattern in which they occur. These areas are outlined on the general soil map in the back of this report. The map is not sufficiently detailed to be useful in studying the soils of a particular farm. It will be helpful in obtaining general information about the soils or in obtaining a broad picture of the county's agriculture.

Each area is made up of several different soils that occur in a characteristic pattern. In most places the pattern is related to the nature of the soil materials and to the shape of the land surface. The six general areas are discussed in the following pages.

Figure 23.—**An aerial view showing part of general soil area 1. In the foreground are rounded ridges and steep, timbered escarpments. The valley slopes are many feet below.**

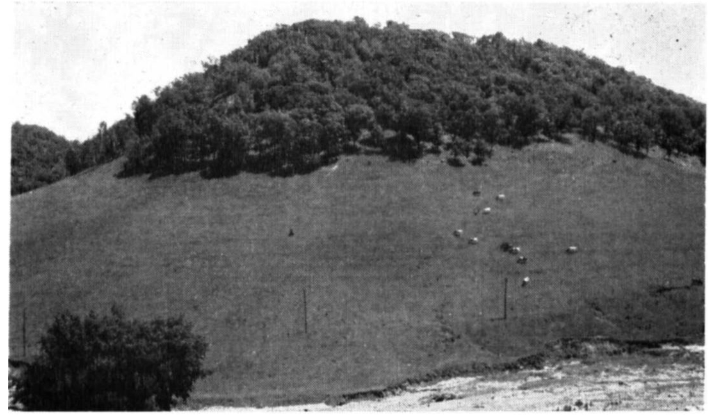

Figure 24.—**Landscape of sandstone uplands showing a narrow, timbered ridge and a sloping, open valley.**

1. Silty Soils on Dolomite (Lime Rock) Uplands

This general soil area is made up largely of Fayette and Dubuque soils but also includes some Gale soils and Rough broken land and rock land. Most of it is on the deeply dissected uplands south of the La Crosse River. It has a ridge and valley type of landscape (fig. 23).

The Fayette and Dubuque soils are similar. The Fayette soils, however, are silty to depths of 42 inches or more; in contrast, the Dubuque are underlain by red clay and dolomite at depths between 10 and 42 inches. The Fayette and Dubuque soils are sloping to moderately steep and are on long, rounded, fingerlike ridges. The ridges are separated from the steep-sided valleys by clifflike escarpments.

Many of the moderately steep to steep slopes in the narrow, V-shaped valleys in the uplands are occupied by the deep, silty Fayette (valley) soils. The Gale silt loams on the valley slopes have a sandy subsoil that has formed from the underlying sandstone. On the bottoms of the narrow valleys are deep, nearly level, silty, alluvial soils that vary in color and drainage. The very steep escarpments consist of Rough broken land and rock land that has a thin covering of silt over all but the larger rocks and perpendicular cliffs.

Because of the serious hazard of water erosion, many of the soils of this general area are limited in their suitability for agriculture. They are highly productive, however, if they are protected from erosion and are well managed otherwise.

2. Silty Soils on Sandstone Uplands

This general soil area is made up mainly of moderately steep soils on highly dissected sandstone uplands (fig. 24). The principal soils are those of the Gale and Hixton series, but some Fayette, Boone, and Dubuque soils are included. Generally, the Fayette and Dubuque soils are on the small, narrow ridgetops; the Gale and Fayette (valley) soils are on the steep, upper slopes of the valleys; and the sandy Hixton soils are on the lower, convex slopes.

The Hixton soils have a sandy texture and have formed from sandstone. The Gale soils have a cap of silty loess over the sandy material. In some places the soils of these two series are so intermingled that they have been mapped together as Gale-Hixton complexes. The Fayette soils are deep and silty. The Boone soils are similar to the Hixton, but they are sandier and have a lower water-storing capacity. The Boone soils have formed from weathered sandstone. They occur along the boundary of Monroe County.

In this general area is the crest of the divide that separates the tributaries of the La Crosse River from those of the Black River. This is a rounded ridge capped by dolomite (lime rock). It is similar to such ridges in general soil area 1 but is narrower. The soils here are the Dubuque and Fayette, which are used mainly for cultivated crops. In the rest of this general soil area, however, the ridges are generally capped by sandstone and are too steep and narrow for tillage. Consequently, most farming is on the sloping to steep soils of the valley slopes. The deep, nearly level, silty soils on the flood plains and bottom lands of the streams vary in color and drainage, but they are generally well suited to agriculture and are highly productive.

The hazard of water erosion is serious on the soils of this general area. Because of the sandy texture of the subsoils, gullies are especially hard to control. These soils generally have a lower water-storing capacity and a lower potential productivity than soils of general soil areas 1 and 5.

3. Rolling, Sandy Soils on Uplands

This general soil area is made up mainly of gently sloping to steep uplands that merge with nearly level to rolling or hummocky outwash plains (fig. 25). The Boone and Hixton soils are on uplands in which the slopes are generally less steep than those in adjacent general soil area 2. Of the soils of these two series, the Boone are the more extensive.

The plains are occupied mainly by deep, light-colored Plainfield fine sands and loamy fine sands, but there are

Figure 25.—Landscape in general soil area 3 showing a blowout area of Boone sand. Low hills occupied by sandy soils are in the background.

Figure 26.—Level benchland in general soil area 5.

also some dark-colored, sandy Sparta soils. These soils of the plains are nearly level, but in some places they have been blown into small hummocks and ridges by wind.

Most of the soils in this general soil area have limited suitability for cultivated crops. The loamy sands are droughty, low in fertility, and easily eroded. Consequently, they are severely limited in their use for agriculture. The very sandy soils are better suited to forestry than to agriculture.

4. Sandy Soils of the Mississippi River Valley

This general soil area is made up mainly of sandy soils. These soils are on the level, hummocky sand plain that lies between the wet, river bottom lands and the bluffs along the edge of the valley of the Mississippi River. The soils are mainly in the Plainfield and Sparta series, but there are some Dakota and Meridian soils.

The Plainfield soils are light colored, deep, and sandy. They have formed under a cover of trees. The Sparta soils have formed from parent material similar to that of the Plainfield soils. They have formed under a cover of native prairie grasses, however, and therefore they have a dark surface soil. The Dakota and Meridian soils have a surface layer and subsoil of sandy loam.

The slopes in this general soil area are mostly less than 4 percent. In some places, however, wind erosion has formed rolling to steep sand dunes that are now stabilized. On these dunes are mainly sloping and eroded Plainfield fine sands and loamy fine sands. These more sloping areas are just north and east of Onalaska and east and south of New Amsterdam.

Most of the soils in this general soil area are droughty, low in fertility, and easily eroded by wind; they are severely limited in their use for agriculture. Nevertheless, some areas of loamy fine sands and sandy loams are suited to crops. The crops make good yields if rainfall is adequate and is well distributed throughout the growing season.

5. Silty Soils of Valleys and Benches

This general soil area is made up of silty soils that are on level to gently sloping benches and low hills. The soils are mainly in the valleys of Fleming and Mormon Creeks and of the La Crosse and Mississippi Rivers. Much of this general soil area is occupied by soils of the Richwood, Toddville, and Port Byron series, but soils of the Rowley and Judson series are also extensive.

The Richwood, Toddville, and Rowley series consist of deep, level soils that are dark colored and silty. These differ in drainage, the Richwood being well drained, the Rowley somewhat poorly drained, and the Toddville intermediate in drainage between the two. The areas along the edges of the valleys are occupied by the Port Byron soils, which are deep, dark colored, and silty. The Port Byron soils are near the deep, black Judson soils. The Judson soils are in drainageways that extend from upland areas and in areas where these drainageways fan out onto the terraces. They generally are silty and dark colored to depths of 2 or more feet.

Other less extensive soils occur in this general soil area. Among these are sandy loams of the Meridian series and deep, light-colored, silty loams of the Bertrand series. Others are Tell and Waukegan silt loams that overlie sand. In addition, lake-laid silt loams of the Medary and Zwingle series occur in a few places on the high benches. The areas on the flood plains along the La Crosse River are made up of Alluvial land, poorly drained; Alluvial land, moderately well drained; and Marsh.

The deep, dark, silty soils of this general soil area are more nearly level than most of the other soils of the county (fig. 26). Consequently, they are less likely to erode and are more suitable for agricultural use than some of the more sloping soils.

6. Wet Bottom Lands

This general soil area consists of miscellaneous land types and of soils that are on the bottom lands of the Mississippi River. The water table is high throughout the area. Alluvial land, poorly drained, and Marsh occupy most of the area. Only a small acreage of other soils is included. The included soils are generally sandy.

This area has little value for agriculture. Its best use is for recreational purposes or for wildlife.

Soil Series and Mapping Units

In the following pages, the soil series of La Crosse County are described in alphabetical order. Following the general description of each series is a description of the mapping units in that series. A discussion of how the soils are classified, including a definition of soil series and soil type, is given in the section, Classification of Soils. Following that section is a description of each soil type in the county and a description of a profile that is representative of each.

A list of the soils mapped is given in the back of this report, along with the capability unit of each. The approximate acreage and the proportionate extent of the soils are given in table 11; their location and distribution are shown on the soil map at the back of this report.

TABLE 11.—*Approximate acreage and proportionate extent of the soils mapped*

Soil	Area	Extent
	Acres	*Percent*
Alluvial land:		
Moderately well drained	4, 772	1. 6
Poorly drained	18, 287	6. 1
Arenzville silt loam	2, 643	. 9
Arenzville, Orion, and Huntsville soils	1, 490	. 5
Bertrand silt loam, 2 to 6 percent slopes	1, 064	. 4
Bertrand silt loam, 0 to 2 percent slopes	959	. 3
Bertrand silt loam, 2 to 6 percent slopes, moderately eroded	412	. 1
Bertrand silt loam, 6 to 12 percent slopes, moderately eroded	189	. 1
Boaz silt loam	128	(1)
Boone sand, 6 to 12 percent slopes, eroded	3, 038	1. 0
Boone sand, 2 to 6 percent slopes, eroded	2, 274	. 8
Boone sand, 12 to 60 percent slopes, eroded	4, 808	1. 6
Boone-Hixton loamy sands, 0 to 6 percent slopes	1, 505	. 5
Boone-Hixton loamy sands, 6 to 12 percent slopes	284	. 1
Boone-Hixton loamy sands, 6 to 12 percent slopes, eroded	873	. 3
Boone-Hixton loamy sands, 12 to 60 percent slopes, eroded	3, 888	1. 3
Chaseburg silt loam, 2 to 6 percent slopes	1, 732	. 6
Chaseburg silt loam, 0 to 2 percent slopes	398	. 1
Chaseburg silt loam, 6 to 12 percent slopes	73	(1)
Chaseburg and Judson silt loams, 0 to 2 percent slopes	66	(1)
Chaseburg and Judson silt loams, 2 to 6 percent slopes	1, 199	. 4
Curran silt loam	119	(1)
Dakota sandy loam, 0 to 2 percent slopes	1, 023	. 3
Dakota sandy loam, 2 to 6 percent slopes	264	. 1
Dakota sandy loam, 6 to 12 percent slopes, moderately eroded	44	(1)
Dubuque silt loam, 20 to 30 percent slopes	5, 029	1. 7
Dubuque silt loam, 2 to 6 percent slopes, moderately eroded	190	. 1
Dubuque silt loam, 6 to 12 percent slopes, moderately eroded	155	. 1
Dubuque silt loam, 12 to 20 percent slopes	416	. 1
Dubuque silt loam, 12 to 20 percent slopes, moderately eroded	1, 106	. 4
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded	949	. 3
Dubuque silt loam, 30 to 45 percent slopes	1, 393	. 5
Dubuque soils, 12 to 20 percent slopes, severely eroded	532	. 2
Dubuque soils, 20 to 30 percent slopes, severely eroded	307	. 1
Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded	9, 876	3. 3
Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded	1, 010	. 3
Dubuque silt loam, deep, 6 to 12 percent slopes, moderately eroded	263	. 1
Dubuque silt loam, deep, 12 to 20 percent slopes	2, 390	. 8
Dubuque silt loam, deep, 20 to 30 percent slopes	2, 233	. 7
Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded	2, 099	. 7
Dubuque soils, deep, 12 to 20 percent slopes, severely eroded	1, 998	. 7
Dubuque soils, deep, 20 to 45 percent slopes, severely eroded	629	. 2
Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded	12, 457	4. 2
Fayette silt loam, uplands, 2 to 6 percent slopes	341	. 1
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	4, 402	1. 5
Fayette silt loam, uplands, 6 to 12 percent slopes	177	. 1
Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded	7, 310	2. 4
Fayette silt loam, uplands, 12 to 20 percent slopes	1, 024	. 3
Fayette silt loam, uplands, 20 to 30 percent slopes	455	. 2
Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded	2, 939	1. 0
Fayette silt loam, uplands, 30 to 40 percent slopes	150	(1)
Fayette soils, uplands, 12 to 20 percent slopes, severely eroded	347	. 1
Fayette soils, uplands, 20 to 30 percent slopes, severely eroded	444	. 1
Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded	4, 890	1. 6
Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded	199	. 1
Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded	1, 123	. 4
Fayette silt loam, valleys, 20 to 30 percent slopes	2, 095	. 7
Fayette silt loam, valleys, 30 to 40 percent slopes, moderately eroded	208	. 1
Fayette soils, valleys, 12 to 20 percent slopes, severely eroded	397	. 1
Fayette soils, valleys, 20 to 30 percent slopes, severely eroded	469	. 2
Gale silt loam, 20 to 30 percent slopes, moderately eroded	7, 588	2. 5
Gale silt loam, 2 to 6 percent slopes	60	(1)
Gale silt loam, 6 to 12 percent slopes, moderately eroded	303	. 1
Gale silt loam, 12 to 20 percent slopes	915	. 3
Gale silt loam, 12 to 20 percent slopes, moderately eroded	2, 806	1. 0
Gale silt loam, 20 to 30 percent slopes	2, 316	. 8
Gale silt loam, 20 to 30 percent slopes, severely eroded	1, 222	. 4
Gale silt loam, 30 to 60 percent slopes	1, 012	. 3
Gale silt loam, 30 to 60 percent slopes, moderately eroded	1, 317	. 4
Gale-Hixton complex, 30 to 60 percent slopes	15, 486	5. 2
Gale-Hixton complex, 2 to 6 percent slopes	164	. 1
Gale-Hixton complex, 6 to 12 percent slopes, moderately eroded	184	. 1
Gale-Hixton complex, 12 to 20 percent slopes	187	. 1
Gale-Hixton complex, 12 to 20 percent slopes, moderately eroded	2, 146	. 7
Gale-Hixton complex, 20 to 30 percent slopes	2, 461	. 8
Gale-Hixton complex, 20 to 30 percent slopes, moderately eroded	6, 636	2. 2
Gale-Hixton complex, 20 to 30 percent slopes, severely eroded	1, 362	. 5
Gale-Hixton complex, 30 to 60 percent slopes, moderately eroded	2, 882	1. 0

TABLE 11.—*Approximate acreage and proportionate extent of the soils mapped*—Continued

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Gale-Hixton complex, 30 to 60 percent slopes, severely eroded	325	0. 1	Plainfield loamy fine sand, 0 to 2 percent slopes	1, 330	0. 4
Gotham loamy sand, 0 to 2 percent slopes	277	. 1	Plainfield loamy fine sand, 2 to 6 percent slopes, eroded	1, 317	. 4
Gotham loamy sand, 2 to 6 percent slopes	221	. 1	Plainfield loamy fine sand, 6 to 12 percent slopes	1, 706	. 6
Gotham loamy sand, 2 to 6 percent slopes, eroded	181	. 1	Plainfield loamy fine sand, 6 to 12 percent slopes, eroded	119	(1)
Gotham loamy sand, 6 to 12 percent slopes, eroded	99	(1)	Plainfield loamy fine sand, 12 to 20 percent slopes, eroded	183	. 1
Gullied land	52	(1)	Plainfield-Sparta complex	2, 065	. 7
Hesch sandy loam, 6 to 12 percent slopes, moderately eroded	121	(1)	Port Byron silt loam, 6 to 12 percent slopes, moderately eroded	3, 212	1. 1
Hesch sandy loam, 2 to 6 percent slopes, moderately eroded	19	(1)	Port Byron silt loam, 2 to 6 percent slopes	1, 183	. 4
Hesch sandy loam, 12 to 20 percent slopes, moderately eroded	70	(1)	Port Byron silt loam, 2 to 6 percent slopes, moderately eroded	2, 600	. 9
Hesch sandy loam, 20 to 30 percent slopes, moderately eroded	70	(1)	Port Byron silt loam, 12 to 20 percent slopes	472	. 2
Hixton sandy loam, 30 to 60 percent slopes	16, 881	5. 6	Port Byron silt loam, 12 to 20 percent slopes, moderately eroded	1, 844	. 6
Hixton sandy loam, 2 to 6 percent slopes	511	. 2	Port Byron silt loam, 12 to 20 percent slopes, severely eroded	108	(1)
Hixton sandy loam, 2 to 6 percent slopes, moderately eroded	677	. 2	Port Byron silt loam, 20 to 30 percent slopes, moderately eroded	47	(1)
Hixton sandy loam, 6 to 12 percent slopes, moderately eroded	989	. 3	Port Byron silt loam, 6 to 12 percent slopes	56	(1)
Hixton sandy loam, 12 to 20 percent slopes	335	. 1	Richwood silt loam, 0 to 2 percent slopes	3, 391	1. 1
Hixton sandy loam, 12 to 20 percent slopes, moderately eroded	1, 482	. 5	Richwood silt loam, 2 to 6 percent slopes	3, 318	1. 1
Hixton sandy loam, 12 to 20 percent slopes, severely eroded	115	(1)	Richwood silt loam, 2 to 6 percent slopes, moderately eroded	1, 105	. 4
Hixton sandy loam, 20 to 30 percent slopes	865	. 3	Riverwash	369	. 1
Hixton sandy loam, 20 to 30 percent slopes, moderately eroded	735	. 2	Rough broken land and rock land	35, 714	12. 0
Hixton sandy loam, 20 to 30 percent slopes, severely eroded	199	. 1	Rowley silt loam, 0 to 2 percent slopes	2, 386	. 8
Hixton sandy loam, 30 to 60 percent slopes, moderately eroded	1, 129	. 4	Rowley silt loam, 2 to 6 percent slopes	592	. 2
Hixton sandy loam, 30 to 60 percent slopes, severely eroded	206	. 1	Seaton silt loam, 12 to 20 percent slopes, moderately eroded	188	. 1
Jackson silt loam	146	(1)	Seaton silt loam, 12 to 20 percent slopes, severely eroded	51	(1)
Judson silt loam, 2 to 6 percent slopes	1, 700	. 6	Seaton silt loam, 20 to 30 percent slopes	51	(1)
Judson silt loam, 0 to 2 percent slopes	460	. 2	Seaton silt loam, 20 to 30 percent slopes, moderately eroded	177	. 1
Judson silt loam, 6 to 12 percent slopes	402	. 1	Seaton silt loam, 20 to 30 percent slopes, severely eroded	90	(1)
Lawson and Huntsville silt loams	1, 013	. 3	Seaton silt loam, 30 to 50 percent slopes, moderately eroded	42	(1)
Lawson and Huntsville silt loams, sandy substrata	381	. 1	Sparta loamy fine sand, 0 to 2 percent slopes	2, 827	1. 0
Marsh	6, 931	2. 3	Sparta loamy fine sand, 2 to 6 percent slopes	1, 907	. 6
Medary silt loam, 0 to 2 percent slopes	128	(1)	Sparta loamy fine sand, 6 to 12 percent slopes, eroded	174	. 1
Medary silt loam, 2 to 7 percent slopes	14	(1)	Sparta sand, 0 to 2 percent slopes	122	(1)
Meridian sandy loam, 2 to 6 percent slopes	372	. 1	Sparta sand, 2 to 6 percent slopes	64	(1)
Meridian sandy loam, 0 to 2 percent slopes	243	. 1	Sparta sand, 6 to 12 percent slopes, eroded	83	(1)
Meridian sandy loam, 2 to 6 percent slopes, moderately eroded	154	. 1	Stabilized dunes	2, 450	. 8
Meridian sandy loam, 6 to 12 percent slopes, moderately eroded	60	(1)	Stony colluvial land	1, 063	. 4
Meridian-Waukegan complex, 0 to 2 percent slopes	45	(1)	Tell silt loam, 2 to 6 percent slopes	685	. 2
Meridian-Waukegan complex, 2 to 6 percent slopes	41	(1)	Tell silt loam, 0 to 2 percent slopes	36	(1)
Meridian-Waukegan complex, 2 to 6 percent slopes, moderately eroded	63	(1)	Tell silt loam, 6 to 12 percent slopes, moderately eroded	83	(1)
Meridian-Waukegan complex, 6 to 12 percent slopes, moderately eroded	56	(1)	Terrace escarpments	3, 585	1. 2
Muck and peat, drained	436	. 1	Toddville silt loam	1, 607	. 5
Muck and peat, undrained	535	. 2	Trempe loamy fine sand, 0 to 2 percent slopes	173	. 1
Orion fine sandy loam	302	. 1	Trempe loamy fine sand, 2 to 12 percent slopes	95	(1)
Orion silt loam	361	. 1	Trempealeau fine sandy loam, 0 to 2 percent slopes	84	(1)
Plainfield fine sand, 2 to 6 percent slopes, eroded	3, 684	1. 2	Trempealeau fine sandy loam, 2 to 6 percent slopes	56	(1)
Plainfield fine sand, 0 to 2 percent slopes, eroded	599	. 2	Trempealeau silt loam, 0 to 3 percent slopes	60	(1)
Plainfield fine sand, 6 to 12 percent slopes, eroded	2, 767	1. 0	Waukegan silt loam, 2 to 6 percent slopes	411	. 1
Plainfield fine sand, 12 to 20 percent slopes, eroded	535	. 2	Waukegan silt loam, 0 to 2 percent slopes	115	(1)
Plainfield loamy fine sand, 2 to 6 percent slopes	2, 701	1. 0	Waukegan silt loam, 2 to 6 percent slopes, moderately eroded	220	. 1
			Waukegan silt loam, 12 to 20 percent slopes, moderately eroded	90	(1)
			Zwingle silt loam	185	. 1
			Total land	300, 160	100. 0

[1] Less than 0.1 percent.

Alluvial Land

Alluvial land is made up of materials recently deposited by streams. The soil materials vary widely in texture and are generally stratified. Because they are flooded frequently, the areas are subject to change, but the soil materials have been in place long enough for trees or other plants to grow. The deposits are too recent for a soil profile to have formed, although the material may be mottled.

Alluvial land, moderately well drained (Ab).—This mapping unit occurs on bottom lands. It consists of highly variable soil materials that range in texture from sand to silt loam. Occasionally, it receives additional sediments from the silty soils of the uplands or from soils underlain by sandy bedrock.

The areas are slightly wet or are flooded occasionally. Nevertheless, they are suited to use for crops, as the floodwaters do not remain long, nor do they flow rapidly. In some areas dikes and ditches are used to improve the drainage and to protect the areas from runoff. Corn and hay grown for silage are the most common crops. (Capability unit IIIw–2.)

Alluvial land, poorly drained (Aa).—This mapping unit occurs on bottom lands, mostly along the Black, La Crosse, and Mississippi Rivers. It consists of sandy and silty soil materials. The areas are flooded much of the time, especially in spring. They support a good stand of trees and are probably best used for timber. (Capability unit Vw–1.)

Figure 27.—**Profile of Arenzville silt loam showing light-colored soil material over an older, buried soil.**

Arenzville Series

The Arenzville series is made up of deep, silty, alluvial soils that are well drained to moderately well drained. The soils occur throughout the county on the bottom lands and flood plains of the larger streams. They have formed from silty materials washed in by the streams. The materials are stratified, and the separate layers show clearly in the profile. In the substratum of these soils is the surface layer of a darker, buried soil.

Arenzville silt loam (Ac).—The surface layer of this soil is laminated, dark-brown silt loam, 12 to 24 inches thick, that in places contains a few lenses of pale-brown soil material. Just below it is the surface layer of an old, buried soil. This layer of older soil is 6 to 12 inches thick. It consists of black, friable silt loam, which is transitional, with increasing depth, to very dark grayish-brown or dark yellowish-brown silt loam. The underlying material is yellowish-brown, friable silt loam that contains thin strata of sand. Figure 27 shows a typical profile of this soil.

This soil is flooded every year or two. Nevertheless, if it is well managed, high yields can be obtained. (Capability unit I–1.)

Arenzville, Orion, and Huntsville Soils

Arenzvile, Orion, and Huntsville soils (Ad).—The soils in this undifferentiated soil group occur throughout the county in areas adjacent to the larger streams. Although the areas consist mostly of Arenzville, Orion, and Huntsville soils, small areas of Boaz soils are included. The Orion and Huntsville soils resemble the Arenzville soils, but the Orion are somewhat poorly drained and the Huntsville do not have the dark, buried soil in the profile. All of these soils are described elsewhere in the report.

These soils are flooded frequently. The floodwaters are turbulent and erosive. When the waters are high, the streams cut into the streambanks. Because of the hazard of flooding, it is desirable to use the areas for improved pasture. (Capability unit VIw–1.)

Bertrand Series

The Bertrand series is made up of deep, silty, well-drained soils that are on the terraces of the larger streams throughout the county. The soils are associated with the Jackson and Curran soils, which are less well drained, and with the Richwood soils. The Richwood soils have a thicker, darker surface layer than the Bertrand.

Bertrand silt loam, 2 to 6 percent slopes (BaB).—This is the most extensive of the Bertrand soils in the county. The surface soil is dark grayish-brown silt loam, 6 to 9 inches thick. The subsoil is dark yellowish-brown, friable to firm silty clay loam, about 38 inches thick. The subsoil overlies a layer of deep, yellowish-brown silt or silt loam that, in places, has spots or mottles of various colors at depths of about 4 feet. In some places stratified fine sand occurs at depths between 4 and 8 feet.

Although this soil is on slopes where there is some runoff, erosion can be controlled easily. If practices to control erosion are used, the soil can be cropped intensively. Under good management it is highly productive. (Capability unit IIe–1.)

Bertrand silt loam, 0 to 2 percent slopes (BaA).—Except that the slopes are less steep and mottling occurs at depths slightly below 30 inches, this soil is similar to Bertrand silt loam, 2 to 6 percent slopes.

If this soil is well managed, it is highly productive. Runoff is slight, and there is little hazard of erosion. The soil is suited to intensive cropping and needs few or no practices for control of erosion. (Capability unit I-1.)

Bertrand silt loam, 2 to 6 percent slopes, moderately eroded (BaB2).—Except that it is moderately eroded, this soil is similar to Bertrand silt loam, 2 to 6 percent slopes. Yields are slightly lower than on the less eroded soil; and there is a greater need for practices to control erosion. If practices are used to control erosion and other good management is used, the soil can be cropped intensively and is highly productive. (Capability unit IIe–1.)

Bertrand silt loam, 6 to 12 percent slopes, moderately eroded (BaC2).—Except for having a slightly thinner surface soil and subsoil, this soil is similar to Bertrand silt loam, 2 to 6 percent slopes. It is not extensive in La Crosse County.

This soil is highly productive if it is well managed. Runoff needs to be controlled to prevent erosion, and the soil should be used for row crops less often than the less sloping soils of the series. (Capability unit IIIe–1.)

Boaz Series

The soils of the Boaz series occur on the nearly level bottom lands along streams. Both surface runoff and internal drainage are slow. The soils are wet. Sometimes they are flooded by water from the uplands. Only one soil of this series, Boaz silt loam, is mapped in this county.

Boaz silt loam (Bb).—This soil has a surface layer of very dark grayish-brown silt loam that is mottled with yellowish red at depths of about 9 inches. The subsoil is at depths of about 12 to 40 inches and is mostly silt loam. There is a layer of silty clay loam, which is also mottled, at depths of 30 to 40 inches. The layer of silty clay loam is dense and impermeable and restricts the movement of water through the soil.

Usually, surface drainage is required on this soil before good yields of crops can be obtained, and sometimes deep drainage, or surface drainage and deep drainage combined, are necessary. (Capability unit IIw–2.)

Boone Series

The soils of the Boone series are light colored and very sandy. They are excessively drained, and their slopes range from gentle to very steep. Generally, the steeper soils are shallower over bedrock than the other soils of the series. The Boone soils are too coarse textured to grow crops profitably.

These soils are similar to the Hixton soils but contain more sand. This difference is probably caused by differences in the composition of the underlying sandstone bedrock. In places, where the Boone and Hixton soils are closely intermingled, they have been mapped as complexes of Boone-Hixton loamy sands.

Boone sand, 6 to 12 percent slopes, eroded (BcC1).—This soil is mostly in trees. Erosion ranges from little or none to moderate, but because the soil lacks definite horizons and because it is difficult to separate slight and moderate erosion in mapping, it has been called an eroded phase.

If undisturbed, the surface layer, in areas where the soil was formed under trees, is made up of dark humus mixed with sand and is 1 to 3 inches thick. Below this is pale-brown to brown sand in successive layers to a depth between 7 and 25 inches, depending on how deeply the material has weathered. The lower part of the profile consists of brownish-yellow to pale-brown sand that in places has fragments of sandstone and bands of brown loamy sand. In some places weathered sandstone occurs at depths ranging from 1 to 4 feet.

Because it is so sandy, this soil is not suited to crops or pasture. It is best used for growing trees for timber or for sale as Christmas trees. (Capability unit VIIs–1.)

Boone sand, 2 to 6 percent slopes, eroded (BcB1).—Except that this soil generally does not contain fragments of weathered sandstone, it is similar to Boone sand, 6 to 12 percent slopes, eroded. The soil is gently sloping, but it is very sandy and is not suited to crops. (Capability unit VIIs–1.)

