

SOIL SURVEY OF GREEN COUNTY, WISCONSIN

By W. J. GEIB, in Charge, A. C. ANDERSON, and F. J. O'CONNELL, U. S. Department of Agriculture, and T. J. DUNNEWALD, M. J. EDWARDS, WALTER VOSQUIL, and KENNETH WHITSON, Wisconsin Geological and Natural History Survey

COUNTY SURVEYED

Green County is in the extreme southern part of Wisconsin bordering the Wisconsin-Illinois boundary line. It is bounded on the north by Dane County, on the east by Rock County, on the south by the State of Illinois, and on the west by Lafayette County. The county is nearly square, measuring approximately 24 miles on each side. It comprises an area of 585 square miles or 374,400 acres. Monroe, the county seat, is 36.5 miles from Madison and 138 miles from Chicago.

Green County consists, topographically, of a dissected plain, the upland surface of which lies at an elevation of about 1,100 feet. It is highest in the northwestern part of the county and lowest in the southeast, the difference in elevation being very slight. It is practically level. The dissection is so nearly complete that the watershed ridges, presumably the remnants of an original plain, are reduced to widths of less than a mile, as a rule. The city of Monroe is located on a remnant covering a few square miles, the largest in the area. In a few other places the ridges widen to about 1 mile. (Pl. LX, figs. 1 and 2.)

In the eastern part of the county Sugar River has not only cut a valley into the plain, but has, through the work of its lateral streams, developed a rather broad belt of undulating lowland on both sides of the stream. The surface of this lowland lies well above the level of the alluvial plain of the river, but it is clearly the product of erosion. It extends along the main stream across the county, although tongues extend up the valleys to the tributary streams as blunt-ended lowlands separated one from another by the projection of the upland inward along the watershed between the tributaries. Owing to the geological structure and stratigraphic character and succession of beds, the slope from the lowland to the upland is rapid in the upper part of the slope and more gradual below, merging imperceptibly into the undulating lowland.

Somewhat the same features have been developed along Little Sugar River and in places along Pecatonica River. The rest of the

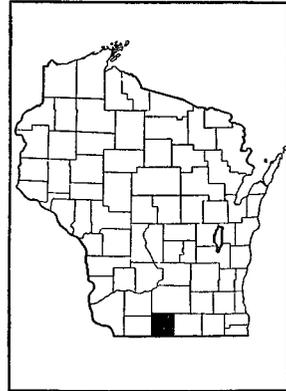


FIG. 58.—Sketch map showing location of Green County, Wis.

area, with the exception of a small part of the northeastern corner, consists merely of a well-dissected plain.

A small area in the northeastern corner of the county, fundamentally much like the rest of the eastern part of the county, has had the detailed irregularities of its surface smoothed out by having been run over by the ice sheet of the Wisconsin glacial period. Its relief is smoother than the rest of the region as a whole.

A special study was made of the land in two representative townships in the county: Decatur Township, which represents the smoothest or least rolling land, and York Township, typical of the roughest part of the county. The following table gives the classification and proportionate extent of each class of land in these townships:

Classification of land in York and Decatur Townships, on the basis of surface relief

Class	Description	Proportionate extent	
		York Township	Decatur Township
		<i>Per cent</i>	<i>Per cent</i>
A	Level to gently undulating (including wet lands).....	8.0	53.0
B	Undulating to gently rolling.....	58.0	38.5
C	Rolling to hilly.....	25.0	5.5
D	Steep, rough, and broken land, mostly rough stony land.....	9.0	3.0

Green County is entirely within the drainage basin of Rock River, and the county is well drained by Sugar and Pecatonica Rivers which come together in Illinois before entering Rock River near Rockton. The alluvial flood plains along the streams are the only poorly drained land.

Settlement, transportation, and markets.—Early settlement in Green County was stimulated by the mineral deposits which were thought to exist in this region. The first settlement is reported to have been made in 1828 at Sugar River Diggings, located near Sugar River in Exeter Township. Green County was organized in 1836, at which time it was separated from Iowa County. The first important industry to receive attention was mining of lead and zinc, but larger mines were located in adjoining counties and the mines in Green County were soon exhausted. Following the early mining activities agriculture was given more attention and the region early became a thriving agricultural community.

The first extensive agricultural development in Green County was made by a colony of Swiss who settled at New Glarus and developed one of the most prosperous agricultural communities in the United States.