Boone sand, 12 to 60 percent slopes, eroded (BcD1).—This very sandy soil has moderately steep to very steep slopes. The depth to sandstone bedrock ranges from less than 1 foot to several feet, and in places the sandstone is exposed. The soil is very susceptible to both wind and water erosion. Gullies, once established, may become large and deep before they can be controlled. This soil is best suited to trees, which can be grown for timber or for sale as Christmas trees. (Capability unit VIIs–1.)

Boone-Hixton Complexes

Boone-Hixton loamy sands, 0 to 6 percent slopes (BdB).—Except that the dominant texture of the surface soil is loamy sand, the soils in this complex are similar to those described for Boone sand and for Hixton sandy loam. They are generally 40 inches or more deep over bedrock. If practices are used to prevent erosion from wind and water, these soils can be used for crops that require little cultivation. Yields of most crops are low on these soils. (Capability unit IVs–1.)

Boone-Hixton loamy sands, 6 to 12 percent slopes (BdC).—Except that the soils in this mapping unit are steeper and have a more severe hazard of water erosion, they are similar to Boone-Hixton loamy sands, 0 to 6 percent slopes. If protected from wind and water erosion, they can be used for crops. (Capability unit IVs–1.)

Boone-Hixton loamy sands, 6 to 12 percent slopes, eroded (BdC1).—Except that the soils are eroded, this complex is similar to Boone-Hixton loamy sands, 6 to 12 percent slopes. If the soils are used for crops, care is needed to prevent further erosion. (Capability unit IVs–1.)

Boone-Hixton loamy sands, 12 to 60 percent slopes, eroded (BdD1).—The soils in this complex are too steep for cultivation. The slopes vary, but slopes of more than 30 percent predominate. Erosion is slight to moderate. Sandstone bedrock is exposed in some places. These soils are best suited to coniferous trees grown for timber or for sale as Christmas trees. (Capability unit VIIs–1.)

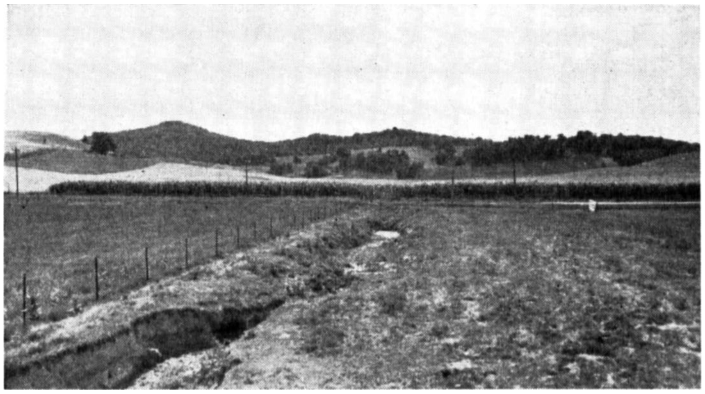

Figure 28.—**Landscape showing Chaseburg silt loam along drainageway in the foreground; Port Byron silt loam on the cultivated slopes; and Boone sand on the hills in the background.**

Chaseburg Series

The Chaseburg soils are deep, permeable, silty, light-colored soils that occur in narrow drainageways. They are sometimes flooded, and in this county the areas most frequently flooded have been mapped with Judson soils. The overflow water continually deposits on the Chaseburg soils fresh silt from the uplands. Therefore, Chaseburg soils have no well-developed horizons but retain the original thin layers, or laminations, as they were deposited by floodwaters.

Chaseburg silt loam, 2 to 6 percent slopes (CaB).—This soil is the most extensive of the Chaseburg soils in the county. It is in the wider drainageways where slopes are relatively mild (fig. 28).

The uppermost layer is very dark grayish-brown to brown silt loam, 24 to 36 inches thick. It is platy or laminated. There are minor differences in color among the layers. Those below depths of 24 to 36 inches may be slightly lighter colored and have less distinct boundaries than the ones in the upper part of the profile. The profile is silty, permeable, and friable to a depth of 4 feet or more.

This soil is highly productive when well managed, but overflow is a hazard in some areas. Diversion ditches or waterways will aid in controlling the floodwaters. (Capability unit IIe–2.)

Chaseburg silt loam, 0 to 2 percent slopes (CaA).—Except that this soil has milder slopes and is, therefore, less likely to be eroded, it is similar to Chaseburg silt loam, 2 to 6 percent slopes. It is highly productive, if well managed, but it is flooded at times. Dikes, diversion ditches, and waterways will help to protect the areas from flooding. (Capability unit I–1.)

Chaseburg silt loam, 6 to 12 percent slopes (CaC).—This soil is similar to Chaseburg silt loam, 2 to 6 percent slopes, but it occurs in narrower drainageways on steeper slopes. Also, the hazard of erosion from runoff is more severe. Diversion ditches and waterways will help protect the cultivated areas from runoff. (Capability unit IIIe–3.)

Chaseburg and Judson Soils

Where the Chaseburg and Judson soils occur in flooded and eroded areas, they are mapped together as an undifferentiated soil group. The descriptions of two of these soil groups follow.

Chaseburg and Judson silt loams, 0 to 2 percent slopes (CbA).—This undifferentiated soil group consists of nearly level soils that are flooded frequently. Consequently, the hazard of erosion is serious if the areas are cultivated. Dikes, diversion ditches, or waterways will help to control runoff and prevent flooding. (Capability unit VIw–1.)

Chaseburg and Judson silt loams, 2 to 6 percent slopes (CbB).—Except that the soils in this mapping unit have steeper slopes, they are similar to Chaseburg and Judson silt loams, 0 to 2 percent slopes. The areas are best kept in sod unless they can be protected from flooding by the use of diversion ditches or waterways. (Capability unit VIw–1.)

Curran Series

The soils of the Curran series occupy flat areas or depressions on stream terraces. They occur with the Bertrand and Jackson soils but have poorer surface and subsoil drainage than those soils. Drainage of water through the Curran soils is so slow that they remain wet late in spring and after rainy periods.

Curran silt loam (Cc).—This is the only soil of the Curran series mapped in the county. The surface soil is very dark gray to very dark grayish-brown silt loam, 7 to 10 inches thick. The subsoil is at depths between 27 and 41 inches and is grayish-brown silt loam in the upper part. The lower part of the subsoil is grayish-brown silty clay loam with many olive-brown and reddish mottles. Below this is 4 feet or more of silt loam or silty clay loam.

If drainage is improved, moderately high yields of corn, small grains, and hay can be obtained on this soil. Drainage can be improved by using surface ditches to remove ponded water. (Capability unit IIIw–3.)

Dakota Series

The soils of the Dakota series are dark colored and are well drained. They occupy gently sloping areas on stream terraces. Typically, the soils have a surface soil of sandy loam. The subsoil, a sandy loam or loam, overlies loose sand that is at depths between about 19 and 30 inches. In some areas of this soil west of Midway, there is a thin layer of gravel between the subsoil and the layer of sand. These soils are acid throughout unless they have been limed.

Dakota sandy loam, 0 to 2 percent slopes (DaA).—This is the most extensive of the Dakota soils. It is on nearly level terraces and has had little or no erosion from wind or water.

The surface layer is black to very dark brown sandy loam, 8 to 14 inches thick. This layer is browner in the lower part. The subsoil, a dark-brown sandy loam or loam, ranges in depth from 19 to 30 inches. Generally, however, it extends to depths between 22 and 24 inches. In places there is a thin band of gravel between the subsoil and the yellowish-brown sand below. The sand is several feet thick.

Except in years when rainfall is low or poorly distributed throughout the growing season, this soil is moderately productive if it is well managed. Its capacity for storing moisture is so low that in dry years corn, hay, and other crops planted late in the season are damaged by drought. (Capability unit IIIs-1.)

Dakota sandy loam, 2 to 6 percent slopes (DaB).—Except that it is on steeper slopes, this soil is similar to Dakota sandy loam, 0 to 2 percent slopes. The hazard of erosion is greater, and more care is needed to prevent losses of soil. (Capability unit IIIs-1.)

Dakota sandy loam, 6 to 12 percent slopes, moderately eroded (DaC2).—This soil differs from Dakota sandy loam, 0 to 2 percent slopes, in being steeper and moderately eroded. It has somewhat thinner surface and subsoil layers. In addition, it has a greater hazard of erosion and is less productive, particularly in dry years. (Capability unit IIIs-2.)

Dubuque Series

The soils of the Dubuque series are light colored and well drained. They occur throughout the county on ridges capped with dolomite (lime rock). Typically, they are covered by a layer of windblown silt (loess) of variable thickness. This is underlain by heavy red clay that is 1 to several feet thick over the dolomite. Normally, the Dubuque soils contain numerous chert fragments that have weathered from the dolomite.

The Dubuque soils have been mapped in two phases, depending upon the thickness of the silt cap over the underlying red clay. Generally, the deep phases occur on slopes of 12 to 20 percent and are underlain by red clay at depths of 20 to 42 inches. The shallower soils, however, are on slopes of 20 to 30 percent, and their depth to red clay is only 10 to 20 inches. The shallower soils are on the edges of rounded ridges below areas of Dubuque silt loam, deep, and soils of the Fayette series. All of the Dubuque soils are acid throughout, unless they have been limed.

Dubuque silt loam, 20 to 30 percent slopes (DbE).—This is the most extensive of the Dubuque silt loams. Much of it has been kept in pasture or trees; therefore it has not eroded excessively.

The surface soil is very dark gray to dark grayish-brown silt loam, 6 to 9 inches thick. Below this is 8 to 10 inches of reddish-brown silty clay loam over several feet of reddish clay. The soil contains many fragments of chert, which become more numerous with increasing depth.

This soil is too steep to be tilled intensively. Only a small amount of silt remains over the red clay. Care must be taken to prevent erosion because, if the silt is washed away, the clay is difficult to work to a good seedbed. If moderate yields of hay or pasture are to be obtained, good management is required. The soil will need lime and fertilizer, and the pastures must be renovated frequently. (Capability unit VIe-1.)

Dubuque silt loam, 2 to 6 percent slopes, moderately eroded (DbB2).—The depth to the underlying red clay in this moderately eroded soil is less than 20 inches. This soil is moderately productive when good management practices, including the use of fertilizer, are applied. The soil is suitable for cultivation if it is protected from erosion. (Capability unit IIe-1.)

Dubuque silt loam, 6 to 12 percent slopes, moderately eroded (DbC2).—This soil is somewhat eroded. Care is needed to prevent further erosion that will expose the underlying silty clay loam or clay. This soil is moderately productive if it is well managed. (Capability unit IIIe-2.)

Dubuque silt loam, 12 to 20 percent slopes (DbD).—Except that this soil is less steep, it is similar to Dubuque silt loam, 20 to 30 percent slopes. (Capability unit IVe-2.)

Dubuque silt loam, 12 to 20 percent slopes, moderately eroded (DbD2).—This soil differs from Dubuque silt loam, 20 to 30 percent slopes, in being less steep but more eroded. Care is needed to prevent further erosion that would expose the underlying red silty clay loam and clay. If it is well managed, this soil is moderately productive, but it is not suited to intensive tillage. (Capability unit IVe-2.)

Dubuque silt loam, 20 to 30 percent slopes, moderately eroded (DbE2).—Except that this soil is moderately eroded, it is similar to Dubuque silt loam, 20 to 30 percent slopes. If it is necessary to cultivate this soil to renovate areas used for hay or pasture, care is needed to prevent further erosion. (Capability unit VIe-1.)

Dubuque silt loam, 30 to 45 percent slopes (DbF).—This soil is steeper than Dubuque silt loam, 20 to 30 percent slopes, and has a subsoil that is thinner and less well developed. Generally, the slopes are too steep and stony for pasture renovation; consequently, yields of pasture are low. Much of this soil is best used to grow trees. When it is used for that purpose, however, it must be managed carefully and protected from grazing. (Capability unit VIIe-1.)

Dubuque soils, 12 to 20 percent slopes, severely eroded (DcD3).—Erosion has caused nearly all of this mapping unit to lose its surface layer of silt loam, and spots of silty clay loam have been exposed. Because of the resulting intricate pattern of textural classes, the areas have been mapped as Dubuque soils. They are difficult to cultivate and are best kept in sod-forming crops, such as renovated pasture, most of the time. (Capability unit VIe-1.)

Dubuque soils, 20 to 30 percent slopes, severely eroded (DcE3).—Because of severe erosion, the surface layer in part of this mapping unit is silty clay loam, and in the rest it is silt loam. The areas are hard to cultivate, and it is best to keep them in sod as much of the time as feasible. Moderate yields of hay and pasture can be obtained if the soils are well managed. Lime and fertilizer are required. The areas need to be renovated. (Capability unit VIIe-1.)

Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded (DdD2).—This extensive soil is on rounded ridges. The surface layer is very dark grayish-brown silt loam that is 4 to 8 inches thick. The subsoil, at depths of 20 to 42 inches, is yellowish-brown to brown silt loam in the upper part and reddish-brown to yellowish-red clay in the lower part. The clay generally is several feet deep; in places it contains numerous fragments of chert that become larger and more numerous with increasing depth.

This soil requires careful use of practices to prevent further erosion. It is moderately productive if it is well managed. (Capability unit IVe-1.)

Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded (DdB2).—Except that this soil has milder slopes, it is similar to Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded. It is a more desirable soil for agriculture and is highly productive if it is well managed. (Capability unit IIe-1.)

Dubuque silt loam, deep, 6 to 12 percent slopes, moderately eroded (DdC2).—This soil can be used for row crops and small grains more frequently than Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded. Practices are needed to protect it from erosion. If fertilizer is added and other good management practices are used, crops on this soil produce moderately high yields. (Capability unit IIIe-1.)

Dubuque silt loam, deep, 12 to 20 percent slopes (DdD).—Except for having a thicker surface layer and more silt over the underlying red clay, this soil is similar to Dubuque silt loam, 12 to 20 percent slopes, moderately eroded. This is a productive soil, but it requires careful management to prevent erosion. (Capability unit IVe-1.)

Dubuque silt loam, deep, 20 to 30 percent slopes (DdE).—Except that this soil occupies steeper slopes and is less eroded, it is similar to Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded. Its use is limited mainly to hay crops or pasture. This soil is highly productive, if it is well managed, but it needs fertilizer. Pastures and the areas used for hay must be renovated frequently. (Capability unit VIe-1.)

Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded (DdE2).—This soil is steeper and is more subject to erosion, but it is otherwise similar to Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded. Moderately high yields of hay and pasture can be obtained if good management is used. Fertilizer is required for best yields. The pastures and areas used for hay must be renovated frequently. (Capability unit VIe-1.)

Dubuque soils, deep, 12 to 20 percent slopes, severely eroded (DeD3).—This soil is so severely eroded that the heavy silty clay loam is exposed in places. Because of the resulting variation in the texture of the surface soil, the areas have been mapped as Dubuque soils. These soils are difficult to cultivate, and seedbeds are hard to prepare. Therefore, their use is limited chiefly to pasture and hay crops. (Capability unit VIe-1.)

Dubuque soils, deep, 20 to 45 percent slopes, severely eroded (DeF3).—Most of this mapping unit has slopes of 20 to 30 percent, but there are some small areas that have slopes of 30 to 45 percent that are somewhat less eroded. The surface texture is more variable, and the soils are stonier than the less eroded and less sloping deep phases of Dubuque silt loams. Because of the severe erosion and steep slopes, the use of these soils is limited to permanent pasture or to trees planted for timber. (Capability unit VIIe-1.)

Fayette Series

The Fayette soils are light colored and are deep and well drained. They occur on ridges throughout the county and on the upper slopes of many coulees below escarpments of sandstone or dolomite. They have formed in thick deposits of windblown silt (loess) on slopes that range from 2 to 40 percent. Generally, the slopes of the ridges are between 12 and 20 percent, and those on the upper valleys are between 20 and 30 percent. The Fayette soils are acid to a depth of 5 feet or more, unless they have been limed.

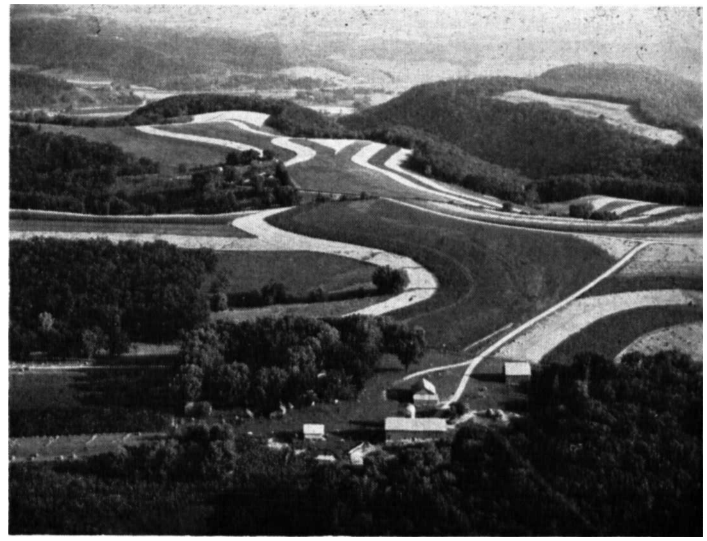

Figure 29.—**Typical landscape of Fayette and Dubuque soils under cultivation.**

These soils occur with the Dubuque and Gale soils. The parent material of the Dubuque and Gale soils, however, is dolomite (lime rock) and sandstone, respectively, rather than loess. Figure 29 shows a typical landscape of Fayette and Dubuque soils.

The soils on the upper valley slopes differ from the soils on the upland ridges in having a somewhat lighter textured subsoil that has less structural development and in containing a greater number of fragments of sandstone and limestone. Consequently, two topographic phases are recognized—uplands and valleys—within the soil type. Figure 30 shows a profile typical of Fayette silt loam, valleys.

Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded (FaD2).—This is the most extensive of the Fayette soils. It is on moderately steep slopes, where it erodes readily.

The surface soil is dark grayish-brown, friable silt loam that is 5 to 7 inches thick. The subsoil extends from a depth of 7 to about 40 inches and is brown or yellowish-brown, firm silty clay loam. Below this, the soil grades to less weathered loess. The loess is several feet thick in places and is calcareous at depths of 6 to 8 feet.

Because of its moderately steep slopes and moderate erosion, this soil is severely limited in its use for crops. Intensive measures are needed to prevent further erosion. Nevertheless, the soil holds moisture well. High yields can be obtained if the soil is well managed. (Capability unit IVe-1.)

Fayette silt loam, uplands, 2 to 6 percent slopes (FaB).—Except for its milder slopes, this soil is similar to Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded. It occurs near the tops of the broader, loess-covered ridges.

Figure 30.—**A typical profile of Fayette silt loam, valleys. Photograph by courtesy of La Crosse Tribune.**

This deep, silty soil is among the most desirable for agriculture of the upland soils in the county. Its capacity for storing moisture is excellent, and when well managed the soil is highly productive. Although the slopes are mild, the soil is subject to erosion from runoff, and practices are needed to prevent further losses of soil. (Capability unit IIe–1.)

Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded (FaB2).—This soil differs from Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded, in having milder slopes. It is, therefore, less likely to erode. In addition, it has a somewhat deeper subsoil that is slightly mottled in places at depths below 36 inches. This soil occurs near the tops of broad, rounded ridges. If it is well managed, it is highly productive. (Capability unit IIe–1.)

Fayette silt loam, uplands, 6 to 12 percent slopes (FaC).—This soil differs from Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded, in being less steep and less eroded. In addition, it has thicker surface and subsoil layers. If it is well managed, it is highly productive, but it requires practices to prevent further erosion. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded (FaC2).—This soil is on milder slopes and is less subject to erosion; otherwise, it is similar to Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded. If practices are used to prevent erosion and if the fertility is kept at a high level, this soil is well suited to crops and is highly productive. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 12 to 20 percent slopes (FaD).—Except for having a thicker surface layer, this soil is similar to Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded. Most of it has been covered by timber or used for pasture and is only slightly eroded. Nevertheless, because of its steep slopes, it is severely limited in its use for crops. If it is used for crops, intensive practices are needed to prevent erosion. High yields can be obtained if fertility is kept at a high level and other good management is used. (Capability unit IVe–1.)

Fayette silt loam, uplands, 20 to 30 percent slopes (FaE).—This soil differs from Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded, in that it is steeper and less eroded. It also has a slightly thicker surface layer. Yields of hay or pasture are moderately high if the soil is well managed and the areas are renovated frequently. (Capability unit VIe–1.)

Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded (FaE2).—This soil differs from Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded, in that it is steeper and generally has a thinner surface layer and subsoil. It is too steep for cultivation. If the areas can be fertilized and otherwise renovated, moderately high yields of hay and pasture can be obtained. The soil needs to be kept under a good cover of vegetation. Otherwise, much of the water from rain and snow runs off, and crops, especially pasture, burn up. For best yields and to prevent further erosion, pastures and woodlands must be managed carefully. (Capability unit VIe–1.)

Fayette silt loam, uplands, 30 to 40 percent slopes (FaF).—Much of this soil is in timber, which is its best use. It is too steep for pastures to be renovated; consequently, yields of pasture are low. Areas under timber need protection from grazing. (Capability unit VIIe–1.)

Fayette soils, uplands, 12 to 20 percent slopes, severely eroded (FbD3).—Erosion has removed much of the surface layer of this soil and, in most places, part of the subsoil. As a result, the texture of the surface layer varies. This soil can be reclaimed and will give high yields of hay and pasture if it is well managed. It will always be more susceptible to erosion than the uneroded Fayette soils and should be cultivated only if necessary. (Capability unit VIe–1.)

Fayette soils, uplands, 20 to 30 percent slopes, severely eroded (FbE3).—Erosion has removed most of the original surface layer of this soil and part of the subsoil. As a result, the texture of the surface soil varies. Practices are needed to prevent further erosion. If erosion is controlled and other desirable management practices are used, good yields of permanent pasture or timber can be obtained. (Capability unit VIIe–1.)

Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded (FcE2).—This steep soil is the most extensive of the Fayette soils on valley slopes. The surface layer is dark grayish-brown, friable, granular silt loam, 4 to 8 inches thick. When dry, it is light brownish gray. The subsoil, a brown to yellowish-brown, friable, heavy silt loam, is at depths between 8 and approximately 28 inches. Below this is yellowish-brown silt loam. In most places sandstone occurs below the silt loam at depths of 42 inches to several feet. Fragments of sandstone are

Figure 31.—**Fayette silt loam, valleys, in the foreground with Rough broken land and rock land on the timbered areas in the background.**

scattered throughout the soil. Figure 31 shows a typical landscape in which this soil occurs.

This soil is on slopes too steep to cultivate. When fertilizer is added and the soil is well managed otherwise, high yields of hay or pasture can be obtained. The capacity for storing moisture is high, and the soil receives runoff from the uplands. The runoff water increases the hazard of erosion. Consequently, if the soil is used for hay or pasture, it should have a cover of sod or a cover crop. In addition, diversion ditches are needed in some places to control runoff and to aid in preventing further erosion. (Capability unit VIe–1.)

Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded (FcC2).—This soil differs from Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded, in being less steep and in having a slightly deeper subsoil. The slopes are mild enough so that corn and similar crops can be grown if practices are used to control erosion. Although the runoff received from upland soils is an advantage in dry years, it also adds to the hazard of erosion. This soil is highly productive if it is protected from erosion, kept at a high level of fertility, and otherwise well managed. (Capability unit IIIe–1.)

Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded (FcD2).—This soil differs from Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded, in having milder slopes and a slightly deeper subsoil. It is suitable for crops if measures are used to control erosion. This soil is highly productive if fertilizer is added and if it is well managed otherwise. (Capability unit IVe–1.)

Fayette silt loam, valleys, 20 to 30 percent slopes (FcE).—This soil differs from Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded, in being less eroded. It can be used and managed in the same way. (Capability unit VIe–1.)

Fayette silt loam, valleys, 30 to 40 percent slopes, moderately eroded (FcF2).—This soil differs from Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded, in having steeper slopes. It is not extensive in La Crosse County. Because of the steep slopes, use of the soil is limited to pasture or timber. The yields are good if the soil is well managed. (Capability unit VIIe–1.)

Fayette soils, valleys, 12 to 20 percent slopes, severely eroded (FdD3).—This soil differs from Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded, chiefly in having a thinner surface layer. Less than 4 inches of the original surface layer remains, and in some places part of the subsoil has been lost. As a result, the texture of the surface soil varies.

This mapping unit is not suited to continuous use for cultivated crops, but it is suitable for hay or pasture. The hay or pasture will help improve the tilth of the surface soil and will aid in preventing further loss of soil. Diversion ditches for control of runoff water are needed in some places. If erosion is controlled and this soil is well managed otherwise, it will give high yields of hay or pasture. (Capability unit VIe–1.)

Fayette soils, valleys, 20 to 30 percent slopes, severely eroded (FdE3).—This mapping unit differs from Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded, chiefly in the depth and texture of the surface layer. More than 75 percent of the original surface layer has been lost through erosion, and the subsoil has been mixed with the remaining surface soil. Care is needed to prevent further erosion. Construction of diversion ditches, good management of pastures, and planting the areas to trees will aid in controlling erosion. (Capability unit VIIe–1.)

Gale Series

The Gale series consists of silty, light-colored soils that are well drained. The soils are in the uplands, mostly north of the La Crosse River. They generally have slopes of 12 to 30 percent, but in some small areas the slopes are less steep or are steeper.

The silty surface layer and the upper part of the subsoil have formed from windblown silt that was deposited over sandstone. The underlying sand or weathered sandstone is at depths below 20 to 42 inches.

These soils occur in association with the Hixton soils. They are similar to these associated soils, except that the Hixton soils have formed either from sandstone or from sandy shale. The Gale and Hixton soils are intermingled in some areas, and some of them have been mapped as Gale-Hixton complexes. The Hixton soils are described elsewhere in the report.

Gale silt loam, 20 to 30 percent slopes, moderately eroded (GaE2).—This steep soil is the most extensive of the Gale soils. The surface soil is friable, dark-brown silt loam, 4 to 7 inches thick; it is acid unless lime has been applied. The subsoil is brown, friable, heavy silt loam to depths of 20 to 30 inches. Below the subsoil is loam or sandy loam that overlies sand or sandstone.

Because of the severe hazard of erosion, this soil is best used for hay or pasture. It erodes rapidly. If gullies penetrate to the sandy subsoil, they are hard to control. This soil is moderately productive if it is protected from erosion and is well managed otherwise. (Capability unit VIe–1.)

Gale silt loam, 2 to 6 percent slopes (GaB).—Except for having milder slopes and a thicker surface soil and subsoil, this soil is similar to Gale silt loam, 20 to 30 percent slopes, moderately eroded. It can be cultivated intensively if practices are used to protect it from erosion. Crops on this soil produce moderately high yields if good management is used. (Capability unit IIe–1.)

Gale silt loam, 6 to 12 percent slopes, moderately eroded (GaC2).—This soil is less steep and has a thicker subsoil, but otherwise is similar to Gale silt loam, 20 to 30 percent slopes, moderately eroded. It is well suited to cultivated crops if practices are used to protect it from erosion. Moderately high yields are obtained if the soil is well managed. (Capability unit IIIe–2.)

Gale silt loam, 12 to 20 percent slopes (GaD).—Except for its milder slopes and thicker surface layer, this soil is similar to Gale silt loam, 20 to 30 percent slopes, moderately eroded. It is limited in its suitability for crops and requires the use of intensive practices to prevent erosion. The capacity for storing moisture is fairly high, and the soil is moderately productive if it is well managed. Nevertheless, crops may be damaged during prolonged droughts. (Capability unit IVe–2.)

Gale silt loam, 12 to 20 percent slopes, moderately eroded (GaD2).—Except for having less steep slopes, this soil is similar to Gale silt loam, 20 to 30 percent slopes, moderately eroded. This soil is likely to erode. When the surface soil is lost, the moisture-storage capacity is lowered; also, if gullies erode to the sandy layer, they are hard to control. This soil is limited in its suitability for crops, and intensive practices are needed to prevent further erosion. In normal years this soil is moderately productive, but during periods of prolonged drought crops may be damaged. (Capability unit IVe–2.)

Gale silt loam, 20 to 30 percent slopes (GaE).—This soil is too steep for tilled crops, but it can be used for hay or pasture. It is moderately productive if the pastures and hayfields are renovated. Fertilizer is needed, and other good management is required. (Capability unit VIe–1.)

Gale silt loam, 20 to 30 percent slopes, severely eroded (GaE3).—This soil is shallower over sand or sandstone; otherwise, it is similar to Gale silt loam, 20 to 30 percent slopes, moderately eroded. It has lost nearly all, or all, of the original surface soil. In some places part of the subsoil has been lost. This soil is best suited to permanent pasture or to timber. (Capability unit VIIe–1.)

Gale silt loam, 30 to 60 percent slopes (GaF).—Although this soil is on steeper slopes, it is less eroded than Gale silt loam, 20 to 30 percent slopes, moderately eroded. Much of it is already in timber or in permanent pasture, and these are its best uses. It is especially well suited to timber. (Capability unit VIIe–1.)

Gale silt loam, 30 to 60 percent slopes, moderately eroded (GaF2).—Except for having a somewhat thinner surface layer and outcroppings of bedrock in places, this soil is similar to Gale silt loam, 20 to 30 percent slopes, moderately eroded. It is best suited to timber and to permanent pasture. Because of the steep slopes, the pastures are hard to renovate, and they generally produce low yields. (Capability unit VIIe–1.)

Gale-Hixton Complexes

Gale-Hixton complex, 30 to 60 percent slopes (GbF).—This complex is made up of Gale and Hixton sandy loams. The areas are mostly timbered and have little or no erosion.

This complex has characteristics of both the Gale and Hixton sandy loams, but it has gradations between the typical profiles described for the two soil types. Its use is limited to pasture or timber, but generally it is best used for timber. Because of the steep slopes, the pastures are hard to renovate and yields are low. (Capability unit VIIe–1.)