The population of the county in 1920 was 21,568. It is well distributed over the entire county. Of the total population 3,187 or 14.8 per cent are foreign-born white people. Monroe, the county seat, has a population of 4,788. Other important railway and shipping points within the county are Browntown, Martintown, Monticello, New Glarus, Belleville (partly in Dane County), Albany, Brodhead, and Juda.

The county is fairly well supplied with railroads. A branch of the Illinois Central Railroad runs from Madison to Freeport, Ill., and passes through Belleville, Monticello, and Monroe. The Chicago, Milwaukee & St. Paul Railway crosses the southern part of the county from east to west and passes through Brodhead, Juda, Monroe, and Browntown. A branch of this line runs northwest from Brodhead through Albany and Monticello to New Glarus. Most farms are within 10 miles of a shipping point. Dirt roads are for the most part good when they are kept graded, but during the wettest season many of them are almost impassable. Several State trunk highways, kept in excellent condition, cross the county.

The towns within the county afford a local market for farm products, but the greater proportion of the marketable produce is shipped out. Dairy products form the bulk of the sales. Cheese is shipped to numerous points in the Middle West, South, and East. Livestock is sent chiefly to the Chicago market. A larger proportion of the dairy products are sold through cooperative agencies.

CLIMATE

Nearly all of Green County is located within the southern highlands, one of the eight climatic provinces in Wisconsin. "Southern highlands" is a term used to include the rough or rolling region, mostly over 1,000 feet in elevation, which extends from Clark County south to the Illinois line and lies between the Mississippi Valley on the west and the Wisconsin and Rock River valleys on the east. It is characterized by a cooler temperature than the adjoining valleys, the summer temperature being similar to that along the Lake Michigan shore, and the mean winter temperature about 2° F. higher than along the Lake Superior shore. The frost-free season, averaging 158 days, is apparently from 20 to 30 days shorter than on the lower land of the State in the same latitude; and in the river valleys and ravines in this region, the frost danger is still greater, the records there showing an average frost-free period of 140 days. In some years corn fails to mature, and the use of land for pasturage and hay production is encouraged both by the surface relief and the heavier rainfall.

The mean annual temperature at Brodhead, as shown by the accompanying table, is 47.3° F. with an absolute maximum of 111° and a minimum of -33°. Although these temperatures are extreme, they are of very short duration and seldom occur. The average annual rainfall at Brodhead is 33.77 inches, and the average snowfall 33.4 inches. The prevailing winds are from the southwest. Rainfall is well distributed throughout the growing season when most needed.

The average date of the last killing frost in the spring is May 3, and the average first in the fall is October 8. The latest recorded frost in spring occurred on May 25 and the earliest in the fall on September 11.

The following table, compiled from data of the Weather Bureau station at Brodhead, gives the normal monthly, seasonal, and annual temperature and precipitation at that place:

*Normal monthly, seasonal, and annual temperature and precipitation at
Brodhead*

[Elevation, 812 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1901)	Total amount for the wettest year (1907)	Snow, average depth
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December.....	23.1	62	-26	1.55	1.16	1.23	7.9
January.....	19.0	60	-33	1.44	1.47	3.13	8.4
February.....	19.4	56	-31	1.56	1.30	.40	8.0
Winter.....	20.5	62	-33	4.55	3.93	4.76	24.3
March.....	34.6	84	-13	2.33	2.83	2.13	5.4
April.....	47.5	89	15	2.91	.75	3.61	1.9
May.....	59.0	95	24	4.11	2.89	2.64	Trace.
Spring.....	47.0	95	-13	9.35	6.47	8.38	7.3
June.....	67.8	103	34	3.95	1.43	4.71	.0
July.....	73.4	111	40	4.04	3.83	9.37	.0
August.....	70.8	103	35	3.46	.46	4.21	.0
Summer.....	70.7	111	34	11.45	5.72	18.29	.0
September.....	63.3	100	20	4.09	3.30	7.83	.0
October.....	51.9	87	15	2.49	1.57	1.25	.5
November.....	37.6	77	-4	1.84	.83	1.38	1.3
Fall.....	50.9	100	-4	8.42	5.70	10.46	1.8
Year.....	47.3	111	-33	33.77	21.82	41.89	33.4

AGRICULTURE

In the earliest settlement of Green County wheat was grown exclusively and continuously for several years by the Swiss settlers until some of the land was practically worn out. Not until then did they turn to dairying which has since become the principal industry. (Pl. LXI, fig. 1.) Dairying is carried on in all parts of Green County and is by far the most important enterprise conducted in the region, though general farming is also engaged in by most farmers.

With the development of dairying came a more diversified system of cropping. The acreage of wheat was greatly reduced, and the acreage in hay and corn increased. Small grains are grown on nearly every farm. However, on the gently rolling prairie lands throughout the county and on the smoother lands in the eastern part of the county, there is a larger acreage of corn, oats, and barley than in the western part where the slopes are steep and where there is more danger of washing in cultivated fields. On the other hand more land is in pastures in the steeper parts of the county. Adams Township has more pasture land than Washington Township, for Adams Township is more rolling and has much more steep land than Washington Township. In Spring Grove Township and also in other townships traversed by Sugar River, pasture land is low wet land rather than steep land.

Tobacco farming is a special industry followed to a small extent in this county, but confined almost entirely to sandy soils in Decatur and Brooklyn Townships. Potatoes are also grown in the eastern part of the county and in other areas of sandy soils.

Cultural methods.—The tendency in farming throughout the county is toward better methods of cultivation, fertilization, and seed selection. On the heavier types of soil considerable fall plowing is done, especially where the fields are level or nearly so, or where there is no danger of serious washing. It is customary to apply manure to fields which are to be planted to corn. When land is plowed in the fall many farmers haul the manure out daily during winter and scatter it over the plowed fields. This is a good practice except where the land surface is so steep that the nutrient elements are lost by the run-off of surface water from rains and melted snow.

On the sandy soils in the eastern part of the county conditions are somewhat different and spring plowing is preferred to fall plowing. Cover crops of rye or other crops on fields during fall and winter prevent wind erosion and loss of plant-food elements by leaching. Seeding rye in the corn rows at the time of the last cultivation, and in potato fields at digging time, prevents the loss of some of the nutrient elements, and this practice is followed by some farmers.

On the sandy soils near Brodhead some inferior cultural methods have been followed, resulting in a marked reduction in the fertility of the soils. In the early days excellent crops of clover hay were produced, whereas it is now very difficult to get a good stand of clover, owing in part to the low state of fertility and in part to the acid condition of the soil. The tobacco fields are heavily fertilized, but the remainder of the land receives but little fertilization, so that its productiveness has been gradually reduced. (Pl. LXI, fig. 2.)

In the management of the steep land in Green County the methods followed are usually such as tend to keep the slopes from washing. Many of the steep slopes are kept in permanent pasture or are plowed up and reseeded enough to insure a good stand of grass, and in many places strips of sod are left in surface runs in order to prevent washing. Plowing with the contour of the hills is common, but terracing is not practiced. Some slopes which are much too steep are cultivated, and danger of destructive erosion is great. Such slopes would be better kept in permanent pasture, and forested slopes allowed to remain so.

Farm products and agricultural statistics.—Of the farm crops grown in Green County the cereals lead in acreage and value. The total value of all cereals grown in the area in 1919, as given by the census, was \$3,861,645. This represented approximately half of the value of all crops in that year. Hay and forage crops had a total value of \$3,699,932. The value of the dairy products produced in the county in 1919 amounted to \$5,585,782.

The following table, taken from the census reports, gives the acreage and production of the leading crops for five census years. This table shows the importance of the various crops and the changes in acreages of the different crops during the last 40 years.

Acreage and production of the principal crops in Green County for five census years

Crops	1879		1889		1899		1909		1919	
	<i>Acres</i>	<i>Tons</i>								
Hay and forage.	44,390	67,252	56,516	88,705	47,797	63,978	58,022	96,685	88,283	281,090
Oats.....	37,166	1,348,942	44,832	1,829,351	55,628	2,116,250	35,421	1,147,266	40,916	1,355,532
Corn.....	59,745	2,187,550	52,399	1,595,922	68,162	2,692,680	56,915	1,880,987	34,664	1,401,880
Rye.....	3,334	51,100	4,011	65,322	2,907	40,860	892	11,429	1,511	19,763
Barley.....	635	12,544	1,180	37,055	2,516	79,460	14,132	368,636	12,303	345,603
Wheat.....	11,774	192,983	2,859	33,568	1,191	21,790	494	10,137	4,802	70,031
Potatoes.....		142,103	1,693	158,033	1,354	151,270	1,163	121,365	889	44,836
Tobacco.....	122	117,571	243	277,703	323	419,470	257	294,210	91	110,048

The 1920 census reports 1,988 beef cattle in Green County, valued at \$136,428; 47,276 swine, valued at \$1,057,410; and 5,057 sheep, valued at \$66,789. Honey and wax produced the same year had a value of \$14,400, and chickens and eggs a value of \$480,329. Dairy cattle in the county in 1920 were valued at more than \$6,250,000, and the value of the milk, cream, and butterfat sold and of butter and cheese made on the farms in that year was over \$5,500,000.