Gale-Hixton complex, 2 to 6 percent slopes (GbB).—This complex is more nearly level and has a thicker surface soil and subsoil but is otherwise similar to Gale-Hixton complex, 30 to 60 percent slopes. A few included areas have been moderately eroded. This complex is well suited to crops, and moderate yields are obtained if the soils are well managed. In dry years, however, crops are sometimes damaged by lack of moisture. (Capability unit IIe–1.)

Gale-Hixton complex, 6 to 12 percent slopes, moderately eroded (GbC2).—This complex is less sloping than Gale-Hixton complex, 30 to 60 percent slopes, and is moderately eroded. The areas are suitable for tilled crops, but they require practices to protect them from erosion. Moderate yields are obtained if the soils are well managed, but crops are sometimes damaged during periods of prolonged dry weather. (Capability unit IIIe–2.)

Gale-Hixton complex, 12 to 20 percent slopes (GbD).—This complex is on milder slopes but is otherwise similar to Gale-Hixton complex, 30 to 60 percent slopes. The soils are suited to cultivation, but it is best to use them for row crops only when practices are applied to protect them from erosion. Normally, the yields are moderately low, even when the soils are well managed. In dry years, however, yields are severely limited. (Capability unit IVe–2.)

Gale-Hixton complex, 12 to 20 percent slopes, moderately eroded (GbD2).—This complex is more eroded and has slopes that are less steep, but it is otherwise similar to Gale-Hixton complex, 30 to 60 percent slopes. If these areas are used for crops, practices are needed to prevent further erosion. The yields are moderately low, even if the soils are well managed. (Capability unit IVe–2.)

Gale-Hixton complex, 20 to 30 percent slopes (GbE).—Although the slopes are slightly less steep, this complex is otherwise similar to Gale-Hixton complex, 30 to 60 percent slopes. It is better suited to pasture than the complex on steeper slopes, but it is not suited to tilled crops. The pastures in many areas can be improved by renovating them. (Capability unit VIe–1).

Gale-Hixton complex, 20 to 30 percent slopes, moderately eroded (GbE2).—Except for having less steep slopes, more erosion, and slightly thinner layers, this complex is similar to Gale-Hixton complex, 30 to 60 percent slopes. The areas are best suited to permanent pasture or timber. Many of the pastures can be improved by renovating them. (Capability unit VIe–1.)

Gale-Hixton complex, 20 to 30 percent slopes, severely eroded (GbE3).—This complex has lost all, or nearly all, of the original surface soil through erosion. The areas are best protected from further erosion by planting grass or trees and managing them carefully. (Capability unit VIIe–1.)

Gale-Hixton complex, 30 to 60 percent slopes, moderately eroded (GbF2).—This complex is more eroded but is otherwise similar to Gale-Hixton complex, 30 to 60 percent slopes. To help prevent further erosion, timber or pasture on these areas will need to be managed carefully. (Capability unit VIIe–1.)

Gale-Hixton complex, 30 to 60 percent slopes, severely eroded (GbF3).—This complex should be protected by replanting it to trees wherever feasible. The areas should be fenced to prevent grazing and should be used only for timber. (Capability unit VIIe-1.)

Gotham Series

The soils of the Gotham series are deep and sandy. Their capacity for storing moisture is low, and they are low in natural fertility. The soils are on the terraces of the larger streams. Most of the areas are fairly level, but, in some, the wind has blown the soil into low ridges.

These soils occur in association with the Plainfield and Sparta loamy fine sands. Their surface layer is intermediate in color between that of the Plainfield and Sparta loamy fine sands, and the subsoil is slightly heavier and more compact.

Gotham loamy sand, 0 to 2 percent slopes (GcA).—This is the most extensive of the Gotham soils in the county. It has been affected only slightly by wind erosion.

The surface soil is very dark grayish-brown loamy sand or heavy loamy sand, 6 to 10 inches thick. The subsoil extends to a depth of about 24 inches and is brown, heavy loamy sand that is compact in place. Below this is several feet of yellowish-brown sand.

The low moisture-storing capacity, sandy texture, and low natural fertility of this soil limit its use for agriculture. In addition, it needs to be protected from wind erosion. During seasons when rainfall is below normal or is poorly distributed throughout the growing season, yields of crops are especially low. (Capability unit IVs-1.)

Gotham loamy sand, 2 to 6 percent slopes (GcB).—This soil is on slightly steeper slopes but is similar to Gotham loamy sand, 0 to 2 percent slopes. It can be used and managed in the same way. (Capability unit IVs-1.)

Gotham loamy sand, 2 to 6 percent slopes, eroded (GcB1).—This soil has been eroded more than Gotham loamy sand, 0 to 2 percent slopes. In many places the surface and subsoil layers are thinner, and this soil is generally sandier. In some places the wind has blown in soil materials from other areas and has deposited them on this soil. (Capability unit IVs-1.)

Gotham loamy sand, 6 to 12 percent slopes, eroded (GcC1).—This soil is steeper and more eroded than Gotham loamy sand, 0 to 2 percent slopes. It has thinner surface and subsoil layers, and, as a rule, the surface soil is slightly sandier. This soil has a very low moisture-storing capacity. If it is used for cultivated crops, the hazard of erosion from wind and water is serious. (Capability unit IVs-1.)

Gullied Land

Gullied land (Gd).—This mapping unit consists of areas that have deep gullies that are eroding or that have been controlled only recently. The soil material ranges from silty to sandy in texture.

The gullies need to be fenced to prevent grazing by livestock and should be reseeded to grass or planted to trees (fig. 32). It may be necessary to slope the banks and install a large metal pipe in the upper end of some of the larger gullies. In this way runoff water will be carried to the bottom of the gully and will be prevented from making the gully larger and deeper. This practice is particularly needed where the gully is cutting into good cropland or toward buildings. For information on the design and installation of such a pipe, consult an agricultural engineer. (Capability unit VIIe-1.)

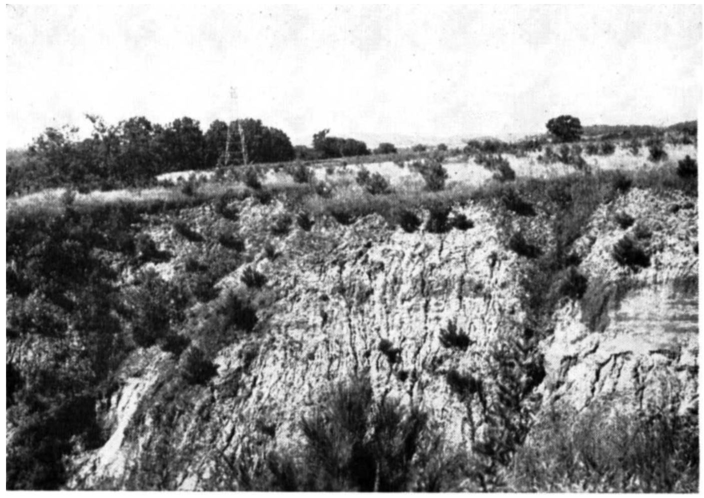

Figure 32.—A large gully that has been planted to trees. The trees will aid in controlling the gully and will provide wood for the farmer and cover for wildlife.

Hesch Series

The Hesch series consists of dark-colored sandy loams that have formed on the slopes below steep bluffs of Rough broken land and rock land. The soils generally receive some runoff from the steeper slopes above them. Consequently, deep deposits of stratified sandy material have accumulated on them in many places. These soils are similar to the Hixton soils, but they have a darker surface layer and are almost entirely on valley slopes rather than on upland ridges. Generally, only the soils of the Hesch series that are on upland ridges require lime.

Hesch sandy loam, 6 to 12 percent slopes, moderately eroded (HaC2).—Most of this soil is on slopes below steeper areas of Rough broken land and rock land. It generally receives large amounts of sediments from the water that runs off these higher lying areas.

The surface layer is very dark brown, heavy sandy loam, 8 to 16 inches thick. The subsoil is very dark brown to brown sandy loam or loam that is layered or stratified in many places. It generally extends to depths of 28 to 48 inches and contains fragments of sandstone. Below the subsoil, at depths of 4 feet or more, there is sandstone that is weathered in places.

This soil is moderately productive when well managed, but it needs protection from runoff. In many places diversion terraces or waterways are needed. (Capability unit IIIs-2.)

Hesch sandy loam, 2 to 6 percent slopes, moderately eroded (HaB2).—Except for milder slopes and, generally, greater depth to sandstone, this soil is similar to Hesch sandy loam, 6 to 12 percent slopes, moderately eroded.

Unless measures are used to protect it from runoff, it will become more eroded. (Capability unit IIIs–1.)

Hesch sandy loam, 12 to 20 percent slopes, moderately eroded (HaD2).—This soil differs from Hesch sandy loam, 6 to 12 percent slopes, moderately eroded, in being steeper, sandier, thinner over sandstone, and more easily eroded. If it is used for crops, it needs to be protected from runoff from the adjacent higher slopes and it should be kept in sod-forming crops most of the time. (Capability unit IVs–1.)

Hesch sandy loam, 20 to 30 percent slopes, moderately eroded (HaE2).—This soil is shallower and sandier and contains more fragments of sandstone, but otherwise is similar to Hesch sandy loam, 6 to 12 percent slopes, moderately eroded. It is too steep for tilled crops. In some places it is suitable for pasture and can be renovated along with adjacent areas. (Capability unit VIs–1.)

Hixton Series

The soils of the Hixton series are light-colored sandy loams and loamy sands that are well drained and occur on uplands. They vary in their depth to the underlying sandstone.

These soils are similar to the Gale soils, but they do not have a cap of silt over the sandy material. In some places the Gale and Hixton soils are intermingled and have been mapped as Gale-Hixton complexes.

The Hixton loamy sands are similar to the Boone sands, but they have a finer textured, more coherent subsoil. Where the soils of these two series are intermingled, they have been mapped as Boone-Hixton complexes.

Hixton sandy loam, 30 to 60 percent slopes (HbF).—This is the most extensive Hixton soil in the county. Most of it is under timber, and, consequently, it is little eroded.

The surface soil is dark grayish-brown, friable sandy loam, 6 to 8 inches thick. The subsoil, a brownish sandy loam, is at depths between 12 and 36 inches. Below this, the soil material grades to sand and weathered sandstone.

This soil is steep and is best suited to timber. The stands can be improved by good management. (Capability unit VIIs–1.)

Hixton sandy loam, 2 to 6 percent slopes (HbB).—Except for having milder slopes, this soil is similar to Hixton sandy loam, 30 to 60 percent slopes. Normally, the yields of crops are moderately low. In years of low rainfall, or if rain is poorly distributed throughout the growing season, crops may be damaged by lack of moisture. (Capability unit IIIs–1.)

Hixton sandy loam, 2 to 6 percent slopes, moderately eroded (HbB2).—Except for its milder slopes and greater erosion, this soil is similar to Hixton sandy loam, 30 to 60 percent slopes. It needs protection from further erosion. In years of low rainfall or when rainfall is poorly distributed throughout the growing season, crops may be damaged by lack of moisture. (Capability unit IIIs–1.)

Hixton sandy loam, 6 to 12 percent slopes, moderately eroded (HbC2).—This soil is on milder slopes than Hixton sandy loam, 30 to 60 percent slopes, but it is generally more eroded. If it is protected from erosion, it can be used for crops. The yields of crops are generally low. (Capability unit IIIs–2.)

Hixton sandy loam, 12 to 20 percent slopes (HbD).—The soil differs from Hixton sandy loam, 30 to 60 percent slopes, in being less steep and in having a thicker subsoil in most places. Before it is used for crops, it must be protected from erosion. The yields of crops are low. In years when there is little rainfall, crops may be damaged by lack of moisture, particularly when the plants are numerous and close growing. (Capability unit VIs–1.)

Hixton sandy loam, 12 to 20 percent slopes, moderately eroded (HbD2).—This soil differs from Hixton sandy loam, 30 to 60 percent slopes, in being less steep and more eroded and in having a subsoil that is generally thicker. If it is protected from erosion, it can be used for crops requiring tillage. The yields are low. Capability unit VIs–1.)

Hixton sandy loam, 12 to 20 percent slopes, severely eroded (HbD3).—This soil is less steep but is shallower than Hixton sandy loam, 30 to 60 percent slopes. To protect it from further erosion, it should be used for permanent pasture or planted to trees. (Capability unit VIs–1.)

Hixton sandy loam, 20 to 30 percent slopes (HbE).—This soil is better suited to pasture than the steeper Hixton soils. It is also suitable for producing timber, and much of it is already in forest. (Capability unit VIs–1.)

Hixton sandy loam, 20 to 30 percent slopes, moderately eroded (HbE2).—This soil is less steep than Hixton sandy loam, 30 to 60 percent slopes, but it is more eroded. To help prevent further erosion, it is best to use this soil for pasture or timber. (Capability unit VIs–1.)

Hixton sandy loam, 20 to 30 percent slopes, severely eroded (HbE3).—This soil is slightly less steep but is more eroded and is shallower than Hixton sandy loam, 30 to 60 percent slopes. It needs to be planted to trees or reseeded to grass that will protect it from further erosion. (Capability unit VIIs–1.)

Hixton sandy loam, 30 to 60 percent slopes, moderately eroded (HbF2).—This soil differs from Hixton sandy loam, 30 to 60 percent slopes, in being more eroded and shallower and in having more outcrops of rock. It is best suited to timber. (Capability unit VIIs–1.)

Hixton sandy loam, 30 to 60 percent slopes, severely eroded (HbF3).—This steep, shallow soil has many outcrops of rock; if left bare, it will wash or blow readily. Replanting to trees, wherever feasible, and protecting the areas from grazing will help to prevent further erosion. (Capability unit VIIs–1.)

Huntsville Series

The Huntsville series consists of deep, dark-colored, silty soils that are neutral in reaction. The soils are moderately well drained to well drained. They occur along the larger streams, particularly just below the bluffs along the Mississippi River. The soils belong to the Alluvial great soil group. They have formed from silty alluvium that was deposited on the broader flood plains. During periods of high runoff, the soils are flooded.

In La Crosse County only one soil type of this series, Huntsville silt loam, is recognized, and the soils of that type are not mapped separately. They are mapped with the Lawson soils in two undifferentiated groups of soils consisting of Lawson and Huntsville silt loams. Huntsville soils are also mapped in an undifferentiated group consisting of Arenzville, Orion, and Huntsville soils.

Jackson Series

The Jackson soils have formed from the same kind of materials as the Bertrand and Curran soils. They are better drained than the Curran soils but are not so well drained as the Bertrand. The Jackson soils are not extensive in La Crosse County.

Jackson silt loam, (Ja).—This deep, silty, light-colored soil is on the terraces of streams throughout the county. Generally, it has poor surface drainage, is slightly wet, and is somewhat slow to warm in spring.

The surface layer is very dark grayish-brown, friable silt loam that is about 11 inches thick. The subsoil is brown silty clay loam, mottled in the lower part with yellowish brown and reddish brown, and it extends to a depth of about 40 inches. The substratum is a mottled silt loam and is generally several feet thick.

This soil is highly productive if it is well managed. Some areas require drainage to remove excess surface water. (Capability unit I–1.)

Judson Series

The Judson series is made up of deep, dark-colored soils that are on fans and in draws along drainageways. Most of the areas are small, but they are widely distributed throughout the county. The soils have formed under prairie grasses in deposits brought down by water and gravity from the uplands. Runoff from the uplands continually leaves fresh deposits of soil material on these soils. The surface layer is 2 or more feet deep in places and has a high content of organic matter. These soils are similar to the Chaseburg soils, but the Chaseburg soils have formed under forest and are lighter colored throughout. They are mapped with Chaseburg soils in two undifferentiated soil groups of Chaseburg and Judson silt loams.

The Judson soils are flooded during periods of heavy runoff. The water does not stand on the soil for long periods but drains downward readily through the profile. The frequency of flooding varies from place to place.

Judson silt loam, 2 to 6 percent slopes (JbB).—This soil is on gentle slopes, but it is flooded occasionally. The surface layer ranges from very dark brown to black and is 18 to 42 inches thick. It is granular and is very friable to a depth of about 24 inches, but at greater depths it is firmer. Below depths of 30 to 40 inches, there are yellowish-brown or grayish mottles in places. A few small lenses of sandy material occur in places throughout the profile.

The surface soil has a high content of organic matter. It is naturally high in plant nutrients, especially nitrogen, and seldom needs lime. When the soil is cropped intensively, however, the supply of plant nutrients is reduced and manure and commercial fertilizer will be needed. This soil is one of the most productive in the county, but it requires protection from overflow. (Capability unit IIe–2.)

Judson silt loam, 0 to 2 percent slopes (JbA).—This soil is more nearly level but is generally similar to Judson silt loam, 2 to 6 percent slopes. It is highly productive if it is well managed, but overflow is a hazard in some places. Diversion ditches, terraces, grassed waterways, or dikes generally are needed to control runoff. This soil can be cropped intensively if it is protected from overflow. (Capability unit I–1.)

Judson silt loam, 6 to 12 percent slopes (JbC).—This soil differs from Judson silt loam, 2 to 6 percent slopes, chiefly in that it is on steeper slopes and in narrower draws and drainageways. Also, the hazard of overflow is greater. This soil will erode if it is cultivated, unless the floodwaters are diverted or controlled. (Capability unit IIIe–3.)

Lawson Series

The soils of the Lawson series are deep and dark colored. They are neutral in reaction and are somewhat poorly drained. These soils belong to the Alluvial great soil group. They occur with soils of the Huntsville series. The soils of both series have formed in silty alluvium, but the Lawson soils are less well drained than the Huntsville and the lower part of their profile is less brown. In this county the Lawson and Huntsville silt loams are mapped together as undifferentiated groups of soils.

Lawson and Huntsville Soils

Lawson and Huntsville silt loams (La).—This undifferentiated group of soils is made up of Lawson and Huntsville silt loams. The soils do not occur in a consistent pattern, nor is the proportionate distribution the same in all areas.

The surface layer of the Lawson soils is black to very dark grayish-brown silt loam that has a weak, granular structure. At depths of 15 to 20 inches, the soil is very dark gray, structureless silt loam, which in most places has a few dark mottles. At depths of 30 to 40 inches, the soil is very dark gray to grayish-brown silt loam to heavy loam mottled with reddish brown, yellowish brown, or gray. This material grades to stratified silt loam and sandy loam with increasing depth.

The Huntsville soils are very dark brown and have a weak, fine, granular to weak, subangular blocky structure. The color ranges from very dark brown through dark brown to very dark gray with increasing depth. In most places there are reddish-brown mottles at a depth of about 40 inches. The texture of the substratum ranges from silt loam to silty clay loam or sandy loam. Lenses of fine sand or sand become more numerous with increasing depth. The soil is neutral or slightly acid throughout.

Because of overflow, this undifferentiated group of soils is cold in spring and warms slowly. This is particularly true of the Lawson soil. When well managed, the soils are highly productive. (Capability unit IIw–2.)

Lawson and Huntsville silt loams, sandy substrata (Lb).—This undifferentiated group of soils is underlain by sand at depths between 28 and 36 inches; otherwise, it is similar to Lawson and Huntsville silt loams. It occurs in a large area northwest of Midway. If the soils are well managed, they are highly productive, but they are slightly wet in spring. (Capability unit IIw–2.)

Marsh

Marsh (Ma).—This mapping unit is made up of mineral and organic soil materials that generally are intermingled. The areas are wet. They are along the Black, La Crosse, and Mississippi Rivers. The vegetation consists of rushes, sedges, cattails, and other plants that tolerate water. This mapping unit is best used for wildlife. (Capability unit VIIIw-1.)

Medary Series

The soils of the Medary series have a silty surface soil and are underlain by dense, reddish-brown clay at shallow depths. They occupy small areas that are mostly on the slightly rounded slopes of stream terraces. The soils occur with soils of the Bertrand and Zwingle series. They have better surface drainage than the more nearly level Zwingle soils and a heavier subsoil than the Bertrand.

In some places most of the silt cap has been lost from the Medary soils, and in these the underlying reddish clay has been mixed with the surface layer by plowing. Here, the soil is heavier and more difficult to till than the normal soil.

Medary silt loam, 0 to 2 percent slopes (MbA).—This is the most extensive Medary soil in the county. It occurs mostly near the edges of terraces, where surface drainage is better than in the soils farther back.

The surface layer is brown, heavy silt loam that is about 6 inches thick. Just below this, to depths of about 40 inches, is reddish-brown heavy silty clay loam that is transitional to underlying clay. The clay is brown and generally is several feet thick.

When well managed, this soil is moderately productive for long periods, but it requires surface drainage. (Capability unit IIe-3.)

Medary silt loam, 2 to 7 percent slopes (MbB).—This soil has steeper and more convex slopes, less silt over the red clay, and better surface drainage than Medary silt loam, 0 to 2 percent slopes. Because the silt cap is thinner, tillage is more difficult than for Medary silt loam, 0 to 2 percent slopes. A good seedbed is, therefore, more difficult to prepare. (Capability unit IIe-3.)

Meridian Series

The soils of the Meridian series are moderately deep sandy loams or loams that are light colored and well drained. They occur on the terraces of the larger streams throughout the county. These soils are associated with the sandy soils of the Dakota, Gotham, Plainfield, and Sparta series. They are lighter colored than the Dakota soils and have a heavier texture than the Gotham, Plainfield, and Sparta soils. In this county the Meridian loams are intermingled with the Waukegan silt loams, and the soils of these two series have been mapped as Meridian-Waukegan complexes.

Meridian sandy loam, 2 to 6 percent slopes (McB).—This is the most extensive of the Meridian soils in the county. Most of it is on short, undulating slopes.

The surface layer is very dark grayish-brown to dark-brown sandy loam that is about 9 inches thick. The subsoil is dark-brown sandy loam or loam to depths between 20 and 30 inches. Below this is variegated brown and yellowish-brown sand that is several feet thick.

Crops on this soil will make moderately low yields. During dry years or years when rainfall is poorly distributed throughout the growing season, they are damaged by lack of moisture. This soil needs protection from wind erosion, especially at planting time. (Capability unit IIIs-1.)

Meridian sandy loam, 0 to 2 percent slopes (McA).—This soil differs from Meridian sandy loam, 2 to 6 percent slopes, in being more nearly level. The hazard of erosion by wind and water is, therefore, less severe than in the more sloping soil. (Capability unit IIIs-1.)

Meridian sandy loam, 2 to 6 percent slopes, moderately eroded (McB2).—This soil differs from Meridian sandy loam, 2 to 6 percent slopes, in being more eroded, in having a slightly coarser textured surface layer, and in being shallower over the underlying sand. (Capability unit IIIs-1.)

Meridian sandy loam, 6 to 12 percent slopes, moderately eroded (McC2).—This soil is steeper and more eroded than Meridian sandy loam, 2 to 6 percent slopes. In addition, it generally has a slightly coarser textured surface layer and is shallower over the underlying sand. (Capability unit IIIs-2.)

Meridian-Waukegan Complexes

Meridian-Waukegan complex, 0 to 2 percent slopes (MdA).—This complex is made up of Meridian loam and Waukegan silt loam. The soils are intermingled and occur on nearly level areas where erosion is not a hazard. If good management is used, crops make moderately high yields on these soils. (Capability unit IIs-1.)

Meridian-Waukegan complex, 2 to 6 percent slopes (MdB).—This complex is steeper and more easily eroded by wind and water but is otherwise similar to Meridian-Waukegan complex, 0 to 2 percent slopes. The soils are moderately productive if they are well managed, but they require practices to check erosion. (Capability unit IIs-1.)

Meridian-Waukegan complex, 2 to 6 percent slopes, moderately eroded (MdB2).—This complex is steeper and more eroded and has thinner surface and subsoil layers than Meridian-Waukegan complex, 0 to 2 percent slopes. The soils are moderately productive, if they are well managed, but they need protection from erosion by wind and water. (Capability unit IIs-1.)

Meridian-Waukegan complex, 6 to 12 percent slopes, moderately eroded (MdC2).—This complex is steeper and more eroded than Meridian-Waukegan complex, 0 to 2 percent slopes, and it has thinner surface and subsoil layers. It is also sandier and more droughty, and it is more easily eroded by wind. Consequently, yields are lower than on Meridian-Waukegan complex, 0 to 2 percent slopes. (Capability unit IIIs-2.)

Muck and Peat

These soils occur on the terraces of large streams, mostly in small depressions. They have formed under water from partly decomposed sedges and other plants that tolerate water. They consist of black to brown, fibrous organic matter that varies in thickness from 1 foot to several feet. Some areas of Muck and peat are wet, but other areas have been drained and are used for crops.

Muck and peat, drained (Me).—All of this mapping unit has been drained. The soils are suitable for growing crops, but the crops require special management.

The surface layer is black, well-decomposed muck, 6 to 15 inches thick. Below this is a layer of organic matter, ½ foot to several feet deep, that is browner, less decomposed, and more loose and peaty than the surface soil. Where the peaty material is thicker, it is very slightly decomposed in the lower part.

High yields of corn are obtained on this mapping unit, but oats are likely to lodge. Generally, the soils are deficient in potash unless liberal amounts of it have been added. (Capability unit IIIw–1.)

Muck and peat, undrained (Mf).—These soils are wet throughout the year, and most of the areas cannot be drained easily. If drained, they are highly productive, but they require liberal applications of fertilizer, especially potash. Areas that are drained should be managed the same as suggested for capability unit IIIw–1. (Capability unit Vw–1.)

Orion Series

The soils of the Orion series are deep and somewhat poorly drained. They occur on flood plains. The soils are made up of layers of fine sandy loam, sandy loam, loam, and silt loam laid down by water.

Orion fine sandy loam (Oa).—This soil is generally sandy. The surface layer is dark-brown to brown fine sandy loam, 7 to 14 inches thick. The subsoil consists mostly of layers of brown or dark-brown fine sandy loam, sandy loam, and loam. In some places there are a few layers of silt loam in the subsoil. The subsoil is 4 feet or more thick, and in places it has reddish or grayish mottles or streaks in the lower part.

This soil is flooded occasionally. In places it needs to be protected by dikes or ditches. Nevertheless, if it is well managed, crops make moderately high yields. (Capability unit IIw–2.)

Orion silt loam (Ob).—This deep soil is similar to Orion fine sandy loam, but it has more silt throughout the profile. In places it contains thin layers of loam, sandy loam, or fine sandy loam.

The surface layer is dark-brown to brown silt loam, 7 to 14 inches thick. It still retains the layered structure of the sediments as they were laid down. Below this is the dark-brown, stratified subsoil, which is loose to friable and consists mostly of silt. The subsoil is 4 feet or more thick, and in places the lower part is mottled with gray or reddish brown.

If it is well managed, this soil is highly productive, but overflow is a hazard in some areas. Dikes or ditches will aid in controlling or removing the floodwaters. (Capability unit IIw–2.)

Plainfield Series

The soils of the Plainfield series are very sandy, light-colored fine sands and loamy fine sands. They are on terraces and are nearly level to moderately steep. These soils are droughty and are easily blown about by wind. They contain only small amounts of silt, and the sandier soils are not suitable for permanent cultivation. An area of stabilized sand dunes northeast of Onalaska has been mapped as a Plainfield-Sparta complex. In this complex the Plainfield soil is on the convex slopes of the stabilized dunes and the Sparta soil is in the depressions between them.

Plainfield fine sand, 2 to 6 percent slopes, eroded (PaB1).—This gently sloping, deep, sandy soil is droughty and is easily eroded by wind. It is the most extensive of the Plainfield fine sands in the county.

The surface layer is dark grayish-brown to very dark grayish-brown fine sand, 6 to 10 inches thick. Immediately below, to depths between 20 and 24 inches, is loose, brown fine sand, which overlies brownish or yellowish-brown, loose sand.

Because of its low moisture-storing capacity and the hazard of wind erosion, this soil generally is not suitable for continuous tillage. In years when rainfall is adequate and well distributed throughout the growing season, it is fairly productive. In dry seasons, however, crops burn up rapidly. This soil is best suited to coniferous trees. (Capability unit VIIs–1.)

Plainfield fine sand, 0 to 2 percent slopes, eroded (PaA1).—This soil is more nearly level but is otherwise similar to Plainfield fine sand, 2 to 6 percent slopes, eroded. Generally, it is not suitable for continuous cultivation. (Capability unit VIIs–1.)

Plainfield fine sand, 6 to 12 percent slopes, eroded (PaC1).—This soil is on steeper, more choppy slopes but is similar to Plainfield fine sand, 2 to 6 percent slopes, eroded. Its use is limited to the growing of coniferous trees. (Capability unit VIIs–1.)

Plainfield fine sand, 12 to 20 percent slopes, eroded (PaD1).—This soil is steeper, but it is otherwise similar to Plainfield fine sand, 2 to 6 percent slopes, eroded. It is best suited to coniferous trees. (Capability unit VIIs–1.)

Plainfield loamy fine sand, 2 to 6 percent slopes (PbB).—This soil is the most extensive of the Plainfield loamy fine sands in the county. It is level enough for tillage, but it needs protection from wind erosion.

The surface layer is very dark grayish-brown to dark-brown, loose loamy fine sand, 6 to 9 inches thick. Below this, to depths of 12 to 24 inches, is dark grayish-brown loamy fine sand. This is underlain by loose, yellowish-brown to brown sand that is several feet deep. In some places, at depths between 3 and 5 feet, there are one or more bands of sandy loam or sandy clay loam. In many places these bands are 1 to 4 inches thick.

This soil is suitable for cultivation, but it is droughty, low in plant nutrients, and easily eroded by wind. It is best suited to crops that mature early or that are deep rooted. In favorable years, melons and cucumbers also grow well. To prevent wind erosion, it is best to till strips of this soil in a north-south direction and to plant shelterbelts along the boundaries of the fields. (Capability unit IVs–1.)

Plainfield loamy fine sand, 0 to 2 percent slopes (PbA).—This soil is more nearly level but is similar to Plainfield loamy fine sand, 2 to 6 percent slopes. It can be used and managed in about the same way. (Capability unit IVs–1.)

Plainfield loamy fine sand, 2 to 6 percent slopes, eroded (PbB1).—This soil differs from Plainfield loamy fine sand, 2 to 6 percent slopes, chiefly in being more eroded. Wind has removed much loamy material from the surface soil. Consequently, this soil has a more serious erosion hazard and is less productive than Plainfield loamy fine sand, 2 to 6 percent slopes. If it is cultivated, it needs to be protected carefully from further wind erosion. (Capability unit IVs–1.)

Plainfield loamy fine sand, 6 to 12 percent slopes (PbC).—This soil is similar to Plainfield loamy fine sand, 2 to 6 percent slopes, but it has stronger slopes and in some places its surface layer is somewhat thinner over the fine sand. The difference in thickness of the surface layer is most evident on knolls and slopes exposed to wind. Nevertheless, damage from wind erosion is not serious. This soil has a limited use for crops, but it must be protected from erosion by wind and water. (Capability unit IVs–1.)

Plainfield loamy fine sand, 6 to 12 percent slopes, eroded (PbC1).—This soil is similar to Plainfield loamy fine sand, 2 to 6 percent slopes, but it is steeper, is more eroded, and contains less loamy material, particularly where blown sand has accumulated. This soil has limited use for crops. It must be protected from further erosion by wind and water. (Capability unit IVs–1.)

Plainfield loamy fine sand, 12 to 20 percent slopes, eroded (PbD1).—This soil is steeper and eroded, but it is similar to Plainfield loamy fine sand, 2 to 6 percent slopes. It is too steep to use for crops and can best be used for growing conifers for timber or for sale as Christmas trees. (Capability unit VIIs–1.)

Plainfield-Sparta Complex

Plainfield-Sparta complex (Pc).—This complex is in a single large area northeast of Onalaska. It consists of windblown sand. The sand has been piled into a maze of dunes by winds sweeping across the large, level sand plain to the northwest. These dunes have been revegetated and stabilized. An intricate pattern of Plainfield and Sparta soils has formed on and between the dunes.

Light-colored Plainfield sand, formed under a cover of scrub oak, occupies the convex slopes of this complex. Loamy sands of the Sparta and Plainfield series are in the many small, undrained depressions between the dunes. Dark-colored Sparta loamy sand, formed under a cover of prairie grasses, is predominant in these depressions.

The sands in this complex are generally too steep, droughty, and easily eroded by wind to be suitable for cultivation. The loamy sands are more fertile and less droughty. They are less likely to be eroded by wind. Where the areas are large enough, the loamy sands can be used for cultivated crops, but yields will be low, even under good management. (Capability unit VIIs–1.)

Port Byron Series

The Port Byron series consists of deep, silty, dark-colored soils that are well drained. They occur on low, irregular hills and on gentle to steep valley slopes along the edges of the terraces of large streams. Except for some areas on the valley slopes, these soils are made up of relatively coarse-textured loess. Figure 33 shows a typical landscape of Port Byron silt loam.

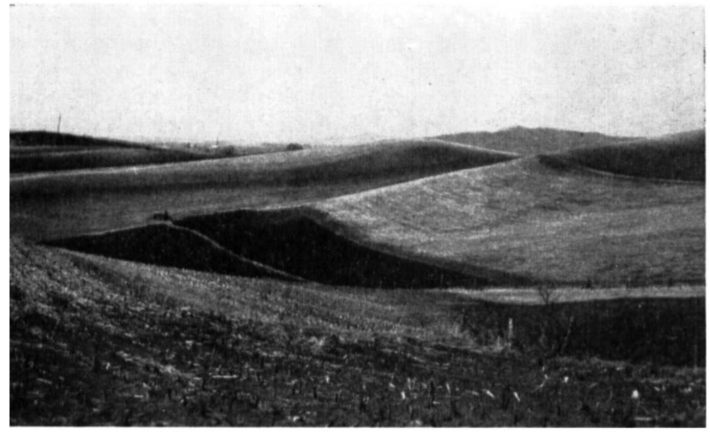

***Figure 33.*—Typical landscape of Port Byron silt loam showing slight to severe erosion and light- to dark-colored surface soil.**

These soils are extensive in La Crosse County, and they occur on a wide range of slopes. Of particular interest is an area that lies between Barre Mills and West Salem along the south edge of the valley of the La Crosse River. Here, a number of low hills, running in a generally east-west direction, lie parallel to one another. They were apparently formed from the coarse-textured loess that was blown from the nearby valleys of the La Crosse and Mississippi Rivers.

Port Byron silt loam, 6 to 12 percent slopes, moderately eroded (PdC2).—This is the most extensive of the Port Byron soils in this county. Most of it is used for crops.

The surface layer is very dark brown silt loam, which is about 8 inches thick in most places. In some places the upper part of the subsoil is very dark grayish-brown silt loam, but at depths of 32 to 44 inches there is dark yellowish-brown heavy silt loam. In some places the subsoil is dark brown to depths of about 32 inches. Below the subsoil is dark yellowish-brown silt, which is several feet thick.

This soil is highly productive if it is well managed. It needs care to prevent further loss of surface soil through erosion. (Capability unit IIIe–1.)

Port Byron silt loam, 2 to 6 percent slopes (PdB).—This soil is on milder slopes and has thicker surface and subsoil layers, but it is otherwise similar to Port Byron silt loam, 6 to 12 percent slopes, moderately eroded. Because of the milder slopes, however, it is less likely to erode. This soil is highly productive if it is well managed. If it is cropped intensively, practices are needed to prevent erosion. (Capability unit IIe–1.)

Port Byron silt loam, 2 to 6 percent slopes, moderately eroded (PdB2).—This soil is on milder slopes and has a thicker subsoil in places, but it is otherwise similar to Port Byron silt loam, 6 to 12 percent slopes, moderately eroded. If it is well managed, this soil is highly productive. To maintain its productivity, protect it from erosion. (Capability unit IIe–1.)

Port Byron silt loam, 6 to 12 percent slopes (PdC).—This soil differs from Port Byron silt loam, 6 to 12 percent slopes, moderately eroded, in that it occurs near the bottom of long, concave slopes. It receives runoff from the slopes above. The runoff carries soil sediments and deposits them on this soil. Under good management the soil is highly productive. Nevertheless, it needs protection from erosion and from runoff. (Capability unit IIIe-1.)

Port Byron silt loam, 12 to 20 percent slopes (PdD).—This soil occurs on steeper slopes and is only slightly eroded, but it is otherwise similar to Port Byron silt loam, 6 to 12 percent slopes, moderately eroded. If it is well managed, this soil is highly productive, but it must be protected from erosion. (Capability unit IVe-1.)

Port Byron silt loam, 12 to 20 percent slopes, moderately eroded (PdD2).—This soil is on steeper, concave slopes that are longer from top to bottom than those occupied by Port Byron silt loam, 6 to 12 percent slopes, moderately eroded. This soil receives runoff from the steep slopes above. Diversion terraces or waterways are needed in some areas to aid in controlling runoff. The soil needs to be kept in sod-forming crops most of the time to prevent excessive erosion. (Capability unit IVe-1.)

Port Byron silt loam, 12 to 20 percent slopes, severely eroded (PdD3).—This soil has lost nearly all of the surface layer through erosion. Much of the eroded material has accumulated in drainageways where it forms a striking pattern of light and dark colors. This soil should be kept in sod crops and protected from further erosion. If its fertility is restored by good management, including the use of large amounts of fertilizer, it is moderately productive. (Capability unit VIe-1.)

Port Byron silt loam, 20 to 30 percent slopes, moderately eroded (PdE2).—This soil differs from Port Byron silt loam, 6 to 12 percent slopes, moderately eroded, in being steeper and in having a thinner, less developed subsoil. The subsoil has a very weak structure and resembles the silty, underlying loess. This soil is best suited to hay or pasture. If it is well managed, good yields are obtained. (Capability unit VIe-1.)

Richwood Series

The Richwood series consists of deep, silty, dark-colored soils that are well drained. The soils are on the nearly level terraces of the larger streams throughout the county. They are associated with soils of the Rowley and Toddville series but are better drained than those soils.

Richwood silt loam, 0 to 2 percent slopes (RaA).—This is the most extensive of the Richwood soils in the county. It is also one of the most desirable for agriculture.

The surface layer is black silt loam that is as much as 16 inches thick in places. The subsoil is at depths of 38 to 40 inches; it is dark-brown, light silty clay loam in the upper part and dark yellowish-brown, firm silty clay loam in the lower part. Below this, at depths between 42 inches and several feet, is brown silt loam to silty clay loam.

If it is well managed, this soil is highly productive. It has good moisture-storing capacity, it does not erode easily, and it responds well to good management. (Capability unit I-1.)

Richwood silt loam, 2 to 6 percent slopes (RaB).—Except for having stronger slopes and a slightly thinner subsoil, this soil is similar to Richwood silt loam, 0 to 2 percent slopes. If it is well managed, it is highly productive, but simple practices are needed to protect it from erosion. (Capability unit IIe-1.)

Richwood silt loam, 2 to 6 percent slopes, moderately eroded (RaB2).—Although the slopes are stronger and the surface layer is somewhat thinner because of erosion, this soil is otherwise similar to Richwood silt loam, 0 to 2 percent slopes. If it is well managed, it is highly productive, but it requires measures to protect it from further erosion. (Capability unit IIe-1.)

Riverwash

Riverwash (Rb).—This mapping unit consists of fresh deposits of loose sand and gravel that have been laid down by permanent or intermittent streams. Little useful vegetation grows on these areas.

In the northern part of the county, the sandy material from large gullies that are cutting into the sandy hills has been mapped in this land type. Every effort should be made to control these gullies. In this way the sand will be stopped at its source rather than deposited on good cropland. (Capability unit VIIe-1.)

Rough Broken Land and Rock Land

Rough broken land and rock land (RcF).—This mapping unit is made up of very steep land that has slopes of 30 percent or more. It occurs between the ridgetops and the lower valley slopes throughout the county. There is a thin covering of silt over all but the larger rocks, but because of the steep slopes, no true soil has developed. In areas of this mapping unit that lie next to the terraces along the Mississippi River, many large bluffs of bare rock are exposed.

In most areas the covering of silt over rock is thick enough to support a good stand of hardwoods. The cooler, north, northeast, and northwest slopes are better for producing timber than the warmer, south-facing slopes. Timber on these areas will yield as much as 200 board feet per acre each year when protected from grazing and allowed to reach maximum density. In addition, if the areas are protected from grazing, leaves and other plant remains accumulate and help to reduce runoff and flooding of the streams below. (Capability unit VIIe-1.)

Rowley Series

The Rowley series consists of deep, silty, dark-colored soils that have slow surface and subsoil drainage. The soils occur with soils of the Richwood and Toddville series, but they are not so well drained as those soils.

Rowley silt loam, 0 to 2 percent slopes (RdA).—This soil is nearly level. It has slow drainage, which is a hazard to the growing of crops.

The surface layer is black to very dark brown silt loam, 8 to 14 inches thick. The upper part of the subsoil, to depths of about 18 to 20 inches, is very dark brown silt loam. The lower part, to depths between 35 and 40 inches, is brown to light olive-brown light silty clay loam mottled with yellowish red. Below this is brown to light brownish-gray silt loam mottled with yellowish brown. The silt loam is generally several feet thick.

If this soil is drained and is well managed otherwise, it is highly productive. In many areas tile and shallow surface drains will help to improve the drainage, and they should be used wherever needed. The use of such practices generally will improve the areas for crops and will make it possible to prepare the seedbed earlier in the season. In some places, especially in Mormon Coulee, the channels of streams have been cut downward recently and thus the need for tiling is reduced. (Capability unit IIw-1.)

Rowley silt loam, 2 to 6 percent slopes (RdB).—This soil generally has better surface drainage than Rowley silt loam, 0 to 2 percent slopes. Under good management, it is highly productive. Tile drains or surface drains are needed in some areas and will improve the soils for crops. (Capability unit IIw-1.)

Seaton Series

The Seaton series consists of deep, light-colored soils that are well drained. The soils are on steep slopes in the uplands. They have formed from coarse-textured silt that was deposited by wind. The silt was blown onto the uplands from the flood plains of the Mississippi and La Crosse Rivers.

These soils are similar to the soils of the Fayette and Port Byron series. They are coarser textured than the Fayette soils. Unlike the Port Byron soils, which have formed under prairie grasses, they have formed under forest.

In La Crosse County, silt loam is the only soil type mapped in this series. These Seaton silt loams occur in two areas. One area is northwest of Barre Mills near the Oakhurst School, and the other is on the lower slopes of the bluffs northeast of Onalaska. The soils are easily eroded by water. Most of the areas that have been cultivated are considerably eroded. Gullies are a severe hazard; they cut rapidly and have steep or overhanging banks.

Seaton silt loam, 12 to 20 percent slopes, moderately eroded (SaD2).—This is the most extensive Seaton soil in the county. Generally, it occurs with soils that are steeper or more severely eroded.

The surface layer is very dark grayish-brown to brown silt loam, 6 to 8 inches thick. The subsoil extends to depths of about 40 inches and is dark-brown, heavy silt loam. Below this is yellowish-brown, massive coarse silt that extends to depths of several feet.

This soil needs to be managed so as to prevent further erosion. The cropping systems best suited to it are ones in which corn and small grains are grown to only a limited extent. (Capability unit IVe-1.)

Seaton silt loam, 12 to 20 percent slopes, severely eroded (SaD3).—This soil differs from Seaton silt loam, 12 to 20 percent slopes, moderately eroded, in having lost nearly all, or all, of its surface layer. It should be kept in sod crops most of the time to prevent further erosion. (Capability unit VIe-1.)

Seaton silt loam, 20 to 30 percent slopes (SaE).—This soil differs from Seaton silt loam, 12 to 20 percent slopes, moderately eroded, in being steeper but less eroded. In addition, the surface layer is darker and thicker and the subsoil is thinner and less developed. Most of the areas are used to grow timber, which is a good use for this soil. If this soil is cleared, most of the areas are best used for hay or pasture. (Capability unit VIe-1.)

Seaton silt loam, 20 to 30 percent slopes, moderately eroded (SaE2).—This soil differs from Seaton silt loam, 12 to 20 percent slopes, moderately eroded, in having steeper slopes and a thinner subsoil. Because of the serious hazard of erosion, it is best suited to hay, pasture, or timber. (Capability unit VIe-1.)

Seaton silt loam, 20 to 30 percent slopes, severely eroded (SaE3).—This soil has lost all of its original surface layer and, in some places, part of its subsoil. It erodes easily. The areas used for cultivated crops should be seeded to hay or pasture, or trees planted to prevent further loss of soil. (Capability unit VIIe-1.)

Seaton silt loam, 30 to 50 percent slopes, moderately eroded (SaF2).—This soil differs from Seaton silt loam, 12 to 20 percent slopes, moderately eroded, in having thinner soil layers and a subsoil that is less developed. It is easily eroded and is best used for pasture or timber. (Capability unit VIIe-1.)

Sparta Series

The soils of the Sparta series are dark colored and are droughty. They consist of 1 to 2 or 2½ feet of black to very dark brown loamy fine sand or sand that overlies loose sand. These soils are on the terraces of all of the larger streams in the county, but they are mainly on the broad terraces along the Mississippi River.

In many places these soils are level, but in others they have been blown into low ridges and depressions. Two soil types—Sparta loamy fine sand and Sparta sand—have been mapped in this county. Sparta sand occurs primarily on French Island and on adjacent areas of the mainland, such as Brice Prairie. The Sparta soils have also been mapped with Plainfield soils as a Plainfield-Sparta complex.

Sparta loamy fine sand, 0 to 2 percent slopes (SbA).—This is the most extensive of the Sparta loamy fine sands in this county. It is nearly level, and its materials have not been reworked noticeably by wind.

The surface layer is black to very dark brown loamy fine sand, 6 to 10 inches thick. The upper part of the subsoil is very dark brown loamy fine sand. The lower part is dark-brown to dark yellowish-brown loamy sand to depths between 18 and 24 inches. Below this is several feet of dark yellowish-brown or yellowish-brown loose sand.

This soil has a low moisture-storing capacity and is droughty unless rainfall is well distributed throughout the growing season. It is best suited to crops that mature early or that are deep rooted. In favorable years melons or cucumbers also grow well. To protect this soil from wind erosion, stripcrop and plant trees or shrubs for shelterbelts. (Capability unit IVs-1.)

Sparta loamy fine sand, 2 to 6 percent slopes (SbB).—This soil is steeper but is similar to Sparta loamy fine sand, 0 to 2 percent slopes. It has the same limitations for crops. This soil is likely to erode. Consequently, where it is on small knolls exposed to wind, it needs to be protected by stripcropping and by planting trees or shrubs in shelter belts. (Capability unit IVs-1.)

Sparta loamy fine sand, 6 to 12 percent slopes, eroded (SbC1).—This soil is steeper, is more eroded, and has thinner soil layers than Sparta loamy fine sand, 0 to 2 percent slopes. It is slightly more droughty, and yields of crops are slightly lower. If it is used for crops, this soil needs to be protected from erosion by wind and water. (Capability unit IVs-1.)

Sparta sand, 0 to 2 percent slopes (ScA).—This is the most extensive of the Sparta sands in the county. It has not been reworked noticeably by wind.

The surface layer is black to very dark brown loose sand that is as much as 10 inches thick. Below this is dark-brown sand that is slightly more compact than that in the surface layer. At depths between 18 and 20 inches, the soil material grades gradually to yellowish-brown, loose, coarse sand.

This soil is too coarse, sandy, and droughty for continuous cultivation. If left bare, it will blow readily. It can best be used for growing coniferous trees. (Capability unit VIIs-1.)

Sparta sand, 2 to 6 percent slopes (ScB).—This soil differs from Sparta sand, 0 to 2 percent slopes, chiefly in having been reworked to some extent by wind that has blown it into low ridges. Planting to sod crops or coniferous trees will aid in protecting the soil from further erosion by wind. (Capability unit VIIs-1.)

Sparta sand, 6 to 12 percent slopes, eroded (ScC1).—This soil is steeper and more windblown than Sparta sand, 0 to 2 percent slopes. It is best suited to coniferous trees. (Capability unit VIIs-1.)

Stabilized Dunes

Stabilized dunes (Sd).—This mapping unit is made up of large, steep sand dunes that have been stabilized only recently. In some places blowouts occur and the sand is still being shifted about by wind. A good cover of grass or trees is needed on these areas. When the areas are planted to grass or trees, it may be necessary to use straw or other plant residues as an additional cover to keep the sand in place. If the areas are pastured, grazing must be controlled. (Capability unit VIIs-1.)

Stony Colluvial Land

Stony colluvial land (Se).—This mapping unit occurs on the fans along the drainageways of intermittent streams. The streams flow from areas of steep Rough broken land and rock land into the more nearly level valleys. The drainageways have steep slopes. During periods of rapid runoff, they are filled with fast, turbulent waters that carry large pieces of chert and sandstone. The pieces of chert and sandstone are deposited as the water fans out on the milder slopes. Because of the large amount of stone on the surface, this mapping unit is not suitable for tilled crops or for renovated pasture. Native pasture grasses can be improved by direct application of fertilizer. (Capability unit VIs-1.)

Tell Series

The soils of the Tell series are silty and are well drained. They occur on stream terraces. These soils are underlain by sand at depths between 20 and 42 inches, but in most places the depth to underlying sand is 24 to 32 inches. These soils are similar to the soils of the Bertrand and Waukegan series. They are shallower over sand, however, than the Bertrand soils, and they have a lighter colored surface layer than the Waukegan soils.

Tell silt loam, 2 to 6 percent slopes (TaB).—This is the most extensive of the Tell soils in the county. The surface soil is dark-brown silt loam, 6 to 8 inches thick. The subsoil, which is between depths of 20 and 42 inches, is dark yellowish-brown silt loam in the uper part and brown sandy loam in the lower part. Below the subsoil is yellowish-brown sand that is several feet deep.

This soil is well suited to crops, but in some places it requires practices to protect it from erosion. As a rule the crop yields are moderately high. Nevertheless, during periods of prolonged drought, the crops may be damaged and the yields lowered. (Capability unit IIs-1.)

Tell silt loam, 0 to 2 percent slopes (TaA).—This soil differs from Tell silt loam, 2 to 6 percent slopes, in being more nearly level and less easily eroded. Generally, crops make moderately high yields on this soil, but they are sometimes damaged during prolonged drought. (Capability unit IIs-1.)

Tell silt loam, 6 to 12 percent slopes, moderately eroded (TaC2).—This soil differs from Tell silt loam, 2 to 6 percent slopes, chiefly in being more eroded and shallower over the underlying sand. If it is used for crops, it needs to be protected to prevent further erosion. (Capability unit IIIs-2.)

Terrace Escarpments

Terrace escarpments (Tb).—This mapping unit is on steep to very steep, long, narrow slopes on terraces. The texture ranges from silt loam to sand. Runoff is rapid. Erosion is slight to severe, and there are deep gullies in some areas.

This mapping unit is not suited to tillage. It is best kept in permanent vegetation, and in some places special practices are needed to prevent or control gullies. If the gullies are not controlled, they will cut back into the nearly level terraces and destroy areas that are valuable for crops. Areas of this mapping unit that are silty are suitable for pasture, but areas that are sandy are best planted to coniferous trees. (Capability unit VIIe-1.)

Toddville Series

The soils of this series are deep and silty and are dark colored. They are on the broad, nearly level terraces of the larger streams and have slow surface and subsoil drainage. These soils occur with soils of the Richwood and Rowley series.

Toddville silt loam (Tc).—This is the only soil of the Toddville series mapped in this county. It has slopes of less than 3 percent.

The surface layer is black to very dark brown silt loam, 8 to 16 inches thick. The subsoil is at depths ranging from 35 to 44 inches; it is a dark-brown silt loam in the upper part and a dark-brown light silty clay loam in the lower part. In places the lower part has a few reddish and yellowish mottles. Below the subsoil is dark-brown silt loam that is distinctly mottled with yellowish red. The silt loam is 1 foot to several feet thick.

This soil is highly productive if it is well managed. Some of the low areas can be improved for crops by draining them, but crops generally will grow well without drainage. (Capability unit I-1.)

Trempe Series

The soils of the Trempe series are light colored and droughty. They occur on sandy stream terraces throughout the county.

These soils are generally associated with soils of the Plainfield, Sparta, and Trempealeau series. They are sandier than the Trempealeau soils and have a more reddish subsoil than the Plainfield and Sparta soils. In many places the reddish color of the parent material is conspicuous.

Trempe loamy fine sand, 0 to 2 percent slopes (TdA).—This is the most extensive of the Trempe soils in the county. It has not been noticeably blown about or drifted by wind.

The surface layer is very dark brown to very dark grayish-brown loamy fine sand, 6 to 9 inches thick. The upper part of the subsoil is dark-brown loamy fine sand. The lower part, at depths of 28 to 30 inches, is dark reddish-brown loamy fine sand. Just below this is a layer of yellowish-red loamy sand, 6 to 10 inches thick. A thick layer of light-gray or white sand is at depths below about 36 inches.

This soil is low in fertility, and it is droughty and eroded easily by wind. It is best suited to crops that mature early or that are deep rooted. Yields are generally low. (Capability unit IVs–1.)

Trempe loamy fine sand, 2 to 12 percent slopes (TdB).—This soil differs from Trempe loamy fine sand, 0 to 2 percent slopes, chiefly in being steeper. It has similar limitations. Some of the areas need to be protected from water erosion. (Capability unit IVs–1.)

Trempealeau Series

The Trempealeau series consists of deep, dark-colored soils that are well drained. These soils have a yellowish-red or reddish subsoil. They occur on stream terraces with soils of the Dakota, Meridian, Plainfield, and Sparta series. The Trempealeau soils have a more reddish subsoil than the associated soils. They are similar to the Trempe loamy fine sands, but they are less sandy and are deeper.

The Trempealeau fine sandy loams occur in small, scattered areas. In many places they are transitional to surrounding soils that have less reddish subsoils.

Trempealeau fine sandy loam, 0 to 2 percent slopes (TeA).—This is the most extensive of the Trempealeau fine sandy loams in the county. It is on nearly level terraces, generally near the channels of streams.

The surface layer is dark brown to very dark brown fine sandy loam, 7 to 10 inches thick. The subsoil extends to depths of 36 to 48 inches. It is yellowish-red, heavy sandy loam in the upper part and a brown, sandy loam in the lower part. Below the subsoil is brown to grayish-brown sand that extends to depths of several feet.

If it is well managed, this soil is moderately productive. It is not likely to be eroded by water or wind, but during prolonged dry periods, crops are damaged at times by lack of water. (Capability unit IIIs–1.)

Trempealeau fine sandy loam, 2 to 6 percent slopes (TeB).—This soil differs from Trempealeau fine sandy loam, 0 to 2 percent slopes, in having slightly stronger slopes. Consequently, some practices are needed to control erosion. (Capability unit IIIs–1.)

Trempealeau silt loam, 0 to 3 percent slopes (TfA).—This deep, dark-colored, well-drained soil is on the nearly level terraces of streams. It has a more reddish subsoil than the Richwood soils with which it is associated.

The surface layer is very dark brown silt loam, 6 to 8 inches thick. The subsoil extends to depths of about 36 inches; it is a reddish-brown to dark reddish-brown silt loam. In places, the lower part of the subsoil has a few red mottles. Below the subsoil is about 20 inches of reddish silt loam or clay loam. This is mottled and streaked, and in some places it contains concretions of iron. Below this is rotted sandstone.

This soil is very desirable for agriculture. It is highly productive if it is well managed. (Capability unit IIs–1.)

Waukegan Series

The Waukegan series consists of silty, well-drained soils that are underlain by sand at depths between 20 and 42 inches. The soils are on terraces. They have a thicker, darker surface layer than the Tell soils and are shallower over sand than the Richwood soils. The Waukegan soils are on small knolls or on low, broad ridges within areas of Richwood and Toddville soils. They are generally steeper than the surrounding soils. In places the Waukegan soils are mapped with Meridian loams as Meridian-Waukegan complexes.

Waukegan silt loam, 2 to 6 percent slopes (WaB).—This is the most extensive of the Waukegan soils in the county. The surface layer is black to very dark brown silt loam, 7 to 10 inches thick. The subsoil is dark-brown, light silty clay loam that extends to depths between 26 and 42 inches. At a depth of about 42 inches, there is an abrupt transition to light yellowish-brown sand that is several feet thick.

This soil is desirable for agricultural use, but in some places it needs to be protected from erosion. During periods of prolonged dry weather, crops are damaged from lack of water sooner than on the associated Richwood and Toddville soils. (Capability unit IIs–1.)

Waukegan silt loam, 0 to 2 percent slopes. (WaA).—This soil is more nearly level than Waukegan silt loam 2 to 6 percent slopes, and is generally deeper to the underlying sand. Also, there is less hazard of erosion on this soil, and it is more productive when well managed (Capability unit IIs–1.)

Waukegan silt loam, 2 to 6 percent slopes, moderately eroded (WaB2).—This soil differs from Waukegan silt loam, 2 to 6 percent slopes, chiefly in being more eroded. Consequently, it has a surface layer that is less thick and the depth to underlying sand is less. Yields are slightly lower on this soil than on the less eroded soils of the series. (Capability unit IIs–1.)

Waukegan silt loam, 12 to 20 percent slopes, moderately eroded (WaD2).—This soil is steeper, is more droughty, and has a thinner subsoil, but it is otherwise similar to Waukegan silt loam, 2 to 6 percent slopes. In some places the underlying sand is at depths as shallow as 20 inches. This soil erodes easily. It is best to keep it in sod crops much of the time. (Capability unit IVe–2.)

Zwingle Series

The Zwingle series, represented in this county by Zwingle silt loam, consists of deep, silty, light-colored soils that are somewhat poorly drained. The soils have a dense, reddish, clayey subsoil. They occur on the nearly level terraces of streams in association with soils of the Bertrand and Medary series. These soils have a heavier subsoil than the Bertrand soils and are more poorly drained than the Medary. In some places the surface layer of silt loam is very thin or absent. Here, seedbed preparation and tillage are difficult.

Zwingle silt loam (Zo).—This is the only soil of the Zwingle series mapped in La Crosse County. It is nearly level and is somewhat poorly drained. It is on terraces along streams.

The surface layer is very dark gray to very dark brown silt loam, about 9 inches thick. Just below is a layer of dark-gray silt loam, 3 to 5 inches thick, that is mottled with grayish brown and light gray. This overlies dense, plastic, reddish-brown clay that extends to depths between 36 and 44 inches. The underlying material consists of brown clay that is several feet deep. Sand occurs at depths between 6 and about 20 feet.

Where there is a thicker cap of silt over clay than that described and surface drainage is good, this soil is moderately productive. Areas that are poorly drained are less productive and are especially poor for corn. Surface drainage can be improved by using shallow ditches to remove water from the low spots. In some areas French drains can be used. These drains are made by digging holes through the clay to the underlying sand and filling the holes with gravel or rock. In places where the cap of silt is thin, the tilth of the surface layer can be improved by using large amounts of manure and of crop residues such as straw or stover. (Capability unit IIIw-3.)

Agriculture

This section discusses the general pattern of agriculture and rural living in La Crosse County. The statistics used are from reports published by the U.S. Bureau of the Census.