Adaptation of crops to soils.—Farmers in general recognize that certain crops are best adapted to certain soils. In this county the light-colored heavy upland soils are well adapted to the production of small grains as well as to grasses. A better quality of grain is produced here than on the black soils, and danger from lodging is not so great. The black prairie land, having an undulating or gently rolling surface, and the drained, heavy, black lowland soils are well suited to corn. Rye is grown most extensively on soils of light texture, and in Green County tobacco also is usually grown on light soils, chiefly in the vicinity of Brodhead. Tame hay is grown on all kinds of soils, but makes its best growth on the heavy soils. Clover and alfalfa do best where the supply of lime in the soil is greatest.

Although soils influence considerably the crops which can be grown to best advantage, topography is a very important factor in the selection of crops to be grown and the farming methods followed.

The largest acreage of corn is grown in Spring Grove Township where there is much reclaimed lowland and also extensive tracts of heavy upland where the surface is gently rolling and not too steep for the cultivation of corn. There is also considerable gently rolling prairie land in this township. Decatur Township was second in acreage of corn. This township contains part of Jordan Prairie which is excellent cornland, and very little of the township is rough and steep. Clarno Township, producing 4,755 acres of corn, occupies high, rolling land, much of which is prairie. On the other hand in New Glarus Township, where there is much steep land, only 2,571 acres of corn were grown, the least in any township of the county, and less than half the acreage grown in Spring Grove Township. These differences are due chiefly to the marked differences in topography.

The effect of topographic difference is particularly evident on pasture land, and especially the pasture land which is not plowed, as this includes most of the steepest land in the county.

Farm equipment.—Farm buildings and equipment in Green County are in general of very high grade and reflect the prosperity of the farmers. Barns are large, well constructed, and designed to provide roomy and comfortable quarters for dairy cattle. (Pl. LXII, fig. 1.) Most farms have a silo, there being 1,968 silos in the county on a total of 2,330 farms.

Tractors are coming into common use, and, although they are not used so generally as in more level regions, there is a total of 354 tractors in the county. Tractors are least used on sandy and extremely rough parts of the county, and are most common in Spring Grove Township where there is considerable fairly smooth prairie land.

Farmhouses are well built, especially where the dairy industry is most highly developed. They are kept in good repair, and many are supplied with such modern conveniences as electric lights, modern heating plants, and running water. Practically all farms have rural mail service, telephone service, and most of the farmers own automobiles.

Farm tenure and labor.—According to the 1920 census, 1,694, or 72.7 per cent, of the 2,330 farms in Green County were operated by the owners; 601 farms, or 25.8 per cent, were operated by tenants; and 35 farms by managers. Of the 601 tenant farmers, 413 were share tenants, 180 were cash tenants, and 8 were classed as share-cash tenants. Farms comprise 90.8 per cent of the land area of the county, and 78.6 per cent of this farm land is improved.

Land values.—The value of farm lands in Wisconsin was not inflated so greatly during the war period as it was in some other parts of the Middle West, and as a result the decline in land values has been moderate.

The census of 1920 reported that the average value of land and buildings to the farm in Green County was \$23,784. Thus the average farm of 148 acres had a value of about \$160 an acre. The average value of the land alone is given as \$127.91 an acre.

Weeds.—Weeds are obnoxious pests on many farms and in many places cause serious economic loss. Quack grass and Canada thistle are the most troublesome ones and most difficult to eradicate, though a great number of other weeds occur, among them ragweed, wild buckwheat, wild mustard, wild morning-glory, sorrel, yellow dock, sour dock, broad-leaved plantain, sow thistle, and snapdragon.