Land Use

The total land area of La Crosse County is 300,160 acres. Of this, 251,944 acres was in farms in 1954. Both the number of farms and the acreage in farms have decreased since 1900. In 1860, the 856 farms in the county occupied only 33 percent of the total acreage. By 1900, the number of farms had increased to 1,850 and farms occupied about 92 percent of the total acreage. Then, by 1954, the number of farms had decreased to 1,454, and these farms occupied 83.9 percent of the total acreage. The farmlands, by use, and the proportionate extent used for each purpose, are as follows:

	Acres	*Percent*
Cropland, total	116, 781	46. 4
Harvested	91, 405	36. 3
Pastured	19, 753	7. 9
Not harvested or pastured	5, 623	2. 2
Woodland, total	91, 329	36. 2
Pastured	60, 753	24. 1
Not pastured	30, 576	12. 1
Other pasture (not cropland and not woodland)	31, 160	12. 4
Improved pasture	1, 743	. 7
Other land (farmsteads, roads, ditches, wasteland, and so on)	12, 674	5. 0

Types and Sizes of Farms

Of the 1,454 farms in La Crosse County in 1954, an estimated 12 percent was miscellaneous and unclassified. The rest are listed according to the major source of income and the proportionate extent of each type as follows:

	Number	*Percent*
Fieldcrop:		
Cash-grain	10	0. 3
Other field crops	20	1. 4
Vegetable	5	. 7
Dairy	1, 021	71. 3
Poultry	30	2. 1
Other livestock	86	6. 0
General:		
Primarily crop	5	. 3
Primarily livestock	65	4. 5
Crop and livestock	20	1. 4

The foregoing tabulation shows the types of farming that are prevalent at the present time. Although farms have become increasingly specialized, there have been three main types of farming in the county. The early farms were those that produced mostly for home use because of the few markets. Later, wheat farming became predominant. Finally, livestock and dairy farming became the most important.

In 1954, the average size of the farms in La Crosse County was 173.3 acres. Because of the rough topography in some parts of the county, the farms are generally larger than the average throughout the State. Within the county, the farms in the town of Shelby had the smallest average size, or 129 acres, and those in the town of Bangor had the largest average size, or 229 acres. Figure 34 shows a typical farmstead.

Figure 34.—**A typical farmstead in La Crosse County.**

Crops

In La Crosse County field crops are grown mainly to provide feed for livestock. The three principal feed crops—corn, oats, and hay—occupied about 92 percent, or 32.0, 22.5, and 38.0, respectively, of the harvested cropland in 1954. On 2,190 acres, cover crops were turned under as green manure. Table 12 gives the acreage of the principal crops grown in the county in selected years.

The total acreage used to grow corn, oats, and hay has been fairly constant for many years. The acreage in hay has increased slightly. The type of hay grown has changed radically. Since 1944, the acreage used to grow clover and timothy together for hay has decreased about 80 percent, and the acreage used to grow alfalfa and alfalfa mixtures has increased about 72 percent. The number of acres used to grow alfalfa and alfalfa mixtures for hay in 1954 was about 6 times that used to grow clover and timothy.

In 1954, a total of 1,393 acres was used to grow vegetables for sale. Sweet corn and green peas were the most important vegetable crops. Although vegetables were grown for sale on only 231 farms in that year and on a rather limited acreage, they yielded a high cash return per acre.

TABLE 12.—*Acreage of principal crops*

Crop	1929	1939	1944	1949	1954
Corn:	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
For grain	13, 270	19, 442	24, 176	21, 712	22, 383
For silage	11, 041	8, 894	(1)	7, 360	6, 661
Hogged, grazed, or cut for fodder	1, 088	233	(1)	752	270
Small grains threshed or combined:					
Grown together or threshed as a mixture	(1)	(1)	(1)	1, 327	616
Oats	22, 108	16, 318	20, 539	21, 480	20, 612
Wheat	964	561	302	754	216
Barley	3, 614	2, 699	383	546	168
Rye	3, 260	2, 202	988	1, 261	400
Soybeans for all purposes	114	3, 425	1, 632	933	1, 556
Hay other than soybeans:					
Alfalfa and alfalfa mixtures	4, 637	9, 973	8, 329	17, 742	29, 740
Clover, timothy, and mixtures of clover and grasses	28, 180	19, 227	25, 811	14, 171	4, 961
Tobacco harvested	462	229	334	437	299
Irish potatoes	1, 092	963	754	[2] 215	[3] 156
Vegetables harvested for sale:					
Green peas	2, 320	154	2, 001	704	350
Sweet corn	684	128	1, 177	775	600
Other	322	2, 380	561	561	443

[1] Not reported.
[2] Does not include acreage for farms with less than 15 bushels harvested.
[3] Does not include acreage for farms with less than 20 bushels harvested.

Tobacco is not a major crop in La Crosse County. Nevertheless, it provided a substantial source of income on 167 farms in 1954.

Pastures

In 1954, a total of 111,666 acres was used for pasture in La Crosse County. About half of this was pastured woodland. Woodland pastures do not produce good-quality grass or trees (fig. 35). In addition, the grazing destroys much of the natural mulch of leaves and grass that covers woodland areas. As a result, runoff becomes more rapid, erosion is accelerated, and streams overflow their banks.

Only about 1,700 acres was in improved pastures in 1954. This indicates that little fertilizer is used on the pastures and that other renovation practices are not yet widely used in this county.

***Figure 35.*—Fence in steep woodland pastures marks the contrast between an area that has been moderately grazed and one that has been overgrazed. All of the grass has been killed on the overgrazed area.**

Livestock and Livestock Products

Most of the farm income in La Crosse County in 1954 was derived from the sale of livestock and livestock products. Dairy products accounted for more than half of this income. Table 13 shows the various kinds of livestock in the county in stated years.

TABLE 13.—*Number of livestock*

Livestock	1930	1940	1950	1954
	Number	*Number*	*Number*	*Number*
Cattle and calves	41, 126	[1] 37, 338	41, 544	47, 551
Milk cows	19, 156	22, 679	21, 988	24, 466
Hogs and pigs	25, 666	[2] 11, 805	24, 133	27, 202
Sheep and lambs:				
Total on farms	5, 605	[3] 3, 203	3, 507	2, 924
Shorn	3, 160	2, 991	2, 021	2, 121
Horses and mules	6, 415	[1] 6, 113	3, 218	1, 770
Chickens:				
Total on farms	[1] 145, 086	[2] 157, 590	[2] 162, 828	[2] 197, 616
Sold	95, 579	102, 685	77, 750	86, 337
Ducks raised	2, 288	1, 077	1, 139	1, 856
Turkeys raised	535	2, 778	6, 759	21, 456

[1] More than 3 months old.
[2] More than 4 months old.
[3] More than 6 months old.

Since 1930 there has been an increase of about 15.6 percent in the total number of cattle and an increase of 27.7 percent in the number of milk cows in the county. The number of sheep has remained fairly constant. The number of hogs has fluctuated, probably according to the price ratio of corn and hogs. The number of turkeys and chickens has increased steadily. In 1954, a total of 1,490,615 dozen eggs was sold, as compared to 668, 472 dozen in 1929. In 1954, more than 141 million pounds of whole milk was sold, and 241,188 pounds of butterfat. A total of 17,241 pounds of wool was shorn.

The two most striking features relating to the changes in livestock production in the county are (1) the increase in the amount of milk produced since 1930, and (2) the almost complete turn from the marketing of cream as butterfat to the marketing of whole milk.

Forests

Forests and woodlands are widely distributed throughout La Crosse County. In 1954, they covered 91,329 acres, or 36.2 percent of the land in farms. This was only 76 acres less than the harvested cropland in that year. Nearly all of the trees are hardwoods, and many of them are large enough and of good enough quality to be of commercial value. The towns of Greenfield and Washington are the most heavily wooded, and the town of Campbell has the smallest acreage of woodland.

A large part of the wooded acreage consists of steep, stony, or sandy soils. These soils are not suited to crops and are easily damaged by erosion. Proper care of the wooded areas is necessary, therefore, to control floods and to conserve the soil (fig. 36).

Most of the products cut from the woodlands are used on the farms. For example, in 1954 forest products were sold from only 70 farms in the county, although firewood and fuelwood were reported cut on 760 farms, and fence posts were reported cut on 801 farms. The principal forest products in 1954 were 13,484 cords of firewood, 191,547 fence posts, and 1,214,000 board feet of lumber.

Figure 36.—**Grazed woodland, in contrast to a dense stand of underbrush and seedling trees, in a wooded area protected by fence.**

Farm Income and Expenditures

In 1949, 88.9 percent of the total farm income was derived from the sale of livestock and livestock products. The rest was from the sale of crops. Sales of whole milk accounted for more than half of the total value of the livestock and livestock products sold in 1954.

Feed for livestock is the largest item of expense for most farmers. In 1954, about 95 percent of the farmers reported purchases of feed. Another large item of expense is for hired labor. In 1954, 1,107 farmers in the county purchased 3,973 tons of commercial fertilizer, which was applied to about 36,000 acres of land. In addition, 15,600 tons of lime was purchased by 597 farmers. The lime was used on nearly 8,000 acres of land.

Farm Facilities and Equipment

In 1954, about 97 percent of the farms in the county had electricity, 78 percent had telephones, and 95 percent had automobiles. Home freezers were on 46 percent of the farms, automatic water systems were on 82 percent, and television sets were on 21 percent. Most of the farms in the county have mechanical and power equipment. In 1954, some source of farm power was reported on 1,332 farms. Of these, tractors were reported on 1,317 farms, although horses were also reported on 732 of the farms. The horses are used mainly on the steeper areas.

Trucks were reported on about 61 percent of the farms, and milking machines, on a little more than 65 percent. In addition, there were 176 grain combines, 321 cornpickers, 301 hay balers, and 146 field-forage harvesters. Much of this equipment is used extensively for custom-work; therefore, it is used more widely than the number reported indicates.

Farm Tenure

In 1954, 973 farms were operated by full owners, 166 were operated by part owners, 13 were operated by managers, and the rest were operated by tenants. In 1954, almost half of the tenants were livestock-share tenants. Cash tenants were the next most numerous.

Additional Facts About the County

In this section the settlement of the county is discussed. Information is also given about the climate, water supply, transportation, marketing facilities, industries, and community facilities.

Settlement

Until 1851, La Crosse County was part of Crawford County. At that time the county included, in addition to its present area, parts of what are now Jackson and Trempealeau Counties. There were numerous boundary changes until 1918, when the present boundaries were established.

The first settler in the county, Nathan Myrick, built his home on Barron's Island in 1841, but he moved to the mainland a year later. Few other settlers came until after 1850. In 1853, the city of La Crosse had a population of 548 and settlement of the uplands was well underway. By 1860, the population of the county had reached approximately 12,000, and by 1900 it was more than 42,000. In 1950, the population of the county was 67,587, of which 50,096 was urban and 17,491 was rural.

There are two cities in the county, La Crosse and Onalaska. Other trading centers are Bangor, Holmen, Rockland, and West Salem.

Transportation

In 1950, La Crosse County had about 825 miles of public highways, most of which were county roads or town roads. Four Federal highways serve the county. One of these, U.S. Highway 16, runs eastward from the city of La Crosse. The others run in a north-south direction. Of the four State highways, three run in a generally north-south direction, and one runs eastward, bisecting the county.

About 71 percent of the farms reporting were on or near blacktop or concrete highways, and 19 percent were near roads that have a gravel surface. The rest were on dirt roads. Most of the farmers live close to their usual trading center. Nearly half of them live within 4 miles of such a center, and approximately 81 percent live within 10 miles.

The city of La Crosse has been the hub of transportation routes since the 1850's. Roads used by stagecoaches and wagons came down to the Mississippi River at that point. Later, the railroads and then modern highways made the city a focal point for transportation facilities. In addition, the city has a modern airport and a river terminal.

Marketing

Milk, the most important product marketed in the county, is generally processed and marketed through one of the several farmer-owned cooperatives. Much of it is picked up and delivered to market by truckers who are under contract to dairies or groups of farmers. The many improved roads in the county aid in delivering the milk to market each day.

Other important livestock products besides milk are cattle and calves, hogs, chickens, and eggs. In 1954, cattle and calves, mainly calves for veal, were sold alive from about 87 percent of the farms in the county; an average of 15 were sold from each of these farms. The calves were marketed mostly through cooperative sales associations, but some were sold to terminal stockyards and local concentration yards.

Approximately 50 percent of the farms in the county in 1954 reported the sale of hogs. An average of 40 hogs per farm was sold. Most of the hogs were sold in the fall, and more than half were sold through cooperative sales agencies.

Chickens and eggs are generally sold through the local stores, according to a 1948 tax assessor's report. The next most common method of marketing chickens and eggs was by sale to truckers at the farm.

Most of the crops are fed on the farm. Little of the grain or hay is shipped to market.

Industries

Most of the industries of the county are located in the city of La Crosse. The industries provide an outlet for some agricultural products, but generally they are not closely related to the agriculture of the county. Some of the principal manufactured products are equipment for air conditioning and heating, agricultural implements, auto parts, beer, clothing, dairy and food products, heavy-duty trailers, plastics, and rubber goods. Most of the products are manufactured for regional, national, and world-export markets.

According to the La Crosse Chamber of Commerce, about 175 manufacturing establishments were located in the city in 1954. These employed about 9,000 workers and produced about $120 million worth of manufactured goods. Within the county, outside of the city, about $2 million worth of manufactured goods was produced in small manufacturing plants.

Community Facilities

The county of La Crosse has many community facilities. About 40 elementary and high schools are located in the city of La Crosse, as well as a college for girls, a State college, a seminary, and a vocational and adult school. In the rest of the county there are 34 one-room schools, 4 grade schools, and 6 high schools.

More than 50 churches are located in the city of La Crosse. In addition, there are many rural and village churches throughout the county. Four hospitals in the city of La Crosse serve both the city and the surrounding rural areas.

The city of La Crosse has 14 parks. The county has three parks and one public hunting ground (fig. 37).

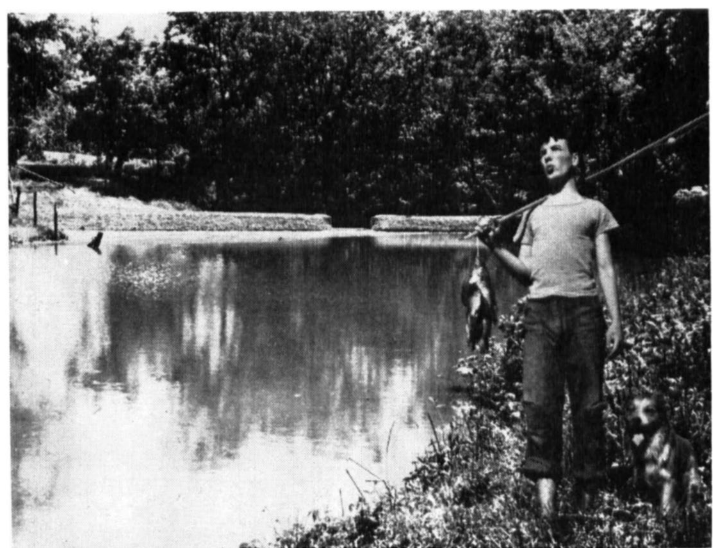

Figure 37.—**Everyone in the county, but especially the young people, enjoy the many recreational facilities.**

Water Supply

La Crosse County has an abundant supply of good underground water.[6] On the ridgetops water generally can be obtained from the dolomite. On the lower slopes and in the valleys, water can be obtained from the sandstone bedrock or from deposits of alluvial sand, silt, and gravel. The sandstone bedrock underlies much of the county. The alluvial deposits, which are at shallower

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[6] WEIDMAN, SAMUEL, and SHULTZ, A. R. THE UNDERGROUND AND SURFACE WATER SUPPLIES OF WISCONSIN. Wis. Geol. and Nat. Hist. Survey Bul. No. 35. [Econ. Ser. No. 17.] 664 pp., illus. Madison, Wis. 1915.

depths than the bedrock, are in the valleys of the major streams.

In the valley of the Mississippi River and its tributaries, there are artesian wells in some of the areas underlain by sandstone. These are in the valleys where stream cutting has been deep enough to allow the water pressure within the sloping beds of sandstone to raise the water to the ground surface. Along the valley slopes there are also numerous springs. The water from the wells and springs is hard; it contains a moderate amount of minerals.

The principal users of water for urban and industrial purposes are in the city of La Crosse. In that city, wells provide much of the water for the homes and for industrial use. Some of the wells are drilled into the alluvial sands and gravel that occur in the valley of the Mississippi River. Others are driven into the underlying beds of sandstone.

Climate

La Crosse County has a humid-continental type of climate,[7] marked by wide extremes of temperature. Table 14, compiled from records of the U. S. Weather Bureau at La Crosse, gives normal, monthly, seasonal, and annual temperatures and precipitation typical of those prevailing in the county. In addition to the average temperatures given, temperatures are given in terms of degree days.

A degree day 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 raise the temperature to 65° F. For example, a day that has an average temperature of 50° would have 15° of needed heat. A knowledge of degree days 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.

This county has an average frost-free period of 163 days. The average date of the last killing frost in spring is April 29, and the average date of the first in autumn is October 9. Although frost has been recorded as late as June 4 and as early as September 10, the growing season normally is long enough for corn and other crops commonly grown in the county to mature.

The crops that are commonly grown generally have enough moisture if the rainfall is well distributed throughout the growing season. As a rule, most of the rainfall comes during the months of May through September, with June having the highest average precipitation. During the years when the rainfall is low or poorly distributed, crops may be damaged by lack of moisture, especially in areas where the soils are shallow or sandy. Because their capacity for storing moisture is low, the soils in capability units IIs–1, IIIs–1, IIIs–2, and IVs–1 are especially subject to drought.

[7] TREWARTHA, GLENN T. AN INTRODUCTION TO WEATHER AND CLIMATE. Ed. 2, 545 pp., illus. New York and London. 1943.

TABLE 14.—*Normal temperature and precipitation at La Crosse, La Crosse County, Wis.*[1]

Period	Temperature				Precipitation				
	Average	Absolute maximum	Absolute minimum	Average degree days	Average	Absolute maximum	Absolute minimum	Maximum 24-hour period	Average snowfall
	° F	*° F*	*° F*	*Number*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
December	20. 5	61	−37	1, 380	1. 22	3. 43	0. 01	2. 11	8. 8
January	15. 7	57	−43	1, 528	1. 22	3. 44	. 14	1. 67	10. 6
February	19. 3	65	−34	1, 280	1. 11	4. 04	. 11	1. 57	8. 9
Winter	18. 5	65	−43	4, 188	3. 55	4. 04	. 01	2. 11	28. 3
March	31. 6	83	−23	1, 035	1. 86	4. 23	. 03	2. 07	8. 0
April	46. 6	93	7	552	2. 31	6. 79	. 42	3. 84	1. 8
May	59. 0	107	26	250	3. 27	8. 37	. 50	3. 11	. 2
Spring	45. 7	107	−23	1, 837	7. 44	8. 37	. 03	3. 84	10. 0
June	68. 6	102	33	74	3. 87	11. 56	. 37	4. 91	(2)
July	74. 0	108	45	11	3. 21	11. 03	. 35	4. 70	0
August	71. 4	103	35	20	3. 29	9. 25	. 35	4. 89	0
Summer	71. 3	108	33	105	10. 37	11. 56	. 35	4. 91	0
September	62. 3	101	24	152	3. 82	10. 87	. 29	5. 69	(2)
October	50. 8	88	6	447	1. 93	12. 09	. 02	7. 23	. 3
November	34. 3	80	−21	921	1. 81	7. 01	. 04	2. 15	4. 2
Fall	49. 1	101	−21	1, 520	7. 56	12. 09	. 02	7. 23	4. 5
Year	46. 2	108 (1936)	−43 (1873)	7, 650	28. 92	12. 09 (1900)	0. 01 (1943)	7. 23 (1900)	42. 8

[1] Based on information taken from local climatological data, with comparative data, compiled by the U.S. Weather Bureau, La Crosse, Wis. 1955.

[2] Trace or no record.

Most of the snowfall takes place during the period from December through March. Since 1900, the heaviest snowfall was in the winter of 1951–52, when 67.5 inches fell. The month in which the heaviest snowfall occurred was January 1929, when 39.6 inches was recorded. The maximum snowfall in any 24-hour period was 13.1 inches, and this fell in March 1931.

From January to April, inclusive, the prevailing winds at the city of La Crosse are from the northwest, but the winds are southerly during the rest of the year. This is partly because the city lies in the valley of the Mississippi River. Westerly winds are more common on the upland ridges of the county. The average hourly windspeed noted at La Crosse ranges from 7.0 miles per hour in August to 11.2 miles per hour in April. The highest recorded windspeed of 69 miles per hour was recorded in October 1949.

La Crosse County receives an average of 56 percent of the possible sunshine. The average maximum is 73 percent, which occurs in July, and the average minimum is 40 percent, which occurs in December. During an average year there are 107 clear days, 118 partly cloudy days, and 140 cloudy days.

Classification of Soils

Soils may be classified in several ways to bring out their relationship to one another. The simple classification units commonly used in the field are the series, type, and phase. The soil type is the basic classification unit. It consists of soils similar in kind, thickness, and arrangement of soil layers. The soil types in the county are described in the section, Descriptions of Soil Types.

A soil type may consist of several phases. Characteristics that suggest dividing a soil type into phases are variations in slope, frequency of rock outcrops, degree of erosion, depth of the soils over the substratum, or natural drainage. The soil phase, or the soil type if it has not been subdivided, is the unit shown on the soil map.

Types that resemble each other in most of their characteristics are grouped into soil series. The soil series consists of two or more soil types that differ in surface texture but that are otherwise similar in kind, thickness, and arrangement of soil layers. Each series is named for a place near where it was first mapped; for example, the Sparta series is named for Sparta, Wis.

In this report most of the names of the soils consist of the series name, the type, and the phase. For example, the Fayette series, silt loam type, has a 12 to 20 percent slope, moderately eroded phase. A few soil names consist only of the series and type because they have no variations in slope, erosion, or other properties. Jackson silt loam is an example.

Soil series are classified in great soil groups. Soils of a great soil group have major features of their profiles in common. They have similar horizons arranged in the same way, although the soils may differ greatly in such things as thickness of profile and degree of development of the different horizons.

The great soil groups in the county are (1) Gray-Brown Podzolic soils, (2) Brunizems, (3) Bog soils, (4) Alluvial soils, and (5) Regosols. Many of the soil series are not representative of the central concept of any one great soil group but intergrade from one great soil group to another. Several series intergrade toward the Low-Humic Gley great soil group, which is otherwise not represented. The classification of the soils in the county is based largely on characteristics observed in the field. It may be revised as knowledge about the soil series and their relations increases. Table 15 shows the great soil groups in the county and lists the soil series in each one.

TABLE 15.—*Classification of soil series by great soil groups*

Great soil group and series	Remarks
Gray-Brown Podzolic:	
Bertrand.	
Curran	Intergrades toward Low-Humic Gley.
Dubuque.	
Fayette.	
Gale.	
Hixton.	
Jackson.	
Medary.	
Meridian.	
Seaton.	
Tell.	
Zwingle	Intergrades toward Low-Humic Gley.
Brunizem:	
Dakota.	
Gotham	Intergrades toward Gray-Brown Podzolic.
Hesch.	
Judson	Intergrades toward Alluvial.
Port Byron.	
Richwood.	
Rowley	Intergrades toward Humic Gley.
Sparta	Intergrades toward Regosol.
Toddville.	
Trempe	Intergrades toward Regosol.
Trempealeau.	
Waukegan.	
Bog: Muck and peat.	
Alluvial:	
Arenzville.	
Boaz	Intergrades toward Low-Humic Gley.
Chaseburg	Intergrades toward Gray-Brown Podzolic.
Huntsville	Intergrades toward Brunizem.
Lawson	Intergrades toward Humic Gley.
Orion.	
Regosols:	
Boone.	
Plainfield.	

Gray-Brown Podzolic Soils

These soils, in their virgin state, have a rather thin, organic covering (A_0) and organic-mineral layers (A_1) that overlie a grayish-brown, leached A_2 horizon. The A_2 horizon rests upon an alluvial, brown B horizon. In La Crosse County the material underlying the Gray-Brown Podzolic soils consists of loessal or alluvial silts, sand, weathered products of sandstone, or red clay.

These soils have formed under deciduous trees in a temperate, humid-continental climate. Podzolization has been the chief process in their development. In La Crosse County the soil series in this great soil group are:

Bertrand.	Jackson.
Curran.	Medary.
Dubuque.	Meridian.
Fayette.	Seaton.
Gale.	Tell.
Hixton.	Zwingle.

The soils of this group occupy the major part of La Crosse County. The soils of the Fayette series are the most extensive, with the Hixton, Gale, and Dubuque soils, respectively, each occupying slightly smaller areas.

The Fayette soils have formed in loess of Peorian age. In these soils the loess is typically at least 42 inches thick, but in many places it is thicker. The soils are on upland ridges or on valley slopes below escarpments of dolomite or sandstone. The slopes range from 2 to 40 percent. The ridge slopes are generally between 12 and 20 percent, however, and the valley slopes are generally between 20 and 30 percent. The soils are well drained, but the C_1 and C_2 horizons on the milder slopes are slightly mottled in places.

A profile of Fayette silt loam is described in detail in the section, Descriptions of Soil Types. In most places in the Fayette soils, the A_0 and A_2 horizons have been changed by tillage. In their place an A_p horizon has formed that has a generally slightly higher chroma than the original A_1 horizon.

Podzolization has been the dominant process in the formation of the Fayette soils. The loessal parent material was probably calcareous at the time it was deposited, but during the soil-forming process it was leached free of carbonates.

The differences among the typical Gray-Brown Podzolic soils in the county are chiefly related to differences in parent materials and topography. The Hixton soils differ from other upland soils in having formed from sandstone of the Cambrian period. Among the upland soils that have formed from loess, there are variations in the depth of the loess. The Fayette and Seaton soils have formed in loess that is 42 inches or more thick, and the Dubuque and Gale soils, in loess that is 20 to 42 inches thick. Furthermore, the Fayette soils have formed in medium- to fine-textured loess, and the Seaton, in coarse-textured loess. The Seaton soils occur in areas where the northwest winds were forced to rise over the nearby hills, and they received coarse-textured loess. Because the coarse-textured loess was dropped and not carried over the bluffs to the uplands, the loess on the uplands is fine to medium textured.

Of the soils on terraces, the Bertrand and Jackson have the deepest deposits of silt. In these soils the silt is 42 inches or more thick. The Meridian and Tell soils generally have 20 to 42 inches of silty or loamy material that overlies sand. The Medary soils are underlain by reddish-brown lacustrine clay.

The Curran and Zwingle soils are intergrades toward Low-Humic Gley soils, which are not represented in this county. Neither soil is extensive in the county.

Brunizems

The Brunizems, or Prairie soils, have formed in a temperate, humid-continental climate under a cover of tall grasses. In this county bluestem and needle grasses were dominant. Typically, the Brunizems have a thick, very dark brown to black A horizon and a dark yellowish-brown B horizon that is heavier textured than the A. When the soil is cultivated, changes may occur in the color and thickness of the A horizon. The underlying materials of the Prairie soils in this county are loessal and alluvial silts, sand, and reddish sand and weathered products from sandstone.

In La Crosse County the soils in this great soil group are:

Dakota.	Rowley.
Gotham.	Sparta.
Hesch.	Toddville.
Judson.	Trempe.
Port Byron.	Trempealeau.
Richwood.	Waukegan.

All of the soils in this group are on terraces or on low hills between the terraces and escarpments. The Port Byron and Richwood soils are typical of the Brunizems in this county and are the most extensive of these soils.

Most of the Brunizems in this county are silty, but the Dakota, Gotham, Hesch, Sparta, and Trempe soils, and the Trempealeau fine sandy loams are sandy. Of the sandy soils, the Dakota, Hesch, and Trempealeau fine sandy loams are true Brunizems, but the Gotham intergrade toward the Gray-Brown Podzolic, and the Sparta and Trempe, toward the Regosol great soil group. All of the silty soils, except the Judson and Rowley, are true Brunizems. The Judson intergrade toward the Alluvial great soil group, and the Rowley intergrade toward the Humic Gley. The Richwood, Toddville, and Waukegan soils, and Trempealeau silt loam all have more strongly developed profiles than the Port Byron soils.

Bog Soils

The Bog soils, represented in this county by Muck and peat, are organic soils. They generally have a surface soil of muck or peat that is underlain by peat. They are forming under swamp or marsh vegetation in a humid or subhumid climate, and generally they are wet.

In this county the Bog soils occur in depressions or on stream bottoms and terraces. They are of variable depth over mineral soil materials and are wet unless they are drained. The wetter areas in some places are less decomposed than the areas that have been artificially drained.

Alluvial Soils

The Alluvial soils are forming from material recently deposited on flood plains and in fans and draws. They have little or no profile development and receive fresh deposits of sediment during periods of high runoff. The following series are in this great soil group:

Arenzville.	Huntsville.
Boaz.	Lawson.
Chaseburg.	Orion.

In this county the Arenzville and Orion are typical Alluvial soils. The Boaz soils intergrade toward the Low-Humic Gley great soil group, the Chaseburg, toward Gray-Brown Podzolic, the Huntsville, toward Brunizem, and the Lawson, toward Humic Gley.

Regosols

The Regosols are made up of deep, soft mineral deposits in which few or no clearly expressed soil characteristics have developed. In this county the soil series in this group are:

Boone. Plainfield.

Except that they have an A horizon, these soils show little or no profile development.

Descriptions of Soil Types

The soil types that occur in La Crosse County are described in the following pages. At least one representative profile of a soil of each type is described in some detail. The great soil group is given for each soil for easy cross reference to table 15.

Arenzville silt loam

The soils of this type are deep and silty and are well drained to moderately well drained. They belong to the Alluvial great soil group. These soils are on bottom lands, and many of the areas are flooded nearly every year. When floods occur during the growing season, crops may be damaged. Some areas are flooded so frequently and so severely that they cannot be used for crops.

The soils have a light-colored surface layer that in places overlies a buried, silty, dark-colored layer. The light-colored sediments were washed from upland soils, and fresh deposits are being washed onto this soil. These soils occur in association with the Orion and Huntsville soils. In some places they have been mapped together as Arenzville, Orion, and Huntsville soils. They are lighter colored than the Huntsville soils and better drained than the Orion soils.

Profile description (SW¼NE¼ sec. 24, T. 15 N., R. 6 W.):

A_p 0 to 12 inches, dark-brown (10YR 3/3)[8] silt loam; cloddy because of recent cultivation; friable; roots and pores abundant; pH 7.8; 8 to 14 inches thick; abrupt smooth boundary.