Erosion.—Erosion may do great damage to land as well as to crops. Sloping land which was originally forested or brush-covered has been largely cleared and cultivated, and because of its unprotected condition, such land has been exposed to extensive washing and gullying by surface run-off of rain and water from melting snow on higher land. Soil erosion is an important problem not only because fields cut by ditches and gullies are hard to cultivate, but because erosion removes the finest and most fertile soil first, thus reducing the fertility.

Methods for weed eradication and prevention of erosion, as well as crop rotations and fertilizers, will be discussed in the section on suggestions for the management of Green County soils.

SOILS

Limestone and sandstone form the rock floor of Green County. The youngest and uppermost formation is the Galena and Trenton limestones, which forms the bedrock over most of the southern and western parts of the county. The two formations, being very similar, are usually spoken of together. An earlier formation, St. Peter's sandstone, predominates over most of the remainder of the county; and the lower magnesian limestone, developed below this sandstone, is the uppermost rock formation in the vicinity of Sugar River. All of these rocks have contributed to some extent to the soils of the region.

Soils of silt loam texture make up nearly 90 per cent of the land surface of Green County, exclusive of rough broken land and peat. Beneath the silty surface layer of the well-drained upland soils, is a layer of heavier material, usually silty clay loam, from 12 to 20 inches thick, and occurring from 8 to 15 inches below the surface. This subsoil layer is underlain by the partly weathered parent material, which, in Green County, may be either disintegrated limestone, sandstone, or glacial drift, or stratified, water-laid deposits. This is the normal texture profile of this region and other regions which are similar in soil-forming agencies and processes.

The color of the surface soil over the well-drained uplands is not so uniform as is the texture. In fact, two distinct soil groups, based on fundamental color differences, are represented in the county; one group is made up of comparatively light-colored soils, and the other of dark-colored soils, the dark color continuing to depths ranging from 8 to 12 inches. These soils are intermingled throughout the county. Soils of the light-colored group, represented by the Dubuque and Lindley soils, and others of minor extent, are generally coincident in distribution with the area originally covered by forest; the dark-colored soils, represented by the Dodgeville and Carrington series, are prairie soils. Poorly drained mineral soils are all very dark colored or nearly black, and total a considerable area, particularly in the eastern part of the county.

From the point of view of the origin of soil materials, there are at least six different kinds of soil in Green County—residual, loessial, glacial, alluvial, colluvial, and cumulose. Some of the soil-forming material has been modified in various ways since it was first formed or deposited. In the soil survey of Green County, these soils have been classed into 13 soil series which include 24 soil types and 14 phases, exclusive of peat and rough broken land.

The Dubuque series includes light-colored upland forested soils which have developed from material originating from the weathering of limestone. These soils have silty or loesslike surface layers. Two soil types, Dubuque silt loam, with a deep phase and a steep phase, and Dubuque loam, with a steep phase, were mapped.

The Dodgeville series includes dark-colored prairie soils developed from the same parent material as Dubuque soils. Two soil types,

Dodgeville silt loam, with a deep phase and a steep phase, and Dodgeville fine sandy loam, with a steep phase, were mapped.

Boone soils are light-colored soils usually of sandy texture, derived from the weathering of sandstone. Boone loam and Boone fine sandy loam, each with a steep phase, were mapped.

Carrington soils are dark-colored prairie soils derived from calcareous glacial drift. Carrington silt loam, with a gravelly phase and a steep phase, was mapped in Green County.

The Lindley series includes light-colored upland forested soils derived from deeply leached calcareous glacial drift. Three members of this series were mapped: Lindley silt loam, Lindley loam, with a steep phase, and Lindley fine sandy loam.

The La Crosse series includes both light-colored and fairly dark colored soils on terraces or outwash plains chiefly in the region of glacial drift. The material has all been reworked and redeposited by water, but now exists above present overflow. The members mapped in Green County are La Crosse silt loam, light-colored phase, La Crosse loam, light-colored phase, La Crosse fine sandy loam with a light-colored phase, La Crosse sandy loam with a light-colored phase, and La Crosse sand.

Clyde soils are dark-colored soils in poorly drained depressions on the glaciated upland. In places the series was extended to include some material which was water-laid. Two soil types, Clyde silt loam and Clyde loam, were mapped in this county.

The Waukesha series includes dark-colored prairie soils on outwash plains or stream terraces well above present overflow. The parent material is water-laid. One member of the series, Waukesha silt loam, was mapped.

Wabash soils are dark-colored, poorly drained first-bottom soils, subject to annual flooding. Two soil types, Wabash silt loam with a colluvial phase, and Wabash loam, were mapped in Green County.

The Bertrand series includes light-colored soils derived from alluvial and colluvial material in the region where Dubuque soils form the higher-lying lands. These soils occur at the base of slopes, and the surface is level or only gently sloping toward the stream bed. They may also occur on terraces in the loessial country, in which case they correspond very closely to soils of the La Crosse series except that they are outside the glacial region. Bertrand silt loam was the only member of this series mapped in Green County.

Rough broken land includes steep, rough, broken, or extremely stony land which is practically nonagricultural. In some places it consists entirely of rock outcrops, but in other places there is considerable soil material, although the surface is very steep.

The Plainfield series includes light-colored sandy soils, which occur on terraces or outwash plains. The parent material is largely sand. Plainfield sand is the only member mapped.

The Coloma series includes light-colored upland soils whose parent material is glacial drift which has developed chiefly from sandstone. Coloma sand is the only soil of this series mapped in Green County.

The Rodman series includes the gravelly, stony glacial drift material which occurs chiefly as kames and eskers where the surface is very rough and where little soil has developed. Rodman gravelly loam is the only member of this series mapped.

Peat consists of vegetable matter in varying stages of decomposition with which small quantities of mineral matter have been mixed. Peat, with a shallow phase, was mapped in Green County.

The following table gives the acreage and proportionate extent of each soil type mapped in Green County:

Acreage and proportionate extent of types of soil

Type of soil	Acres	Per cent	Type of soil	Acres	Per cent
Dubuque silt loam.....	40,832	31.1	La Crosse loam, light-colored phase.....	3,776	1.0
Deep phase.....	45,248		La Crosse fine sandy loam.....	1,152	.7
Steep phase.....	30,400		Light-colored phase.....	1,408	
Dubuque loam.....	3,008	1.0	La Crosse sandy loam.....	3,328	1.5
Steep phase.....	640		Light-colored phase.....	2,176	
Dodgeville silt loam.....	37,056	30.0	La Crosse sand.....	1,216	.3
Deep phase.....	57,024		Clyde silt loam.....	8,960	2.3
Steep phase.....	18,304		Clyde loam.....	1,216	.3
Dodgeville fine sandy loam.....	1,984	.7	Waukesha silt loam.....	6,848	1.8
Steep phase.....	576		Wabash silt loam.....	42,496	12.9
Boone loam.....	3,776	1.2	Colluvial phase.....	5,440	
Steep phase.....	704		Wabash loam.....	1,344	.3
Boone fine sandy loam.....	8,128	2.4	Bertrand silt loam.....	4,288	1.1
Steep phase.....	896		Rough broken land.....	14,336	3.8
Carrington silt loam.....	5,888	1.8	Plainfield sand.....	1,024	.3
Gravelly phase.....	576		Coloma sand.....	192	.1
Steep phase.....	128	.7	Rodman gravelly loam.....	256	.1
Lindley fine sandy loam.....	2,624		Peat.....	4,672	1.4
Lindley loam.....	4,352	1.3	Shallow phase.....	640	
Steep phase.....	384		1.5	Total.....	374,400
Lindley silt loam.....	5,440	.4			
La Crosse silt loam, light-colored phase.....	1,664				

DUBUQUE SILT LOAM

Dubuque silt loam consists of grayish-brown friable, smooth silt loam, from 6 to 10 inches deep, containing a small or moderate quantity of organic matter or humus. The upper subsoil is a yellowish-brown slightly heavy silt loam, grading into silty clay loam, 14 or 16 inches below the surface. With increasing depth the heavy subsoil usually becomes gritty with chert and small angular rock fragments, and at depths ranging from 18 to 24 inches, red gritty clay occurs resting on the bedrock of cherty limestone.

The texture and color of the surface soil are uniform, but there is considerable variation in the depth to the red clay and bedrock. In a few places on steep slopes, the surface soil has been eroded and the red clay exposed. In other places on ridge tops or nearly level areas, the depth to bedrock is much greater than typical. On some of the more shallow areas, chert fragments are present on the surface and through the soil mass, this condition being most common on slopes and ridge tops where erosion has removed part of the surface soil. Some outcrops of limestone bedrock occur, usually on the steepest slopes.