A_1 12 to 22 inches, very dark grayish-brown (10YR 3/2) to dark-brown (10YR 3/3) silt loam; a few lenses of pale-brown (10YR 6/3) sand; weak, very thick, platy structure; friable; many roots and pores; pH 7.8;[9] 6 to 12 inches thick; abrupt smooth boundary.

A_{11b} 22 to 29 inches, black (10YR 2/1) silt loam; massive; friable; many roots and pores; pH 7.8; 6 to 18 inches thick; gradual wavy boundary.

A_{12b} 29 to 36 inches, very dark grayish-brown (10YR 3/2) silt loam stratified with dark yellowish-brown (10YR 4/4) silt loam; massive; friable; some roots and pores; pH 7.8; variable in thickness, and in places this horizon is absent; gradual wavy boundary.

C 36 to 60 inches, yellowish-brown (10YR 5/6) silt loam; in places has thin strata of sand; massive; friable; pH 7.8.

Bertrand silt loam

This type is made up of deep, silty, well-drained soils that belong to the Gray-Brown Podzolic great soil group. The soils have formed on stream terraces from silts of Peorian age. Most of the areas are on terraces along Fleming and Mormon Creeks and along the La Crosse River and its tributaries. The soils are used mainly for crops and are highly productive if they are well managed.

In this county the Bertrand soils occur in association with the moderately well drained Jackson silt loam and the somewhat poorly drained Curran silt loam. In texture they are similar to the Richwood silt loams, but they have formed under a mixed stand of hardwood trees rather than prairie grasses and have a thinner, lighter colored A horizon. Generally, they occur on smaller, more dissected terraces than the Richwood soils.

The depth of silty material ranges from 42 inches to several feet in the Bertrand silt loams. The color of the surface layer ranges from 10YR 4/2 to 10YR 3/2, depending upon the amount of organic matter that has been added by tillage and the closeness of areas of soils formed under prairie. The thickness of the solum ranges from 36 to 48 inches.

Profile description (SW¼NW¼ sec. 27, T. 15 N., R. 7 W.):

A_p 0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, thick, platy structure, but breaks to moderate, fine, angular blocks; friable; many roots and pores; pH 6.2; 6 to 9 inches thick; abrupt smooth boundary.

B_1 7 to 14 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; faces of peds dark brown to brown (10YR 4/3); moderate, subangular blocky structure; friable when moist, and slightly hard when dry; many roots; pH 6.0; 6 to 9 inches thick; gradual smooth boundary.

B_{21} 14 to 22 inches, dark yellowish-brown (10YR 4/4) to yellowish-brown (10YR 5/4)light silty clay loam; faces of peds brown (10YR 5/3); moderate to strong, medium, subangular blocky structure; firm to friable when moist, and hard when dry; many fine roots; pH 5.8; 6 to 8 inches thick; gradual smooth boundary.

B_{22} 22 to 29 inches, yellowish-brown (10YR 5/4) to dark yellowish-brown (10YR 4/4) silty clay loam; faces of peds dark brown (10YR 4/3); moderate, coarse, subangular blocky structure, but breaks readily to moderate to strong, fine to medium, subangular blocks; firm when moist, hard when dry; many fine roots and many old root channels; pH 5.5; 6 to 8 inches thick; gradual smooth boundary.

B_3 29 to 38 inches, yellowish-brown (10YR 5/4) to brownish-yellow (10YR 6/6) light silty clay loam; massive; friable when moist, and slightly hard when dry; some fine roots; vesicular; clay skins on pores and root channels; pH 5.8; 8 to 12 inches thick; gradual smooth boundary.

C 38 to 47 inches, yellowish-brown (10YR 5/4) to brownish-yellow (10YR 6/6) silt loam mottled with light gray (10YR 7/2); massive; friable; few fine roots; pH 5.8; 6 to 8 inches thick; abrupt smooth boundary.

Boaz silt loam

The soils of this type are deep, somewhat poorly drained, Alluvial-Low Humic-Gley intergrades. They occur on the higher bottom lands. The soils have formed from silty, light-colored sediments that recently were deposited over clayey materials. They have slow surface runoff and internal drainage. Some areas are flooded during periods of high water.

The depth to the underlying clayey material varies in these soils as does the thickness of the clayey layer and the content of clay. In this county only one soil of this type, Boaz silt loam, occurs.

[8] Symbols express Munsell color notations. Unless otherwise stated, color is that of moist soil.

[9] All pH determinations were made on undried samples by means of a Hellige-Truog soil reaction tester.

Profile description (NE¼NW¼ sec. 31, T. 18 N., R. 5 W.):

A_p 0 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, subangular blocky structure; friable; many roots and pores; pH 6.0; 7 to 10 inches thick; abrupt smooth boundary.

A_2 9 to 16 inches, dark grayish-brown (10YR 4/2) silt loam; many, medium, distinct, yellowish-red (5YR 5/8) mottles; moderate, medium, platy structure, friable; many roots and pores; pH 5.8; 6 to 12 inches thick; gradual wavy boundary.

B_{1g} 16 to 36 inches, grayish-brown (2.5Y 5/2) to light brownish-gray (2.5Y 6/2) silt loam with many, medium, distinct, yellowish-red (5YR 5/8) mottles; massive; friable when moist, but slightly sticky and slightly plastic when wet; few roots or pores; pH 5.8; 15 to 25 inches thick; gradual wavy boundary.

B_{2g} 36 to 42 inches, grayish-brown (2.5Y 5/2) to light brownish-gray (2.5Y 6/2) silty clay loam with many, medium, distinct, yellowish-red (5YR 5/8) mottles; massive; firm when moist, plastic when wet; contains no roots; a few pores; pH 5.5; 5 to 10 inches thick; gradual wavy boundary.

C_g 42 to 60 inches, light brownish-gray (2.5Y 6/2) and yellowish-red (5YR 4/8 to 5/8) silty clay in about equal parts; massive; dense; plastic when wet, pH 5.2; 16 inches to several feet thick.

Boone sand

This type consists of excessively drained soils that belong to the Regosol great soil group. The soils have formed from sandstone of the Cambrian period. They occur throughout the northern part of the county.

These soils have a low moisture-holding capacity, and their potential productivity is low. The hazard of wind erosion is severe, and there are some deep blowout areas. In many places the surface soil has been reworked by wind. In these places most of the soil on the lower slopes has a few fragments of unweathered sandstone throughout the profile.

These soils resemble the Hixton soils, which have formed from similar parent material. They do not have a textural B horizon, however, and the profile contains little silt or clay.

Variations in this soil type are chiefly in the slope and in the depth to the underlying sandstone. The depth to the sandstone ranges from 1 to 5 feet. The sandstone is weathered or partly weathered.

Profile description (NE¼NW¼ sec. 9, T. 18 N., R. 6 W.):

A_0 1 to 0 inch, partly decomposed oak leaves.

A_{12} 0 to 3 inches, a salt-and-pepper-type mixture of black (10YR 2/1) to very dark brown (10YR 2/2) sand, coated with organic matter, and pale-brown (10YR 6/3) sand, leached nearly free of iron oxide; single grain; loose; many roots of grasses; pH 5.4; ½ to 4 inches thick; clear wavy boundary.

C_1 3 to 22 inches, strong-brown (7.5YR 5/6) sand; single grain; loose; many roots of grasses; some tree roots; pH 5.2; 7 to 25 inches thick; gradual wavy boundary.

C_2 22 to 40 inches, brownish-yellow (10YR 6/6) sand; single grain; loose; some tree roots; pH 5.4; 5 to 20 inches thick; clear wavy boundary.

C_3 40 to 60 inches, very pale brown (10YR 7/3 to 7/4) sand with a few bands of brown (7.5YR 4/4) loamy sand; single grain; loose; some tree roots; pH 5.5.

Chaseburg silt loam

This type consists of deep, silty, light-colored soils that are well drained. The soils belong to the Alluvial great soil group, but they intergrade toward Gray-Brown Podzolic. They have formed in draws and on foot slopes in sediments that were deposited by runoff or soil creep from upland areas. These soils occur throughout the county but are generally in small areas. They have no textural B horizon. The hazard of flooding is slight to severe.

These soils are lighter colored than the Judson silt loams, which occur in similar positions. There are minor differences in the color of the deposits from which they have formed. In some places the structure of the surface soil is weak subangular blocky, and in others it is moderate platy.

Profile description (NW¼NW¼ sec. 11, T. 16 N., R. 7 W.):

A_{11} 0 to 28 inches, very dark grayish-brown (10YR 3/2) to brown (10YR 5/3) silt loam that is pale brown (10YR 6/3) when dry; moderate, thin, platy structure; friable; many roots and pores; pH 7.2; 24 to 36 inches thick; clear wavy boundary.

A_{12} 28 to 35 inches, dark grayish-brown (10YR 4/2) to brown (10YR 5/3) silt loam; a few fine, faint, dark-brown (7.5YR 4/4) mottles; weak to moderate, medium, platy structure; friable; many roots and pores; pH 6.3; 0 to 10 inches thick; clear wavy boundary.

C 35 to 60 inches, very dark grayish-brown (10YR 3/2) silt loam; structureless; friable; a few fine roots; many pores; pH 6.0.

Curran silt loam

The soils of this type are deep and are somewhat poorly drained. They are Gray-Brown Podzolic-Low-Humic Gley intergrades. These soils have formed on stream terraces from deep silt, presumably of Peorian age. They have a silty A horizon. The texture in the lower part of the B horizon and in the C horizon is silty clay loam.

These soils are in the same catena as the well-drained Bertrand soils and the moderately well drained Jackson soils. They are similar to the Rowley silt loams. They have a thinner A horizon, however, that, when moist, is slightly lighter colored than that of the Rowley soil and, when dry, is much lighter colored. In this county the only soil mapped of this type is Curran silt loam.

Profile description (NW¼NW¼ sec. 32, T. 17 N., R. 5 W.):

A_p 0 to 9 inches, very dark gray (10YR 3/1) to very dark grayish-brown (10YR 3/2) silt loam that is grayish brown (10YR 5/2) when dry; weak, coarse, angular blocky structure; friable; many roots and pores; pH 7.5; 7 to 10 inches thick; abrupt smooth boundary.

A_2 9 to 16 inches, grayish-brown (10YR 5/2) to light brownish-gray (10YR 6/2) silt loam; moderate, thin to medium, platy structure; friable; many roots; vesicular; pH 7.0; 5 to 7 inches thick; clear smooth boundary.

B_{1g} 16 to 21 inches, grayish-brown (2.5Y 5/2) heavy silt loam; moderate, medium, subangular blocky structure; firm; some fine roots; many pores; pH 6.5; 5 to 8 inches thick; gradual smooth boundary.

B_{2g} 21 to 26 inches grayish-brown (2.5Y 5/2) to light grayish-brown (2.5Y 6/2) silty clay loam; moderate, medium, angular blocky structure; firm; a few roots and pores; pH 6.0; 5 to 8 inches thick; gradual smooth boundary.

B_{3g} 26 to 32 inches, grayish-brown (2.5Y 5/2) silty clay loam; a few, fine, faint, light olive-brown (2.5Y 5/4) mottles; weak, medium, angular blocky structure; firm; a few roots and pores; pH 5.5; 5 to 8 inches thick; gradual smooth boundary.

C_g 32 to 48 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, coarse, prominent mottles of brown (7.5YR 4/4) and very dusky red (2.5YR 2/2); structureless; firm; pH 5.5; 1 to several feet thick.

Dakota sandy loam

The soils of this type are moderately deep, well-drained Brunizems formed from sandy outwash. They occupy high to intermediate positions on stream terraces. These soils are on the terraces of the Mississippi River and are distributed widely throughout the western part of the county. Generally, their B horizon is slightly finer textured and more compact than the A horizon.

These soils have a thicker, darker colored A horizon than the Meridian sandy loams with which they are associated. Although the Dakota and Waukegan soils are both Brunizems, the Dakota soils are sandier or loamier throughout than the Waukegan.

The depth to underlying loose sand in the Dakota sandy loams ranges from 19 to 30 inches. In some places small amounts of fine gravel occur in the B_2 horizon, and this gravel is weakly cemented in places.

Profile description (100 feet south of center of north line of sec. 25, T. 17 N., R. 8 W.):

A_1 0 to 11 inches, black (10YR 2/1) to very dark brown (10YR 2/2) sandy loam; weak, coarse, subangular blocky structure; very friable; many roots and pores; pH 6.0; 8 to 14 inches thick; gradual smooth boundary.

A_3 11 to 15 inches, dark-brown (7.5YR 3/2 to 3/3) sandy loam; weak, medium, subangular blocky structure; friable; many roots and pores; pH 5.8; 5 to 7 inches thick; gradual wavy boundary.

B_{21} 15 to 21 inches, dark-brown (7.5YR 3/3) loam; moderate, medium, subangular blocky structure; friable; many roots and pores; pH 5.5; 4 to 6 inches thick; in places contains some fine gravel that is compact in place; gradual smooth boundary.

B_{22} 21 to 23 inches, dark-brown (7.5YR 3/2) sandy loam; weak, coarse, subangular blocky structure; very friable; many fine roots and pores; pH 5.8; 2 to 3 inches thick; sharp smooth boundary.

C_1 23 to 33 inches, dark-brown (7.5YR 3/4) sand; structureless; slightly compact in place; loose when dry; pH 6.0; 7 to 12 inches thick; gradual wavy boundary.

C_2 33 to 60 inches, yellowish-brown (10YR 5/4) sand; single grain; loose; pH 6.2; several feet thick.

Dubuque silt loam

In La Crosse County this soil type is divided into normal silt loams and deep silt loams. The normal silt loam is described first.

The soils of this type are silty and are well drained. They belong to the Gray-Brown Podzolic great soil group. These extensive soils occur on uplands throughout the county. Because they generally are on steep slopes, their use for agriculture is limited.

These soils are underlain by cherty red clay at depths between 10 and 20 inches. They have formed from loess of Peorian age and from red clay weathered from dolomite of the Prairie du Chien formations. The soils occur in association with the deep Dubuque soils and the Fayette silt loams. Generally, they are on the lower, steeper slopes where the mantle of loess is thinnest. In contrast, the deep Dubuque and Fayette soils occupy areas near the crests of slopes where the cover of loess is thicker.

The differences among the Dubuque silt loams are related to the depth to the underlying red clay, to the amount of chert in the profile, and to the thickness of the red clay over dolomite.

Profile description of Dubuque silt loam (NW¼SW¼ sec. 22, T. 18 N., R. 5 W.):

A_1 0 to 3 inches, very dark gray (10YR 3/1) to black (10YR 2/1) silt loam that is mixed by worm action with small amounts of very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; friable; many roots and pores; pH 5.3; 1 to 4 inches thick; clear wavy boundary.

A_2 3 to 9 inches, dark grayish-brown (10YR 4/2) to dark-brown (10YR 4/3) silt loam; moderate, fine, angular blocky structure; friable; many tree roots and pores; pH 5.0; 4 to 7 inches thick; clear smooth boundary.

B_{21} 9 to 16 inches, reddish-brown (5YR 4/4) to yellowish-red (5YR 4/6) silty clay loam; moderate to strong, fine, angular blocky structure; friable; slightly sticky and slightly plastic when wet; a few tree roots; a few fine fragments of chert; pH 4.8; 6 to 8 inches thick; gradual smooth boundary.

B_{22} 16 to 22 inches, yellowish-red (5YR 4/8 to 5/8) clay; weak to moderate, very fine and fine, angular blocky structure; plastic and sticky when wet; roots and pores scarce; many fragments of chert; pH 4.8; 4 to 6 inches thick; gradual wavy boundary.

C 22 inches+, equal parts of red (2.5YR 4/8) and yellowish-brown (10YR 5/8) clay, colors intermingled; moderate, medium, angular blocky structure, but breaks to moderate, fine, angular blocks; plastic and sticky when wet; many fragments of chert; pH 4.8; 1 to several feet thick over dolomite.

Except that the loess is thicker over red clay and these soils generally have a somewhat thicker B horizon, the deep Dubuque silt loams are similar to the Dubuque silt loams. They occur extensively on the uplands of La Crosse County. These soils occur in association with the Fayette silt loams, but unlike those soils they have a C horizon of red clay rather than loess. The depth to red clay in the deep Dubuque soils ranges from 20 to 42 inches. Differences in the soils are related to the depth to the red clay, the amount of chert in the clay, and to the thickness of the clay over dolomite.

Profile description of Dubuque silt loam, deep (SW¼NE¼ sec. 8, T. 15 N., R. 5 W.):

A_1 0 to 5 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, very fine, subangular blocky structure; friable; many roots and pores; pH 5.8; 3 to 8 inches thick; clear wavy boundary.

A_2 5 to 16 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, platy structure, but breaks to weak, medium, subangular blocks; friable; many roots and pores; pH 5.3; 6 to 12 inches thick; gradual smooth boundary.

B_1 16 to 21 inches, brown (7.5YR 5/4) heavy silt loam; faces of peds dark brown (7.5YR 4/4); moderate, medium, subangular blocky structure, but breaks to moderate, fine, subangular blocks; friable; many roots; pH 5.8; 5 to 7 inches thick; gradual smooth boundary.

B_{21} 21 to 28 inches, dark-brown to brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure, but breaks to moderate, fine, subangular blocks; slightly sticky and slightly plastic when wet; some fine roots; pH 5.8; 6 to 9 inches thick; gradual smooth boundary.

B_{22} 28 to 34 inches, reddish-brown (5YR 4/4) gritty silty clay; moderate, fine to medium, angular blocky structure; plastic and sticky when wet; many pores with clay skins; pH 5.8; 5 to 10 inches thick; gradual smooth boundary.

C 34 inches +, typically reddish-brown (5YR 4/4) clay, but yellowish red (5YR 5/6) in places; moderate, fine to medium, angular blocky structure; plastic and sticky when wet; some grit and fragments of chert; pH 6.8.

Fayette silt loam

The soils of this type are deep and silty and are well drained. They belong to the Gray-Brown Podzolic great soil group. These soils occur on the crests of broad, rounded, dolomite ridges in the uplands and on the slopes of steep valleys. They have formed under a cover of deciduous trees from loess of Peorian age. These soils are similar to the Dubuque soils, but the Dubuque soils are underlain by red clay. The Fayette silt loams are extensive in this county and generally are highly productive.

In cultivated areas these soils generally lack an A_2 horizon because the A_2 horizon has been incorporated into the A_p horizon. In this county the upland Fayette soils vary chiefly in the amount of mottling in the C horizon, and in some places the C horizon is not mottled. They also vary in the size of the silt particles in the loessal parent material. The valley soils differ from the upland soils in having a subsoil of heavy silt loam that has weak to moderate structure. In addition, they have a loamy surface layer in places, and in places they contain fragments of weathered sandstone.

Profile description (SW¼NE¼ sec. 8, T. 15 N., R. 5 W.):

- A_{00} ½ to 0 inch, partly decomposed leaves from hardwoods; abrupt wavy boundary.
- A_1 0 to 7 inches, very dark gray (10YR 3/1) silt loam; moderate, medium, granular structure, but also has a few very weak, thin plates; friable; many roots and pores; pH 6.0; 4 to 6 inches thick; clear wavy boundary.
- A_2 7 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; faces of peds brown (10YR 5/3); moderate, medium, platy structure; friable; vesicular; pH 5.0; 0 to 6 inches thick; abrupt wavy boundary.
- A_3 12 to 19 inches, brown (10YR 5/3 to 4/3) silt loam; weak, medium, subangular blocky structure, but breaks to weak, medium plates; friable; vesicular; pH 5.2; 6 to 8 inches thick; abrupt wavy boundary.
- B_1 19 to 24 inches, brown (10YR 4/3) heavy silt loam; moderate, coarse to medium, subangular blocky structure; firm; roots common; pH 5.2; 4 to 7 inches thick; clear wavy boundary.
- B_2 24 to 35 inches, brown (7.5YR 4/4 to 5/4) silty clay loam; faces of peds very dark grayish brown (10YR 3/2 to 3/3); moderate to strong, medium to fine, subangular blocky structure; firm; pH 5.2; 7 to 14 inches thick; clear wavy boundary.
- B_3 35 to 45 inches, yellowish-brown (10YR 5/4) heavy silt loam; faces of peds pale brown (10YR 6/3); moderate, coarse to medium, subangular blocky structure; firm; pH 5.5; 6 to 14 inches thick; clear wavy boundary.
- C 45 inches +, yellowish-brown (10YR 5/4) silt loam; very weak, coarse, subangular blocky structure; firm; has a few pores; pH 5.8; loess is calcareous at depths below 6 to 8 feet.

Gale silt loam

The soils of this type are moderately deep and are well drained. They belong to the Gray-Brown Podzolic great soil group. These soils have formed from loess that is no more than 36 inches deep. The loess is of Peorian age and overlies sandstone of the Cambrian period.

The Gale soils are similar to the Dubuque soils, but they are underlain by sand and sandstone rather than by red clay and dolomite. In La Crosse County they occur in association with the Hixton soils. They differ from the Hixton soils in having formed in part from loess instead of from weathered products of sandstone and shale. In many places the two soils are so closely intermingled that they have been mapped as a Gale-Hixton complex.

Profile description (NE¼NE¼ sec. 3, T. 17 N., R. 7 W.):

- A_p 0 to 8 inches, dark-brown (10YR 3/3) silt loam; moderate, fine to medium, subangular blocky structure; friable; many roots and pores; pH 6.5; 4 to 10 inches thick; gradual smooth boundary.
- A_2 8 to 11 inches, dark-brown to brown (7.5YR 4/4) silt loam; weak, medium, platy structure; friable; many roots and pores; pH 5.5; 1 to 4 inches thick; clear wavy boundary.
- B_1 11 to 14 inches, dark-brown to brown (7.5YR 4/4) silt loam; moderate, fine to medium, subangular blocky structure; friable; many roots and pores; pH 5.3; 2 to 5 inches thick; gradual wavy boundary.
- B_2 14 to 20 inches, brown (7.5YR 4/4) to strong-brown (7.5YR 5/6) heavy silt loam; moderate, medium, subangular blocky structure, slightly stronger than that of the B_1 horizon; friable to firm; many fine pores; some fine roots; from 1/10 to more than 3/10 of the faces of peds are coated with silica; pH 5.5; 5 to 12 inches thick; clear wavy boundary.
- B_3 20 to 28 inches, strong-brown (7.5YR 5/6) loam with a few streaks of strong-brown (7.5YR 5/8) sand; weak to moderate, coarse, angular blocky structure; friable; many fine pores; pH 5.5; 6 to 9 inches thick; abrupt wavy boundary.
- D_1 28 to 36 inches, brown (7.5YR 5/4), strong-brown (7.5YR 5/8), and pink (7.5YR 7/4) sand, variegated; single grain; loose; pH 5.2; 0 to 36 inches thick; gradual wavy boundary.
- D_2 36 to 60 inches, strong-brown (7.5YR 5/8) partly weathered sandstone with streaks of yellowish-red (5YR 4/8) siltstone; pH 5.2; many feet thick.

Gotham loamy sand

The soils of this type are sandy and are somewhat excessively drained. They are Brunizem-Gray-Brown Podzolic intergrades. These soils occur on terraces throughout the county. They have formed from sandy outwash that came, at least in part, from adjacent upland areas of Cambrian sandstone.

These soils occur in association with the loamy fine sands of the Plainfield and Sparta series and with the Dakota sandy loams. They differ from the Plainfield and Sparta soils in having an A horizon that is intermediate in color and thickness between those of the Plainfield and Sparta soils and in having a weakly developed textural B horizon. The Gotham soils are lighter textured throughout than the Dakota soils.

The A horizon of the Gotham soils ranges from 12 to 18 inches in thickness. The B horizon ranges from loamy sand to light sandy loam in texture and from weak coarse to medium subangular blocky in structure.

Profile description (NE¼NE¼ sec. 18, T. 17 N., R. 7 W.):

- A_p 0 to 9 inches, very dark grayish-brown (10YR 3/2) heavy loamy sand; single grain; very friable; many roots and pores; pH 6.2; 6 to 10 inches thick; clear wavy boundary.
- A_3 9 to 16 inches, brown to dark-brown (7.5YR 4/3) heavy loamy sand; weak, coarse, subangular blocky structure; friable; many roots and pores; pH 6.0; 6 to 9 inches thick; clear wavy boundary.
- B_2 16 to 24 inches, brown (7.5YR 4/4 to 5/4) heavy loamy sand; weak, medium, subangular blocky structure; very friable; many roots and pores; pH 6.0; 4 to 10 inches thick; gradual smooth boundary.
- C_1 24 to 32 inches, yellowish-brown (10YR 5/4) light loamy sand; single grain; loose; many pores and a few roots; pH 5.5; 6 to 18 inches thick; gradual wavy boundary.
- C_2 32 to 60 inches, yellowish-brown (10YR 5/4) to light yellowish-brown (10YR 6/4) sand; single grain; loose; many pores; has 2 or 3 bands of sandy loam, 1 to 3 inches thick; pH 5.5.

Hesch sandy loam

The soils of this type are moderately deep to deep and are well drained. They belong to the Brunizem great soil group. The soils have formed under prairie vegetation from sandstone of the Cambrian period. In La

Crosse County most of them have formed in alluvial-colluvial materials on foot slopes below steep bluffs where sandstone of the Cambrian period is exposed. They have thus been influenced by weathered sandy outwash and silty loessal outwash.

These soils have a mixed texture that is sandy to silty. Generally, they have a weakly developed and variable profile that has fragments of sandstone throughout. In some places silty and sandy sediments occur in strata of varying thickness; in other places there is deep sandy loam throughout the profile. In a few places the profile has a C horizon of weathered sandstone. The depth to bedrock ranges from 34 inches to several feet. These soils are related to the Hixton sandy loams that have formed from similar parent material but under timber.

Profile description:

A_1 0 to 14 inches, very dark brown (10YR 2/2) heavy sandy loam with very weak, medium, subangular blocky structure; very friable; many roots and pores; pH 6.5; 8 to 16 inches thick; gradual smooth boundary.

A_3 14 to 30 inches, very dark brown (10YR 2/2) to very dark grayish-brown (10YR 3/2) heavy sandy loam; structureless; very friable; many roots and pores; has some small fragments of sandstone; pH 6.5; 8 to 16 inches thick; clear smooth boundary.

B_2 30 to 48 inches, dark-brown (10YR 3/3) loam; very weak, coarse, angular blocky structure; friable; many fine roots and pores; many small fragments of sandstone; pH 6.5; 12 to 24 inches thick; abrupt wavy boundary.

D_r 48 inches +, strong-brown (7.5YR 5/8) to pink (7.5YR 7/4) variegated sandstone bedrock that is unweathered and firm.

Hixton sandy loam

This type consists of moderately deep, well-drained upland soils that belong to the Gray-Brown Podzolic great soil group. The soils have formed from fine-grained sandstone and sandy shale. The sandstone generally contains some fine materials even where it does not lie close to the shale.

These soils are related to the Hesch sandy loams and Gale silt loams. All of these soils have formed from similar materials, but the Hesch soils have formed under prairie vegetation, and the Gale soils have formed from a layer of loess that covered the sandstone. In some places the Gale and Hixton soils are intermingled and have been mapped as Gale-Hixton complexes. The Hixton soils are also related to the Boone sands, but the Boone sands have formed from weathered products of pure sandstone that contained little fine material.

The depth to consolidated rock in the Hixton soils ranges from 20 inches to several feet. The differences among the soils are related to the relative amounts of material formed from shale or sandy shale and to the depth to bedrock. Some included areas have small amounts of loess over the sandstone.

Profile description (NE¼SW¼ sec. 12, T. 18 N., R. 7 W.):

A_p 0 to 6 inches, dark grayish-brown (10YR 4/2) to very dark grayish-brown (10YR 3/2) sandy loam; weak, very fine, granular structure; loose when either moist or dry; many roots and pores; pH 7.2; 3 to 9 inches thick; clear wavy boundary.

A_2 6 to 8 inches, brown (10YR 5/3) to dark-brown (7.5YR 4/4) sandy loam; single grain; loose; many roots and pores; pH 7.0; 1 to 3 inches thick; clear wavy boundary.

B_2 8 to 15 inches, dark-brown to brown (7.5YR 4/4) heavy fine sandy loam; massive; friable; many roots and pores; pH 5.3; 3 to 12 inches thick; gradual wavy boundary.

B_3 15 to 24 inches, yellowish-brown (10YR 5/6) loamy sand; single grain; compact in place; a few fine roots; pH 5.0; 5 to 12 inches thick; gradual wavy boundary.

C_1 24 to 30 inches, light yellowish-brown (10YR 6/4) sand; single grain; only slightly coherent in place; in places has fragments of sandstone; pH 5.2; 4 to 24 inches thick; abrupt wavy boundary.

C_2 30 to 48 inches, pale-yellow (2.5Y 7/4) sand; single grain; a few bands of dark brown (7.5YR 3/4) sandy loam from 1 to 3 inches thick; pH 5.5; grades to sandstone at depths ranging from 20 inches to several feet.

Huntsville silt loam

This type consists of deep, silty soils that are dark colored and moderately well drained to well drained. The soils belong to the Alluvial great soil group. They occupy broad areas on the bottom lands along streams in the western part of the county. The soils have formed in silty alluvium laid down by streams during periods of heavy runoff.

In La Crosse County the Huntsville soils are intermingled with the Lawson soils, and the soils of the two series are mapped together. Most of the Lawson and Huntsville silt loams are just below the bluffs that border the terraces along the Mississippi River. Here, streams from the uplands spread out and the wide bottom lands are flooded frequently. Near Midway there is a large area in which the soils of the two types have sandy substrata and are mapped as Lawson and Huntsville silt loams, sandy substrata.

The Huntsville silt loams in La Crosse County are variable. The thickness of the very dark brown (10YR 2/2) alluvial material ranges from 12 to 24 inches, and in some places the color of the surface soil is nearly very dark grayish brown (10YR 3/2). The texture of the substratum ranges from silty clay loam to sand. The soils that have a sandy substratum are similar to the normal soil, but they have sand at depths between 28 and 36 inches and are moderately well drained. The hazard of flooding in the Huntsville soils is slight to severe.