Dubuque silt loam is one of the most extensive and important types of soil in Green County. It occurs to some extent in nearly every township, though more than 90 per cent of it is in the western half of the county. It is the predominating soil in New Glarus and Jordan Townships, and is developed extensively in Washington, Monroe, Cadiz, Adams, and York Townships. It is associated with soils of the Dodgeville series.

Small bodies of this land on ridge tops or plateaus are rolling or nearly level, but on the sides of ridge slopes and around the heads of drainage ways the surface becomes so steep that it is subject to serious erosion. Most of the steep slopes have been mapped as a steep phase of the soil. Because of the irregular surface the drainage is good, and the texture of the soil is such that it retains moisture well and crops seldom suffer from drought, except during unusually long dry periods.

The native forest growth on this soil consisted chiefly of oak, with some hickory, elm, maple, basswood, ash, walnut, cherry, and hazel brush. Most of the merchantable timber has been removed from the smoother places, but on many of the steep slopes a forest growth still remains.

The chief crops are hay, pasture grasses, small grains, and some corn. Because of the danger of erosion, not much corn is grown on this steep land. It is grown mostly on the gently rolling ridge tops and lower slopes below the steep land, and the steep slopes are utilized mostly for permanent pasture and for wood lots. Much of this land is in permanent pasture, the steep slopes producing grass of excellent quality for dairy cattle. Alfalfa also is grown, usually in the shallow soils on ridge tops, where roots can readily penetrate to the lime-bearing subsoil.

Dubuque silt loam, deep phase.—The surface soil of Dubuque silt loam, deep phase, has an average depth of 12 inches where cultivated, and consists of smooth, light-brown or grayish-brown silt loam, containing only comparatively small quantities of organic matter. The subsoil is yellowish heavy silt loam, grading into silty clay loam at a depth of about 18 inches and continuing as such to depths of 30 or 36 inches, where reddish clay or clay loam is usually present. This clay may contain fragments of chert. Both the surface soil and upper subsoil are free from coarse sand, gravel, and stones, and the texture as a whole is uniform. The soil is slightly acid in places.

Variations in depth of the soil and in surface contour, rather than in texture, occur in the mapped areas of Dubuque silt loam, deep phase. In most places the surface soil and subsoil have a total depth of 3 or 4 feet, but there are places where the underlying residual material comes within 2 or 3 feet of the surface, and some small areas where it is within 1 foot of the surface. The underlying rock is usually limestone which has formed a yellowish-red or red clay loam or clay when decomposed. Immediately above the rock the color of the clay may be variegated red, brown, yellow, and drab. Where the rock is near the surface, limestone fragments and some chert occur in the subsoil and in places on the surface. Where sandstone is the underlying rock, as in some places, the deep subsoil is sandy, and sand is more or less mixed with the silt. In such places the fine sand becomes more abundant as bedrock is approached. In portions of the county, the limestone is rather sandy and thin clay or shale layers may be present in the sandstone, from which, in either case, a sandy or gritty clay loam or clay might be formed by the decomposition or weathering of the rock. Some patches of light-colored silt loam are also included with mapped areas of this soil where the region has evidently been glaciated. A color variation occurs where this soil borders the darker Dodgeville silt loam.

In such places both surface soil and subsoil have a darker color than usual.

Dubuque silt loam, deep phase, is an important soil in Green County, covering a total area of 70.7 square miles. It forms part of every township, the largest areas occurring in Spring Grove, Clarno, Cadiz, Decatur, and Washington Townships. The phase is closely associated with Dodgeville silt loam and with typical Dubuque silt loam.

The surface of this land is for the most part gently rolling and the areas occur chiefly on ridge tops and long gentle slopes. In places these ridges are less than three-quarters of a mile wide, whereas in other places, areas of this soil are several square miles in extent. The natural drainage of this land is good.

The native forest growth on this phase of soil was similar to that on the typical soil. At present the greater part of the land is under cultivation. General farming, practiced in conjunction with dairying, is the most important industry in the county. Of the crops grown, corn, oats, wheat, timothy, and clover, the pasture grasses are the most important. Alfalfa is being grown on a small scale by many farmers and is proving a very valuable crop. Some tobacco is grown, but the acreage is less each year. The acreage of desirable cornland is small, because of the danger of serious washing even on rather gentle slopes.