Profile description (NW¼NW¼ sec. 10, T. 16 N., R. 7 W.):

A_p 0 to 7 inches, very dark brown (10YR 2/2) silt loam; very weak coarse angular blocky structure; friable; many roots and pores; pH 7.2; 6 to 12 inches thick; abrupt smooth boundary.

A_{11} 7 to 24 inches, very dark brown (10YR 2/2) silt loam; weak to moderate, medium, subangular blocky structure; friable; many roots and pores; pH 6.8; 7 to 18 inches thick; gradual wavy boundary.

A_{12} 24 to 34 inches, very dark brown (10YR 2/2) to very dark gray (10YR 3/1) silt loam; weak, medium, subangular blocky structure; many roots and pores; pH 6.5; 5 to 10 inches thick; clear wavy boundary.

A_{13} 34 to 40 inches, very dark gray (10YR 3/1) to dark-gray (10YR 4/1) silt loam; massive; friable; many fine roots and pores; pH 6.5; 4 to 8 inches thick; clear wavy boundary.

C_1 40 to 48 inches, very dark gray (10YR 3/1) to grayish-brown (10YR 5/2) heavy silt loam; common, medium, prominent reddish-brown (5YR 4/3) mottles; massive; firm; a few roots and pores; pH 6.5; 4 to 12 inches thick; gradual wavy boundary.

C_2 48 to 60 inches, variegated very dark grayish-brown (10YR 3/2), dark-gray (10YR 4/1), and gray (10YR 6/1) heavy silt loam; common; coarse, prominent. yellowish-red (5YR 4/6) mottles; massive; firm; pH 6.5,

Jackson silt loam

The soils of this type are deep and silty and are moderately well drained. They belong to the Gray-Brown Podzolic great soil group. These soils have formed from silt of Peorian age. They occupy nearly level areas and slight depressions and are on the terraces of some of the streams throughout the county.

The Jackson soils occur in association with the Bertrand and Curran soils. Unlike the Jackson soils, the Bertrand soils are well drained, and the Curran are somewhat poorly drained. The Jackson soils are similar to the Toddville soils, but they have a thinner, lighter colored A horizon. Although the variations in the Jackson soils are slight, the thickness of the soil profile varies as does the abundance of mottles.

These soils are not extensive. They generally occur within areas of Bertrand silt loam. In La Crosse County the only soil mapped of this type is Jackson silt loam.

Profile description:

A_p 0 to 11 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium to coarse, subangular blocky structure; friable; many roots and pores; pH 6.5; 8 to 12 inches thick; abrupt smooth boundary.

B_1 11 to 18 inches, dark-brown (10YR 4/3) silt loam; some very dark grayish-brown (10YR 3/2) aggregates formed by activity of earthworms; weak, coarse, subangular blocky structure; friable; many roots and pores; pH 6.5; 6 to 9 inches thick; clear smooth boundary.

B_{21} 18 to 24 inches, strong-brown (7.5YR 5/6) silty clay loam; ped faces have a higher chroma (7.5YR 5/8) and in places a few dark-brown (7.5YR 3/2) organic stains; moderate, medium, subangular blocky structure; friable; roots and pores common; pH 6.5; 4 to 10 inches thick; gradual wavy boundary.

B_{22} 24 to 34 inches, brown (7.5YR 5/4) to strong-brown (7.5YR 5/6) silty clay loam; common, medium, distinct, yellowish-brown and reddish-brown mottles; moderate, medium, subangular blocky structure; friable; some fine roots and pores; pH 6.5; 6 to 12 inches thick; gradual wavy boundary.

B_3 34 to 40 inches, brown (7.5YR 5/4) to strong-brown (7.5YR 5/6) silt loam, with common, medium, distinct mottles; weak, coarse, angular blocky structure; friable; a few fine roots; pH 6.5; 5 to 8 inches thick; gradual wavy boundary.

C_1 40 to 60 inches, yellowish-brown (10YR 5/4) silt loam; common, coarse, prominent mottles of yellowish brown (10YR 5/6 and 5/8), light gray (10YR 7/2), and dark reddish brown (5YR 3/2); massive; pH 6.5; 16 inches to several feet thick.

Judson silt loam

This type consists of deep, silty soils that are dark colored and well drained. The soils are Brunizem-Alluvial intergrades. They occur on alluvial fans and in drainageways between the lower slopes of uplands and terraces throughout the county. Drainageways on upland ridges normally are occupied by Chaseburg rather than by Judson soils. The hazard of flooding is slight to severe. The Judson soils are similar to the Chaseburg soils, but they have a darker color. In some areas the soils of the two series are mapped together as Chaseburg and Judson silt loams.

The depth of the dark-colored silty material in the Judson soils ranges from 18 to 42 inches or more. In a few places there are traces of a weakly developed B horizon, but generally this horizon is absent. The texture of the underlying layers ranges from loam to silt loam, and in places the lower layers are stratified.

Profile description (NW¼SE¼ sec. 28, T. 17 N., R. 5 W.):

A_1 0 to 35 inches, very dark brown (10YR 2/2) silt loam; weak, thick, platy clods, but breaks to weak, coarse, angular blocks with some weak, medium, granular aggregates; friable; many roots and pores; pH 7.0; 18 to 42 inches thick; clear wavy boundary.

C_1 35 to 48 inches, dark-brown (10YR 3/3) silt loam; massive; friable; many fine roots and pores; pH 6.5; 10 to 20 inches thick; gradual wavy boundary.

C_2 48 to 60 inches, dark yellowish-brown (10YR 4/4) loam; massive; friable; some roots; many pores; pH 6.0; 4 to 24 inches thick.

Lawson silt loam

The soils of this type are deep, dark-colored Alluvial-Humic Gley intergrades and are somewhat poorly drained. They are on broad bottom lands along the Mississippi River and other streams, mostly in the western part of the county. They have formed from silty alluvium that was laid down by streams during periods of heavy runoff.

In La Crosse County these soils generally occur in association with the Huntsville soils, and the soils of the two series are mapped together as Lawson and Huntsville silt loams. The Lawson soils are similar to the Huntsville soils, but they are less well drained and the lower part of the profile is not so brown. In areas where the substratum is sandy, the soils are mapped as Lawson and Huntsville silt loams, sandy substrata. Although Lawson silt loam is not mapped separately in this county, the following description of a profile observed in central Illinois is provided for those who want to compare the soils.

Profile description:

A_1 0 to 20 inches, black to very dark grayish-brown (10YR 2.5/1.5) silt loam; weak, fine, granular structure; friable to firm; many fine roots; neutral; 15 to 30 inches thick; gradual smooth boundary.

20 to 35 inches, very dark gray (10YR 3/1.5) silt loam; nearly massive; friable; a few, faint, black (10YR 2/1) mottles; many dark-brown to yellowish-brown, soft concretions; neutral; 12 to 20 inches thick; gradual smooth boundary.

35 inches +, grayish-brown (2.5Y 5/2) silt loam to loam; a few, fine, distinct, yellowish-brown mottles and in some places thin layers colored dark gray (2.5Y 4/1); massive; friable; neutral; normally grades to stratified silt loam, sandy loam, or gravelly loam at depths of 7 to 8 feet.

Medary silt loam

The soils of this type are deep and are moderately well drained to well drained. They belong to the Gray-Brown Podzolic great soil group. These soils occupy small areas and occur in high positions on the terraces of streams. They have formed in a thin cover of loess that overlies heavy reddish-brown (2.5YR 4/4) lacustrine clay.

These soils are associated with Zwingle silt loam, but the Zwingle soil occurs on broader, more nearly level terrace areas than the Medary soils and has more restricted surface drainage. Generally, the Medary soils lie next to Bertrand soils. The Bertrand soils also belong to the Gray-Brown Podzolic great soil group, but they are underlain by silt instead of clay.

In La Crosse County the Medary soils differ chiefly in the thickness of the silt over red clay. In most places the cover of silt is thin and the reddish-brown clay is just below the surface. Although the internal drainage of the Medary soils is slow, in this county most of the areas are well drained because they are on convex slopes where surface drainage is good.

Profile description (NW¼SW¼ sec. 14, T. 16 N., R. 7 W.):

A_1 0 to 6 inches, brown (7.5YR 5.3 to 4/3) heavy silt loam; moderate, fine to medium, subangular blocky structure; friable; many roots and pores; pH 6.2; 4 to 8 inches thick; clear wavy boundary.

A-B 6 to 11 inches, reddish-brown (5YR 5/3) heavy silty clay loam; moderate, medium to coarse, subangular blocky structure; firm when moist, but hard when dry; many roots and pores; pH 6.2; 4 to 8 inches thick; gradual wavy boundary.

B_1 11 to 18 inches, reddish-brown (2.5YR 4/4) silty clay; moderate to strong, medium, subangular blocky structure, but breaks to moderate, fine, subangular blocks; firm when moist, but plastic when wet; some tree roots; a few pores; pH 5.5; 6 to 9 inches thick; gradual wavy boundary.

B_2 18 to 25 inches, reddish-brown (2.5YR 4/4) silty clay; moderate to strong, fine, subangular blocky structure; firm when moist, but plastic when wet; some tree roots; pH 5.0; 6 to 12 inches thick; gradual wavy boundary.

B_3 25 to 40 inches, reddish-brown (5YR 4/4) silty clay; weak, coarse, angular blocky structure; firm when moist, but plastic when wet; some tree roots; pH 5.8; 8 to 16 inches thick; gradual wavy boundary.

C 40 inches +, brown to dark-brown (7.5YR 4/4) silty clay; massive; firm when moist, but plastic when wet; pH 6.5.

Meridian sandy loam and Meridian loam

In La Crosse County the Meridian sandy loams are mapped separately; the Meridian loams are intermingled with the Waukegan silt loams, and the soils of the two types are mapped as Meridian-Waukegan complexes. The two Meridian soil types are described together here because they are similar except for the texture of the surface soil.

The Meridian soils are moderately deep and are well drained. They belong to the Gray-Brown Podzolic great soil group. The A horizon of these soils ranges from loam to sandy loam and is underlain by sand at depths of 20 to 36 inches. The soils are on terraces of the Mississippi River and its larger tributaries.

These soils occur in association with Dakota, Gotham, and Waukegan soils. The Meridian sandy loams have a lighter colored A horizon than the Dakota soils and are heavier textured throughout than the Gotham loamy sands. The Meridian loams have a lighter colored surface layer, especially when dry, than the Waukegan soils and are loamy throughout rather than silty. The sandy loam type predominates.

The surface layer of the Meridian soils ranges in color from 10YR 2/2 through 3/2 to 3/4. The texture of the surface soil and of the B_2 horizon ranges from sandy loam to loam. The depth to the underlying sand ranges from 20 to 36 inches, but it generally is 20 to 24 inches.

Profile description of Meridian sandy loam (SE¼NW¼ sec. 8, T. 18 N., R. 7 W.):

A_p 0 to 9 inches, very dark grayish-brown (10YR 3/2) to dark-brown (10YR 3/3) light sandy loam; mostly single grain (recently cultivated); very friable to loose; many roots and pores; pH 6.5; 6 to 10 inches thick; clear wavy boundary.

B_1 9 to 13 inches, dark-brown (10YR 3/3) sandy loam; weak, coarse, subangular blocky structure; friable; many roots and pores; pH 5.8; 3 to 6 inches thick; gradual smooth boundary.

B_2 13 to 22 inches, dark-brown (7.5YR 3/4) loam; weak, medium, subangular blocky structure; friable; many roots and pores; pH 5.8; 6 to 12 inches thick; clear smooth boundary.

B_3 22 to 30 inches, strong-brown (7.5YR 5/6) loamy sand; single grain; loose; porous; many fine roots; pH 5.8; 6 to 12 inches thick; clear smooth boundary.

C_1 30 to 56 inches, variegated brown (10YR 5/3 and 7.5YR 4/4), yellowish-brown (10YR 5/4), and brownish-yellow (10YR 6/6) sand; loose; contains 3 bands of sandy loam 1 to 2 inches thick; pH 6.0; thickness varies; clear smooth boundary.

C_2 56 to 60 inches, light yellowish-brown (2.5Y 6/4) sand; loose; pH 6.0.

Muck and peat

The Muck and peat soils of La Crosse County are made up mainly of noncalcareous, fibrous peat that underlies thoroughly decomposed muck. The thickness of the organic material ranges from less than 20 inches to several feet. The soils belong to the Bog great soil group. They have poor natural drainage, but some areas have been tile drained and are used for crops. Where the areas have been drained, the fibrous material is decomposed to greater depths than in the undrained soil.

Profile description (SW¼SW¼ sec. 35, T. 18 N., R. 5 W.):

1 0 to 10 inches, black (10YR 2/0), well-decomposed muck; moderate, coarse, angular blocky structure, but breaks to moderate, fine, subangular blocks; very friable; pH 6.0; 6 to 15 inches thick; abrupt smooth boundary.

2 10 to 24 inches, black (10YR 2/0) muck with dark reddish-brown (5YR 3/4) stains in root channels; weak, coarse, angular blocky structure; loose; very porous; decomposed except for coarse roots 1/16 inch or more in diameter; pH 6.0; 6 to 20 inches thick; gradual wavy boundary.

3 24 to 44 inches, very dark brown (10YR 2/2) to very dark grayish-brown (10YR 3/2) peat; structureless; loose; very porous; 40 percent of material is decomposed, and 60 percent is fine fibrous peat; pH 6.3; 6 to 20 inches thick; abrupt wavy boundary.

D_1 44 to 60 inches, very dark gray (10YR 3/1) silt loam; massive; friable; pH 7.5; no free lime.

Orion silt loam and Orion fine sandy loam

The Orion silt loams and Orion fine sandy loams are mapped separately, but they are described together here because they are similar except for the texture of the surface layer. These soils are deep and silty and are somewhat poorly drained. They belong to the Alluvial great soil group. They occur along the larger streams throughout the county. Some areas are flooded so frequently and so severely that they are used mainly for pasture. Others are used mainly for crops.

These soils occur in association with Arenzville silt loam. They are not so well drained as the Arenzville silt loams and have a slightly darker surface layer. Some of the areas have been mapped as Arenzville, Orion, and Huntsville soils.

The Orion soils vary chiefly in color, in thickness, and in the number of strata in the solum. The texture of the profile ranges from sandy loam to silt loam, but silty material is dominant. In some places there are thin lenses of sand. Mottling varies somewhat.

Profile description of Orion silt loam (NE¼NW¼ sec. 28, T. 15 N., R. 6 W.):

A_{11} 0 to 13 inches, dark-brown (10YR 3/3) to brown (10YR 5/3) silt loam; moderate, medium, platy structure resulting from stratification of parent material; friable; many roots and pores; pH 7.5; 7 to 14 inches thick; clear wavy boundary.

A_{12} 13 to 28 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, platy structure resulting from stratification of parent materials; friable; many roots and pores, but roots are concentrated between plates; dark reddish-brown (5YR 3/4) iron stains between some plates; pH 7.5; 10 to 20 inches thick; gradual wavy boundary.

A_{13} 28 to 48 inches, stratified dark-gray (10YR 4/1), dark grayish-brown (10YR 4/2), and brown (10YR 5/3) silt loam; common, coarse, prominent, dark reddish-brown (2.5YR 3/4) mottles; many roots, especially between strata; many pores; pH 7.5.

Plainfield fine sand and Plainfield loamy fine sand

In this county Plainfield fine sand and Plainfield loamy fine sand are mapped separately. They are described together here, because they differ chiefly only in the texture of the surface layer. These soils are light colored and are excessively drained. They belong to the Regosol great soil group. The soils are on stream terraces throughout the county. They have formed in sandy outwash from sandstone of Cambrian age.

The Plainfield soils are associated with soils of the Gotham and Meridian series, but they lack the textural B horizon that is weakly developed in the Gotham soils and well developed in the Meridian soils. They are also associated with the Sparta soils, but their A horizon is lighter colored and thinner than that of the Sparta soils. Where the Plainfield and Sparta soils are closely intermingled in dune areas of complex topography, they have been mapped as a Plainfield-Sparta complex.

The Plainfield soils differ chiefly in the degree and complexity of their slopes and in the amount of wind erosion. The soils also differ somewhat in the amount of fine material in the profile. In addition, thin bands of sandy loam occur in some places in the underlying sand at depths of 3 to 5 feet. In La Crosse County the lower part of the A horizon of the Plainfield soils is darker colored and the colors are 2 to 3 units lower in value than in the Plainfield soils in the central part of Wisconsin.

Profile description of Plainfield loamy fine sand (SE¼SE¼ sec. 19, T. 17 N., R. 7 W.):

A_p 0 to 8 inches, very dark grayish-brown (10YR 3/2) to dark-brown (10YR 3/3) loamy fine sand; weak, medium, granular structure; loose; many roots and pores; pH 5.8; 6 to 9 inches thick; abrupt smooth boundary.

A_{12} 8 to 17 inches, very dark grayish-brown (10YR 3/2) to dark grayish-brown (10YR 4/2) loamy fine sand; weak, medium, subangular blocky structure; very friable; many roots and pores; pH 5.8; 2 to 10 inches thick; clear wavy boundary.

A_{13} 17 to 23 inches, brown to dark-brown (10YR 4/3) fine sand; weak, fine, subangular blocky structure; friable; many roots, pH 5.5; 4 to 8 inches thick; clear wavy boundary.

C_1 23 to 39 inches, yellowish-brown (10YR 5/4) fine sand; single grain; loose; many roots; pH 6.0; 15 to 35 inches thick; gradual irregular boundary.

C_2 39 to 53 inches, brown to dark-brown (7.5YR 4/4) sand; single grain; loose; a few roots; some balls of dark-brown (7.5YR 3/4) sandy loam; pH 6.5; thickness variable; clear wavy boundary.

C_3 53 inches to several feet, yellowish-brown (10YR 5/4) to pale-brown (10YR 6/3) sand; single grain; very loose; a few roots; 3 or 4 bands of strong-brown (7.5YR 3/6) sandy loam to sandy clay loam 1 to 2 inches thick; pH 6.5.

Port Byron silt loam

The soils of this type are deep and silty and are well drained. They belong to the Brunizem great soil group. They occur in two positions in the county. One is on small, irregular hills where these soils have formed from coarse-textured loess. The other is on the gentle to steep valley slopes where they have formed from loess of finer texture washed down from areas above. The Port Byron soils occur with the Seaton soils. In uneroded areas, their surface soil is darker than that of the Seaton soils. The Port Byron soils on valley slopes are similar to Fayette soils (valleys), but they have a darker colored surface soil.

The Port Byron soils erode easily, but the degree of erosion varies. In areas where the slopes are concave, there is a slight accumulation of material washed from higher lying areas. Where the slopes are convex, the soil is severely eroded in places. There is a large area of these soils south of West Salem where all of the very dark brown (10YR 2/2) A horizon has been lost from the long, narrow ridgetops and the light-colored subsoil is exposed. Here, the landscape shows a striking contrast in colors when it is not covered by crops. Where Port Byron soils are on the valley slopes, the B_2 horizon is finer textured than that of the typical soil and is a dark yellowish-brown (10YR 4/4) silt loam with moderate, medium blocky structure. In most severely eroded areas, there is calcareous material on or near the surface of the Port Byron soils. In places on the valley slopes, there are fragments of sandstone in the subsoil. These have washed down with the silt from exposures of Cambrian sandstone that occur in areas of Rough broken land and rock land.

Profile description (200 feet north of corner of S¼ sec. 16, T. 16 N., R. 6 W.):

A_{1+} 0 to 9 inches, very dark grayish-brown (10YR 3/2) to very dark brown (10YR 2/2) silt loam; weak, fine, granular structure; very friable; many roots and pores; pH 6.0; 0 to 10 inches thick; clear wavy boundary.

A_1 9 to 17 inches, very dark brown (10YR 2/2) to black (10YR 2/1) silt loam; weak to moderate, fine, subangular blocky structure; very friable; many roots and pores; pH 5.8; 0 to 12 inches thick; gradual smooth boundary.

A_3 17 to 24 inches, dark-brown (7.5YR 3/4 to 3/2) silt loam; weak, very fine, subangular blocky structure; very friable; many roots and pores; pH 5.5; 6 to 10 inches thick; gradual smooth boundary.

B_2 24 to 32 inches, dark-brown (7.5YR 3/4) silt loam; very weak, fine, subangular blocky structure; very friable; many roots; vesicular; pH 5.5; 4 to 10 inches thick; gradual smooth boundary.

B_3 32 to 40 inches, dark yellowish-brown (10YR 3/4 to 4/4) coarse silt; massive; very friable; many roots; vesicular; pH 5.8; 4 to 8 inches thick; gradual smooth boundary.

C_1 40 to 44 inches, dark yellowish-brown (10YR 4/6) coarse silt; massive; very friable; fine vesicular; some fine roots; pH 6.0; 2 to 6 inches thick; gradual smooth boundary.

C_2 44 to 50 inches, yellowish-brown (10YR 5/4 to 5/6) coarse silt; massive; very friable; a few fine roots; fine vesicular; pH 6.0.

Richwood silt loam

The soils of this type are deep and silty and are well drained. They belong to the Brunizem great soil group. The soils have formed in silt loam materials on nearly level areas of stream terraces. In La Crosse County they are mostly on broad areas of the terraces of Fleming Creek, Mormon Creek, the La Crosse River, and tributaries of those streams.

The soils are associated with the somewhat poorly drained Rowley soils and the moderately well drained Toddville soils. Except that they have a darker colored, thicker surface layer, they are similar to the Bertrand soils, which have formed from similar materials but under forest. They are deeper to the underlying sand or gravel than the Waukegan soils, which occur at slightly higher elevations within larger areas of Richwood soils.

In the Richwood soils in La Crosse County, the thickness of the silt loam materials ranges from 42 inches to several feet. In areas of these soils that resemble the Toddville soil, the lower part of the B horizon is slightly mottled. The platy structure in the A_{1p} and A_{12} horizons of the profile described appears to have resulted from compaction by heavy machinery. As mapped in La Crosse County, these horizons are normally granular.

Profile description (SW¼SW¼ sec. 30, T. 17 N., R. 5 W.):

A_{1p} 0 to 8 inches, black (10YR 2/1) silt loam; moderate, thick, platy structure, but breaks readily to moderate, medium granules; friable; many roots and pores; pH 8.0; abrupt smooth boundary.

A_{12} 8 to 13 inches, black (10YR 2/1) to very dark brown (10YR 2/2) silt loam; moderate, thin to medium, platy structure, but breaks to moderate, fine to medium granules; friable; many roots and pores; pH 5.8; A_1 horizon (A_{1p} and A_{12}) ranges from 6 to 14 inches in thickness; clear wavy boundary.

A_3 13 to 20 inches, very dark grayish-brown (10YR 3/2) to dark-brown (10YR 3/3) silt loam; weak, medium, platy structure, but breaks to moderate, fine to medium granules; friable; many roots and pores; pH 5.5; 5 to 9 inches thick; clear wavy boundary.

B_1 20 to 26 inches, dark-brown (10YR 4/3) light silty clay loam; moderate, fine to medium, subangular blocky structure; firm; many roots and pores; pH 5.2; 4 to 7 inches thick; gradual smooth boundary.

B_2 26 to 35 inches, dark yellowish-brown (10YR 3/4) silty clay loam; moderate, medium, subangular blocky structure; firm; many roots in upper part, but few in lower part; pH 5.5; 7 to 11 inches thick; clear wavy boundary.

B_3 35 to 42 inches, dark yellowish-brown (10YR 4/4) to yellowish-brown (10YR 5/4) light silty clay loam; weak, medium subangular blocky structure; firm; pH 6.0; 6 to 9 inches thick; clear wavy boundary.

C_1 42 inches +, brown (10YR 5/3) light silty clay loam; massive; friable; pH 6.5; 4 inches to several feet thick, becomes mottled, with depth, in lower part.

Rowley silt loam

The soils of this type are deep, silty, somewhat poorly drained Brunizem-Humic Gley intergrades. They have formed from silt loam materials on terraces along the major streams of La Crosse County. These soils occur in association with the well-drained Richwood soils and the moderately well drained Toddville soil. They occupy similar positions and are similar in drainage to Curran silt loam, but they have a thicker, darker colored A horizon.

The soils vary in surface and internal drainage and in the amount of mottling. Also, the texture of the B_2 and B_3 horizons ranges from a light to a heavy silty clay loam. Some areas of these soils have been drained. Consequently, they are less likely to be waterlogged and are more productive than the typical soil.

Profile description (SW¼NW¼ sec. 20, T. 15 N., R. 6 W.):

A_1 0 to 12 inches, black (10YR 2/1) to very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; friable; many roots and pores; pH 7.5; 8 to 14 inches thick; gradual wavy boundary.

A_3 12 to 20 inches, very dark brown (10YR 2/2 to 2/3) silt loam; a few, fine, faint, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure, but breaks to weak, medium granules; friable; many roots and pores; pH 7.5; 4 to 10 inches thick; abrupt wavy boundary.

B_{21} 20 to 32 inches, strong-brown (7.5YR 5/6 to 5/8) and light brownish-gray (10YR 6/2) light silty clay loam; strong-brown (7.5YR 5/6 to 5/8) mottles 3 to 4 inches in diameter; moderate, medium, subangular blocky structure; firm; a few fine roots and pores; pH 7.0; 8 to 14 inches thick; clear smooth boundary.

B_{22g} 32 to 38 inches, light olive-brown (2.5Y 5/3) light silty clay loam; yellowish-red (5YR 4/6) stains in root channels and between peds; moderate, coarse, angular blocky structure; firm; a few roots and pores; pH 7.0; 4 to 8 inches thick; clear smooth boundary.

C_g 38 to 60 inches, brown (10YR 5/3) to light brownish-gray (10YR 6/2) silt loam; common, coarse, prominent, yellowish-brown (10YR 5/6 to 5/8) mottles; massive; a few roots and pores; clay skins on old root channels; pH 7.0; 4 inches to several feet thick.

Seaton silt loam

The soils of this type are deep and silty and are well drained. They belong to the Gray-Brown Podzolic great soil group. The soils have formed on steep upland slopes from coarse-textured loess of Peorian age. In La Crosse County they occur mainly in small areas along the bluffs of the Mississippi River, but there is also a small area in the valley of the La Crosse River. These soils have formed from material that is similar, but coarser textured, than that from which the Fayette soils have formed, and they are coarser textured throughout.

The Seaton soils erode easily, and generally they are dissected by many gullies and steep-sided drainageways. In many places erosion is so rapid that a normal soil profile cannot develop. The differences among the Seaton soils in La Crosse County have been caused chiefly by differences in slope and in the degree of erosion.

Profile description (NW¼SW¼ sec. 20, T. 16 N., R. 6 W.):

A_1 0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; many grass roots; pH 6.5; 0 to 6 inches thick; clear smooth boundary.

A_2 3 to 7 inches, brown (10YR 5/3) silt loam; weak, thin, platy structure; very friable; many roots; pH 5.5; 1 to 4 inches thick; gradual smooth boundary.

A_3 7 to 10 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; many roots; pH 5.4; 1 to 4 inches thick; gradual smooth boundary.

B_1 10 to 18 inches, yellowish-brown (10YR 5/4) to dark yellowish-brown (10YR 4/4) silt loam; weak to moderate, fine, subangular blocky structure; friable; many roots; pH 5.3; 6 to 10 inches thick; gradual smooth boundary.

B_{21} 18 to 28 inches, dark-brown (7.5YR 4/4) heavy silt loam with darker (7.5YR 4/3) ped faces; moderate, medium, subangular blocky structure, but breaks to fine, angular blocks; friable; many roots; pH 5.2; 7 to 12 inches thick; gradual smooth boundary.

B_{22} 28 to 38 inches, dark-brown (10YR 4/3) heavy silt loam; faces of peds dark brown (7.5YR 3/2 to 4/4); moderate, medium to coarse, subangular blocky structure; firm; many roots; pH 5.5; 6 to 12 inches thick; clear smooth boundary.

B_3 38 to 48 inches, dark-brown (10YR 4/3) to yellowish-brown (10YR 5/4) silt loam; weak, coarse, subangular blocky structure; friable; a few roots; a few organic stains and silica coatings of very pale brown on ped faces; pH 5.8; 6 to 12 inches thick; gradual smooth boundary.

C_1 48 inches +, yellowish-brown (10YR 5/4 to 5/6) coarse silt; massive; friable; light brownish-gray (10YR 6/2) silica coatings throughout; pH 6.3.

Sparta loamy fine sand and Sparta sand

The Sparta loamy fine sands and Sparta sands are mapped separately in La Crosse County. They are described together here because they are similar except for texture.

These soils are very sandy, excessively drained Brunizem-Regosol intergrades. They have formed from sandy material of the Cambrian period and occur on the terraces of the larger streams throughout the county. The Sparta loamy fine sands predominate. The Sparta sands occur mainly in small areas on or near French Island.

The Sparta soils have a darker, thicker A horizon than the Plainfield soils with which they are associated. In some places, where the topography is complex, they are intermingled with the Plainfield soils and the soils of the two series have been mapped together as a Plainfield-Sparta complex. The Sparta soils also occur in association with the Dakota soils, but they lack the textural B horizon that is typical of the Dakota soils and are lighter textured throughout.

The Sparta soils in La Crosse County vary chiefly in texture, in the size of the sand particles, and in erosion. The Sparta sands contain coarser sand and have less fine material than the Sparta loamy fine sands. Erosion is slight to severe and has generally been caused by wind.

Profile description of Sparta loamy fine sand (SW¼SW¼ sec. 26, T. 18 N., R. 8 W.):

A_{11} 0 to 9 inches, black (10YR 2/1) to very dark brown (10YR 2/2) loamy fine sand; weak, medium, granular structure; loose; many roots and pores; pH 6.0; 4 to 10 inches thick; gradual wavy boundary.

A_{12} 9 to 17 inches, very dark brown (10YR 2/2) loamy fine sand; weak, medium, subangular blocky structure; very friable; many roots and pores; pH 6.2; 4 to 8 inches thick; gradual smooth boundary.

A_3 17 to 23 inches, dark-brown (10YR 3/3) to dark yellowish-brown (10YR 3/4) loamy sand; very weak, coarse, subangular blocky structure; very friable; many roots and pores; pH 6.0; 4 to 9 inches thick; clear wavy boundary.

C_1 23 to 30 inches, dark yellowish-brown (10YR 4/4) sand; single grain; loose; a few roots; pH 5.8; 6 to 12 inches thick; clear wavy boundary.

C_2 30 to 68 inches, yellowish-brown (10YR 5/6) to brownish-yellow (10YR 6/6) loose sand; pH 5.8.

Tell silt loam

This type consists of moderately deep, silty soils that are well drained. The soils belong to the Gray-Brown Podzolic great soil group. They have formed on stream terraces in silt underlain by sandy outwash. The underlying sand is at depths ranging from 20 to 42 inches, but generally it is at depths between 24 and 32 inches.

These soils are similar to the Bertrand soils. They differ in having sand at shallower depths.

Profile description (SW¼SW¼ sec. 3, T. 17 N., R. 7 W.):

A_1 0 to 6 inches, dark-brown (10YR 3/3) silt loam; weak to moderate, medium, subangular blocky structure; friable; many roots and pores; pH 7.0; 4 to 8 inches thick; clear wavy boundary.

B_1 6 to 9 inches, dark yellowish-brown (10YR 4/4) silt loam; weak to moderate, subangular blocky structure; friable; many roots and pores; pH 6.4; 2 to 6 inches thick; gradual wavy boundary.

B_2 9 to 17 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; many roots and pores; pH 6.0; 6 to 12 inches thick; clear wavy boundary.

B_3 17 to 26 inches, strong-brown (7.5YR 5/6) sandy loam; weak, coarse, subangular blocky structure; friable; many roots and pores; pH 5.4; 7 to 10 inches thick; clear wavy boundary.

D_1 26 to 30 inches, strong-brown (7.5YR 5/6) loamy sand; single grain; loose when either moist or dry; a few roots and many pores; pH 5.4; 3 to 6 inches thick; clear wavy boundary.

D_2 30 to 60 inches, light yellowish-brown (7.5YR 6/4) to reddish-yellow (7.5YR 6/6) sand; single grain; loose when either moist or dry; pH 5.8.

Toddville silt loam

The soils of this type are deep, silty, well-drained Brunizems. They have formed from silt and occur on stream terraces, mostly along Fleming and Mormon Creeks and along the La Crosse River and its tributaries. The soils are used mainly for crops and are highly productive when well managed.

These soils are similar in drainage to the Jackson soil, and they occupy similar positions. They differ in having a darker, thicker A horizon. The depth to silt in the Toddville soils ranges from 42 inches to several feet, and the thickness of the solum, from 40 to 48 inches. The mottles in the B_2 horizon range in abundance from few to common, and in size, from fine to medium.

In this county the only soil mapped of this type is Toddville silt loam.

Profile description (NE¼SW¼ sec. 28, T. 17 N., R. 6 W.):

A_1 0 to 12 inches, black (10YR 2/1) to very dark brown (10YR 2/2) silt loam; moderate, coarse to medium, granular structure; soft when dry, but friable when moist; many roots; very porous; pH 7.0; 8 to 12 inches thick; clear smooth boundary.

A_3 12 to 16 inches, very dark brown (10YR 2/2) to very dark grayish-brown (10YR 3/2) silt loam; weak to moderate, coarse, subangular blocky structure; slightly hard when dry, but friable when moist; many roots and pores; pH 5.8; 4 to 8 inches thick; clear wavy boundary.

B_1 16 to 26 inches, dark-brown (10YR 4/3) silt loam; weak to moderate, subangular blocky structure; hard when dry, but friable when moist; many roots and many fine pores; pH 5.5; 8 to 12 inches thick; clear wavy boundary.

B_2 26 to 36 inches, dark-brown (10YR 4/3) light silty clay loam; faces of peds are dark brown (10YR 3/3); moderate, medium, subangular blocky structure; hard when dry, but firm when moist; a few, fine, faint mottles; many fine roots and some root channels approximately 5 millimeters in diameter; a few fine pores; pH 5.5; 8 to 12 inches thick; gradual wavy boundary.

B_3 36 to 44 inches, dark-brown (10YR 4/3) heavy silt loam; faces of peds are dark brown (10YR 3/3); moderate, coarse, subangular blocky structure; hard when dry, but firm when moist; common, medium, distinct, yellowish-red (5YR 5/8) mottles; a few fine roots; clay skins on the larger pores; pH 5.5; 7 to 10 inches thick; gradual wavy boundary.

C 44 to 60 inches, dark-brown (10YR 4/3) to dark grayish-brown (10YR 4/2) silt loam; massive; slightly hard when dry, but friable when moist; a few fine roots; a few old root channels 3 to 5 millimeters in diameter have very dark grayish-brown (10YR 3/2) organic stainings; pH 5.5; 1 to several feet thick.

Trempe loamy fine sand

The soils of this type are very sandy, excessively drained Brunizem-Regosol intergrades. They have formed in outwash from reddish-colored sandstone of the Cambrian period. Generally, the areas are small and occur along the terraces of the Black, La Crosse, and Mississippi Rivers. Although the acreage in La Crosse County is not extensive, these soils are conspicuous because of their distinct reddish color.

These soils are associated with the Plainfield, Sparta, and Trempealeau soils. Except for the surface layer, they are redder throughout than the Plainfield and Sparta soils. They are coarser textured throughout than the Trempealeau soils and have no textural B horizon.

In La Crosse County the color hue of the lower A and upper C horizons of the Trempe soils ranges from 7.5YR to 2.5YR. The color value of the A horizon ranges from 2 to 4, but the chroma is generally 2.

Profile description (SE¼SE¼ sec. 6, T. 18 N., R. 5 W.):

A_p 0 to 7 inches, very dark grayish-brown (10YR 3/2) to very dark brown (10YR 2/2) loamy fine sand; dark grayish-brown (10YR 4/2) when dry; weak, fine, granular structure; very friable; many roots and pores; pH 5.3; 6 to 9 inches thick; gradual smooth boundary.

A_1 7 to 18 inches, dark-brown (7.5YR 3/4) loamy fine sand; weak, medium, subangular blocky structure; loose when moist or dry; many roots and pores; pH 5.3; 6 to 12 inches thick; clear smooth boundary.

A_3 18 to 29 inches, dark reddish-brown (5YR 3/4) loamy fine sand; very weak, medium, subangular blocky structure; loose when moist or dry; many fine roots and pores; pH 5.2; 8 to 12 inches thick; gradual smooth boundary.

C_1 29 to 36 inches, yellowish-red (5YR 4/8 to 5/8) light loamy sand; single grain; loose; a few roots; many pores; pH 5.2; 6 to 10 inches thick; gradual wavy boundary.

C_2 36 to 60 inches, light-gray (10YR 7/2) to white (10YR 8/2) sand; single grain; loose; pH 5.3.

Trempealeau fine sandy loam and Trempealeau silt loam

The soils of these two types are mapped separately in La Crosse County. They are described together here because they differ chiefly only in the texture of the surface soil.

The soils are deep, well-drained Brunizems. They have formed in outwash from reddish sandstone of the Cambrian period, but the silt loam type has also formed partly from silt. These soils occur on stream terraces. In La Crosse County the areas are generally small, but these soils are more extensive in the adjacent Trempealeau County. These soils are conspicuous because of their yellowish-red subsoil.

The Trempealeau soils are associated with the Plainfield and Sparta loamy fine sands and with the Dakota sandy loams. They have a more reddish subsoil and are finer textured than the Plainfield and Sparta soils. They are also associated with the Richwood silt loams, but they differ from those soils in having a yellowish-red subsoil. In La Crosse County the Trempealeau soils vary chiefly in the color of the subsoil, which in places is less red than that of the typical soil.

Profile description of Trempealeau fine sandy loam (SW¼SW¼ sec. 4, T. 18 N., R. 6 W.):

A_p 0 to 9 inches, dark-brown (7.5YR 3/2) to very dark brown (7.5YR 2/2) fine sandy loam; weak, fine, granular structure; very friable when moist, and nonsticky when wet; many roots and pores; pH 6.0; 7 to 10 inches thick; clear wavy boundary.

A_3 9 to 18 inches, yellowish-red (5YR 3/6 to 4/6) fine sandy loam; weak, medium, subangular blocky structure; very friable when moist, and nonsticky when wet; many roots and pores; pH 6.0; 5 to 9 inches thick; gradual wavy boundary.

B_{21} 18 to 27 inches, yellowish-red (5YR 3/8 to 4/8) heavy sandy loam; weak, coarse, subangular blocky structure; very friable when moist, and slightly sticky when wet; many roots and pores; many iron-manganese concretions about 5 millimeters in diameter; pH 5.5; 6 to 10 inches thick; gradual wavy boundary.

B_{22} 27 to 36 inches, yellowish-red (5YR 5/8) heavy sandy loam; weak, coarse, subangular blocky structure; very friable; many roots and pores; many iron-manganese concretions about 5 millimeters in diameter; pH 5.5; 6 to 10 inches thick; gradual wavy boundary.

B_3 36 to 45 inches, strong-brown (7.5YR 4/6) sandy loam; weak, medium, subangular blocky structure; firm; some fine roots and pores; stratified and slightly cemented; pH 5.5; 6 to 10 inches thick; abrupt wavy boundary.

C 45 to 60 inches, variegated strong-brown (7.5YR 5/8) and light brownish-gray (10YR 6/2) sand in about equal parts; single grain; loose; pH 5.5.

Waukegan silt loam

The soils of this type are moderately deep, well-drained Brunizems that occur on stream terraces. They have formed from silt; in La Crosse County the silty material is generally 20 to 42 inches thick over sand.

These soils normally occupy small ridges or knolls within large areas of Richwood soils. Their solum is thinner over sand than that of the Richwood soils, and in places they are somewhat more sloping and are slightly more eroded. The Waukegan soils are similar to the Tell soils, but they have a thicker, darker A horizon.

Profile description (NE¼NW¼ sec. 4, T. 16 N., R. 6 W.):

A_p 0 to 10 inches, black (10YR 2/1) to very dark brown (10YR 2/2) silt loam; cloddy because of recent plowing; friable; many roots and pores; pH 7.2; 5 to 12 inches thick; abrupt smooth boundary.

A_3 10 to 14 inches, dark-brown (7.5YR 3/2) silt loam; massive to weak, very fine, subangular blocky structure; friable; many roots and fine pores; slightly compact; pH 6.0; 3 to 6 inches thick; gradual smooth boundary.

B_2 14 to 20 inches, dark-brown (7.5YR 3/4) light silty clay loam; weak, medium, subangular blocky structure; friable; slightly plastic and nonsticky when wet; many roots; slightly vesicular; pH 5.3; 5 to 10 inches thick; gradual smooth boundary.

B_3 20 to 27 inches, dark-brown (7.5YR 3/4 to 4/4) heavy loam; weak, medium, subangular blocky structure; friable; many fine roots and pores; pH 5.3; 5 to 9 inches thick; abrupt smooth boundary.

D_1 27 to 36 inches, light yellowish-brown (10YR 6/4) sand; single grain; loose when either moist or dry; a few fine roots; pH 5.5; 6 to 30 inches thick; abrupt smooth boundary.

D_2 36 to 60 inches, light yellowish-brown (10YR 6/4) sand with 2- to 3-inch bands of brown to dark-brown (7.5YR 4/4) sandy loam throughout; single grain; loose; many roots common in the bands; pH 6.0.

Zwingle silt loam

The soils of this type are deep and are somewhat poorly drained. They are Gray-Brown Podzolic-Low-Humic Gley intergrades. The soils have formed in deposits of lakelaid, reddish clay that had a cap of silt 10 to 16 inches thick. The deposits were laid down when the streams were at a higher level than they are now. These soils occur on dissected benches within or near areas of Bertrand and other terrace soils. They are not extensive in this county and occupy only small areas, but they are conspicuous because of their poor drainage. In many areas the drainage is generally good, but within each area are small, low spots that are poorly drained. Because of the poor drainage in these areas, the growth of crops is hindered and cultivation is much impeded following periods of wet weather.

The Zwingle soils are associated with the Medary soils, but they are more nearly level than the Medary soils, have slower surface drainage, and are more poorly drained throughout. In addition, they have a thicker cap of silt. In contrast to the associated Bertrand soils, they have a heavy, dense clay subsoil. In this county Zwingle silt loam is the only soil mapped of this series.

Profile description (NE¼SW¼ sec. 14, T. 16 N., R. 7 W.):

A_p 0 to 9 inches, very dark gray (10YR 3/1) to very dark brown (10YR 2/2) silt loam; cloddy because of plowing; friable; many roots and pores; pH 6.0; 6 to 10 inches thick; abrupt smooth boundary.

A_2 9 to 14 inches, dark-gray (10YR 4/1) silt loam; coarse, distinct mottles of grayish brown (10YR 5/2) and gray to light gray (10YR 6/1); moderate, thick, platy structure; friable; many roots and pores; pH 5.0; 3 to 6 inches thick; gradual smooth boundary.

B_1 14 to 19 inches, reddish-brown (5YR 4/3) clay; coarse, prismatic structure, but breaks to strong, coarse, angular blocks; plastic when wet; a few fine roots and pores; pH 5.5; 4 to 6 inches thick; gradual smooth boundary.

B_2 19 to 40 inches, reddish-brown (2.5YR 4/4) clay; coarse, prismatic structure, but breaks to strong, coarse, angular blocks; plastic when wet; a few fine roots and pores; pH 5.5; 15 to 25 inches thick; clear wavy boundary.

C 40 to 60 inches, brown to dark-brown (7.5YR 4/4) silty clay; massive; plastic when wet; pH 6.0; 18 inches to several feet thick.

Meanings of Technical Terms

[Most of the definitions in this section were taken from the Soil Survey Manual, U.S. Dept. of Agr. Handbook 18]

Aggregate, soil. A single mass or cluster consisting of many primary soil particles held together, such as a prism, crumb, or granule.

Alluvium. Soil or rock material, such as gravel, sand, silt, or clay, deposited by a stream of water.

Boron. An element needed in small amounts for the growth of higher plants and particularly for alfalfa and similar legumes.

Clay. Small mineral soil grains, less than 0.002 mm. (0.000079 in.) in diameter. The particles are smaller than either sand or silt. They do not have definite structure and are usually described as massive. They give cohesion or stickiness to the soil.

Colluvium. Rock fragments and soil materials accumulated at the bases of slopes through the action of gravity and water.

Complex, soil. Two or more soils so intermingled that the areas cannot be indicated separately on maps of the scale used. They are therefore mapped as a unit.

Concave, slope. A slope that is shaped like a dish or bowl.

Consistence. The feel of the soil and the ease with which a lump is crushed by the fingers. Terms commonly used to describe consistence of the soil are as follows:

Loose. Noncoherent.

Friable. When moist, crushes easily under moderate pressure between thumb and forefinger and coheres when pressed together.

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 cohesive; wire formable.

Sticky. When wet, adheres to other material; usually very cohesive when dry.

Hard. When dry, moderately resistant to pressure; barely breakable between thumb and forefinger.

Cemented. Hard and brittle and little affected by moistening.

Contour stripcropping. The practice of growing crops on the contour and in strips, or bands. Commonly, cultivated crops and sod crops are alternated in strips to protect the crops and the soil from damage by running water.

Dissection. Cutting by streams so that valleys and gorges are formed.

Diversion. A broad-bottomed ditch that serves to divert runoff so that the water will flow around the slope to an outlet without causing erosion.

Dolomite. A rock that is closely related to limestone but that contains more magnesium; in La Crosse County dolomite is commonly called lime rock.

Drainage, soil. The speed with which water moves from the surface of the soil or through the subsoil, and the extent of the removal of water from the soil.

Natural. The pattern of permanent and intermittent streams in a landscape.

Artificial. Ditches, waterways, tile, and similar devices used to remove water from the soil.

Droughty soil. Soil that has a low water-storing capacity.

Erosion. The removal or wearing away of soil material by wind or water. Geologic erosion occurs constantly, but it is generally accelerated by man.

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.

Flood plain. The nearly level areas immediately adjacent to streams. Unless they are protected from overflow, the areas are sometimes flooded.

Friable. See Consistence.

Horizon. A layer of soil, nearly parallel to the soil surface, with characteristics produced by soil-forming processes.

Humus. The well-decomposed, complex mixture of organic materials in soils.

Land forms. Ridges, hills, coulees, terraces, and other common features of the landscape.

Limestone. Rock originating mainly from shells or coral rock or by precipitation from sea water of calcium or magnesium carbonates.

Liquid limit. The moisture content at which the soil material passes from a plastic to a semiliquid state.

Loess. Deposit of relatively uniform, fine material, mostly silt, presumably transported by wind.

Mottled. Contrasting, irregular patches of color in the soil that vary in number and size.

Muck. Highly decomposed, organic soil material formed from peat. Generally, muck has a higher mineral or ash content than peat and is decomposed to the extent that the original plant remains cannot be identified.

Native vegetation. The original kind of plants growing on the soil. The vegetation has influenced the formation of the soil.

Nutrients, plant. Any element taken in by a plant, essential to its growth, and used by it in elaboration of its food and tissue.

Outwash, glacial. A broad term that includes all of the material swept out, sorted, and deposited under or beyond the glacial ice front by streams of melt water. Commonly, this outwash exists in the form of plains, valley trains, or deltas in old glacial lakes. The valley trains of outwash may extend far beyond the farthest advance of the ice.

Parent material. The unconsolidated material, such as sand, silt, clay, or decomposed bedrock, from which the soil profile develops.

Peat. Unconsolidated soil material consisting largely of undecomposed or only slightly decomposed organic matter accumulated under conditions of excessive moisture.

Plastic limit. The moisture content at which the soil material passes from a solid to a plastic state.

Plasticity index. The numerical difference between the liquid limit and the plastic limit. The plasticity index indicates the range of moisture content within which a soil material is plastic.

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

Reaction. The degree of acidity of the soil mass expressed in pH values or in words as follows:

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

Renovation. Method of restoring soils used for pasture or hay to higher productivity by cultivating carefully so that the tillage will not cause erosion. The soil is then limed, fertilized, and reseeded.

Sand. Soil particles of rocks or minerals ranging in diameter from 0.05 mm. (0.002 in.) to 2.0 mm. (0.078 in.) ; also, a soil that has 85 percent or more sand-size particles and in which the percentage of silt, plus 1½ times the percentage of clay does not exceed 15. The particles are larger than those of silt or clay.

Sandstone. Consolidated rock made up of sand grains cemented by silica, lime, clay, or iron oxide or by a combination of these materials.

Silt. Small mineral soil grains ranging in size from 0.05 mm. (0.002 in.) to 0.002 mm. (0.000079 in.) in diameter. The particles are smaller than sand but larger than clay.

Structure, soil. The arrangement of the 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 by 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, as in the A_1 horizons of many soils. Crumb structure is closely related to granular structure.

Granular. Roughly spherical, firm, small aggregates that may be either hard or soft but that are generally firmer than crumb and without the distinct faces of blocky structure.

Platy. Soil particles are arranged around a plane that normally is horizontal.

Prismatic. Soil particles are arranged around a vertical line; aggregates have flat vertical surfaces.

Terrace, stream. A nearly flat or undulating plain, formerly the bottom land of a stream. It is commonly rather narrow, usually has a steep front, and borders a river, lake, or the sea.

Terracing. Construction of shallow, nearly level ditches with broad slopes that can be farmed. Terraces are used on slopes to control runoff water.

Texture. The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay.

Tilth, soil. The physical condition of a soil or seedbed in respect to its fitness for the growth of a specified plant or sequence of plants. Ideal soil tilth is not the same for each kind of crop nor is it uniform for the same kind of crop growing on contrasting kinds of soil.

Topography. The shape of the ground surface, such as hills, mountains, or plains. Steep topography indicates steep slopes or hilly land; flat topography indicates flat land with minor undulations and gentle slopes.

Uplands. Land that lies well above the level of large streams in which small drainageways, coulees, and so on originate. In general, soil materials of the upland soils have not been transported by water.

Topsoil (engineering application). Soil material containing organic matter and suitable as a surfacing for shoulders and slopes.

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Guide to Mapping Units and Capability Units [10]

	Mapping symbol	Page	Capability unit	Page
Alluvial land, moderately well drained	Ab	54	IIIw-2	14
Alluvial land, poorly drained	Aa	54	Vw-1	16
Arenzville silt loam	Ac	54	I-1	9
Arenzville, Orion, and Huntsville soils	Ad	54	VIw-1	20
Bertrand silt loam, 2 to 6 percent slopes	BaB	54	IIe-1	11
Bertrand silt loam, 0 to 2 percent slopes	BaA	55	I-1	9
Bertrand silt loam, 2 to 6 percent slopes, moderately eroded	BaB2	55	IIe-1	11
Bertrand silt loam, 6 to 12 percent slopes, moderately eroded	BaC2	55	IIIe-1	12
Boaz silt loam	Bb	55	IIw-2	12
Boone sand, 6 to 12 percent slopes, eroded	BcC1	55	VIIs-1	20
Boone sand, 2 to 6 percent slopes, eroded	BcB1	55	VIIs-1	20
Boone sand, 12 to 60 percent slopes, eroded	BcD1	55	VIIs-1	20
Boone-Hixton loamy sands, 0 to 6 percent slopes	BdB	55	IVs-1	16
Boone-Hixton loamy sands, 6 to 12 percent slopes	BdC	55	IVs-1	16
Boone-Hixton loamy sands, 6 to 12 percent slopes, eroded	BdC1	55	IVs-1	16
Boone-Hixton loamy sands, 12 to 60 percent slopes, eroded	BdD1	55	VIIs-1	20

[10] See table 6, p. 22, for estimated crop yields, and table 11, p. 52, for the acreage and the proportionate extent of the soils. See p. 28 to find the engineering properties of the soils.

	Mapping symbol	Page	Capability unit	Page
Chaseburg silt loam, 2 to 6 percent slopes	CaB	56	IIe-2	11
Chaseburg silt loam, 0 to 2 percent slopes	CaA	56	I-1	9
Chaseburg silt loam, 6 to 12 percent slopes	CaC	56	IIIe-3	14
Chaseburg and Judson silt loams, 0 to 2 percent slopes	CbA	56	VIw-1	20
Chaseburg and Judson silt loams, 2 to 6 percent slopes	CbB	56	VIw-1	20
Curran silt loam	Cc	56	IIIw-3	14
Dakota sandy loam, 0 to 2 percent slopes	DaA	56	IIIs-1	14
Dakota sandy loam, 2 to 6 percent slopes	DaB	57	IIIs-1	14
Dakota sandy loam, 6 to 12 percent slopes, moderately eroded	DaC2	57	IIIs-2	14
Dubuque silt loam, 20 to 30 percent slopes	DbE	57	VIe-1	17
Dubuque silt loam, 2 to 6 percent slopes, moderately eroded	DbB2	57	IIe-1	11
Dubuque silt loam, 6 to 12 percent slopes, moderately eroded	DbC2	57	IIIe-2	13
Dubuque silt loam, 12 to 20 percent slopes	DbD	57	IVe-2	15
Dubuque silt loam, 12 to 20 percent slopes, moderately eroded	DbD2	57	IVe-2	15
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded	DbE2	57	VIe-1	17
Dubuque silt loam, 30 to 45 percent slopes	DbF	57	VIIe-1	20
Dubuque soils, 12 to 20 percent slopes, severely eroded	DcD3	57	VIe-1	17
Dubuque soils, 20 to 30 percent slopes, severely eroded	DcE3	57	VIIe-1	20
Dubuque silt loam, deep, 12 to 20 percent slopes, moderately eroded	DdD2	57	IVe-1	15
Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded	DdB2	58	IIe-1	11
Dubuque silt loam, deep, 6 to 12 percent slopes, moderately eroded	DdC2	58	IIIe-1	12
Dubuque silt loam, deep, 12 to 20 percent slopes	DdD	58	IVe-1	15
Dubuque silt loam, deep, 20 to 30 percent slopes	DdE	58	VIe-1	17
Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded	DdE2	58	VIe-1	17
Dubuque soils, deep, 12 to 20 percent slopes, severely eroded	DeD3	58	VIe-1	17
Dubuque soils, deep, 20 to 45 percent slopes, severely eroded	DeF3	58	VIIe-1	20
Fayette silt loam, uplands, 12 to 20 percent slopes, moderately eroded	FaD2	58	IVe-1	15
Fayette silt loam, uplands, 2 to 6 percent slopes	FaB	58	IIe-1	11
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	FaB2	59	IIe-1	11
Fayette silt loam, uplands, 6 to 12 percent slopes	FaC	59	IIIe-1	12
Fayette silt loam, uplands, 6 to 12 percent slopes, moderately eroded	FaC2	59	IIIe-1	12
Fayette silt loam, uplands, 12 to 20 percent slopes	FaD	59	IVe-1	15
Fayette silt loam, uplands, 20 to 30 percent slopes	FaE	59	VIe-1	17
Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded	FaE2	59	VIe-1	17
Fayette silt loam, uplands, 30 to 40 percent slopes	FaF	59	VIIe-1	20
Fayette soils, uplands, 12 to 20 percent slopes, severely eroded	FbD3	59	VIe-1	17
Fayette soils, uplands, 20 to 30 percent slopes, severely eroded	FbE3	59	VIIe-1	20
Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded	FcE2	59	VIe-1	17
Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded	FcC2	60	IIIe-1	12
Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded	FcD2	60	IVe-1	15
Fayette silt loam, valleys, 20 to 30 percent slopes	FcE	60	VIe-1	17
Fayette silt loam, valleys, 30 to 40 percent slopes, moderately eroded	FcF2	60	VIIe-1	20
Fayette soils, valleys, 12 to 20 percent slopes, severely eroded	FdD3	60	VIe-1	17
Fayette soils, valleys, 20 to 30 percent slopes, severely eroded	FdE3	60	VIIe-1	20
Gale silt loam, 20 to 30 percent slopes, moderately eroded	GaE2	60	VIe-1	17
Gale silt loam, 2 to 6 percent slopes	GaB	60	IIe-1	11
Gale silt loam, 6 to 12 percent slopes, moderately eroded	GaC2	61	IIIe-2	13
Gale silt loam, 12 to 20 percent slopes	GaD	61	IVe-2	15
Gale silt loam, 12 to 20 percent slopes, moderately eroded	GaD2	61	IVe-2	15
Gale silt loam, 20 to 30 percent slopes	GaE	61	VIe-1	17
Gale silt loam, 20 to 30 percent slopes, severely eroded	GaE3	61	VIIe-1	20
Gale silt loam, 30 to 60 percent slopes	GaF	61	VIIe-1	20
Gale silt loam, 30 to 60 percent slopes, moderately eroded	GaF2	61	VIIe-1	20
Gale-Hixton complex, 30 to 60 percent slopes	GbF	61	VIIe-1	20
Gale-Hixton complex, 2 to 6 percent slopes	GbB	61	IIe-1	11
Gale-Hixton complex, 6 to 12 percent slopes, moderately eroded	GbC2	61	IIIe-2	13
Gale-Hixton complex, 12 to 20 percent slopes	GbD	61	IVe-2	15
Gale-Hixton complex, 12 to 20 percent slopes, moderately eroded	GbD2	61	IVe-2	15
Gale-Hixton complex, 20 to 30 percent slopes	GbE	61	VIe-1	17
Gale-Hixton complex, 20 to 30 percent slopes, moderately eroded	GbE2	61	VIe-1	17
Gale-Hixton complex, 20 to 30 percent slopes, severely eroded	GbE3	61	VIIe-1	20
Gale-Hixton complex, 30 to 60 percent slopes, moderately eroded	GbF2	61	VIIe-1	20
Gale-Hixton complex, 30 to 60 percent slopes, severely eroded	GbF3	62	VIIe-1	20
Gotham loamy sand, 0 to 2 percent slopes	GcA	62	IVs-1	16
Gotham loamy sand, 2 to 6 percent slopes	GcB	62	IVs-1	16
Gotham loamy sand, 2 to 6 percent slopes, eroded	GcB1	62	IVs-1	16
Gotham loamy sand, 6 to 12 percent slopes, eroded	GcC1	62	IVs-1	16
Gullied land	Gd	62	VIIe-1	20
Hesch sandy loam, 6 to 12 percent slopes, moderately eroded	HaC2	62	IIIs-2	14
Hesch sandy loam, 2 to 6 percent slopes, moderately eroded	HaB2	62	IIIs-1	14
Hesch sandy loam, 12 to 20 percent slopes, moderately eroded	HaD2	63	IVs-1	16
Hesch sandy loam, 20 to 30 percent slopes, moderately eroded	HaE2	63	VIs-1	17
Hixton sandy loam, 30 to 60 percent slopes	HbF	63	VIIs-1	20
Hixton sandy loam, 2 to 6 percent slopes	HbB	63	IIIs-1	14
Hixton sandy loam, 2 to 6 percent slopes, moderately eroded	HbB2	63	IIIs-1	14
Hixton sandy loam, 6 to 12 percent slopes, moderately eroded	HbC2	63	IIIs-2	14
Hixton sandy loam, 12 to 20 percent slopes	HbD	63	VIs-1	17
Hixton sandy loam, 12 to 20 percent slopes, moderately eroded	HbD2	63	VIs-1	17
Hixton sandy loam, 12 to 20 percent slopes, severely eroded	HbD3	63	VIs-1	17
Hixton sandy loam, 20 to 30 percent slopes	HbE	63	VIs-1	17
Hixton sandy loam, 20 to 30 percent slopes, moderately eroded	HbE2	63	VIs-1	17

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