Dubuque silt loam, steep phase.—Dubuque silt loam, steep phase, is closely associated with typical Dubuque silt loam but is not so extensive. The soil usually resembles the typical soil, but is subject to greater variation, and forms a thinner covering over the underlying rock. The surface soil is usually a light-brown silt loam about 10 inches deep. This is underlain by a yellowish brown silty clay loam material, which usually prevails to a depth of 3 feet or more. In many places, erosion has removed the surface covering, and the heavy silty clay loam material forms the surface soil. In other places, especially where the soil is shallow, rock fragments are present in the soil mass. Where the soil overlies sandstone considerable fine sand is incorporated with the soil in many places, and the deep subsoil may consist of a fine sand or fine sandy loam. Where limestone is the underlying rock the subsoil may be a red or reddish-brown, heavy clay loam containing cherty fragments. Rock outcrops occur here and there on this soil.

The surface of this kind of land is rolling or hilly with steep slopes and sharp, narrow ridges where the danger from erosion is great.

The original forest growth consisted of maple, hickory, birch, basswood, and several varieties of oak. Only a small part of this soil is under cultivation. Most of it remains forested, though where the timber has been partly or completely removed the land is generally in permanent pasture.

DUBUQUE LOAM

Dubuque loam consists of grayish fine sandy loam or loam, 8 or 10 inches deep, underlain by yellowish or reddish-brown sandy clay loam which prevails to depths ranging from 18 to 24 inches, and



FIG. 1.—GENERAL VIEW IN EXETER TOWNSHIP

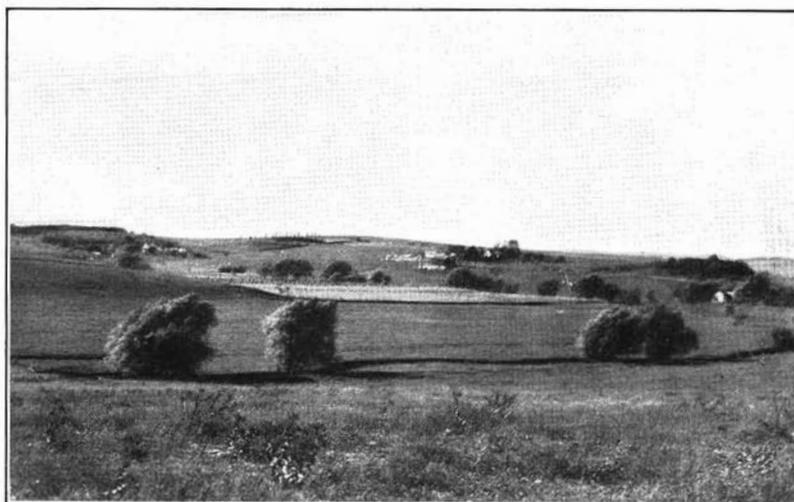


FIG. 2.—GENERAL VIEW IN WASHINGTON TOWNSHIP

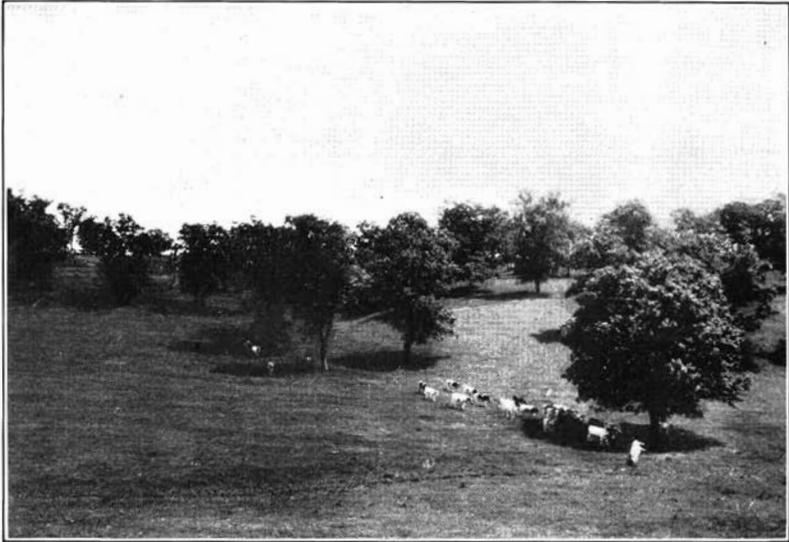


FIG. 1.—STEEP SLOPES UTILIZED FOR PASTURING DAIRY CATTLE

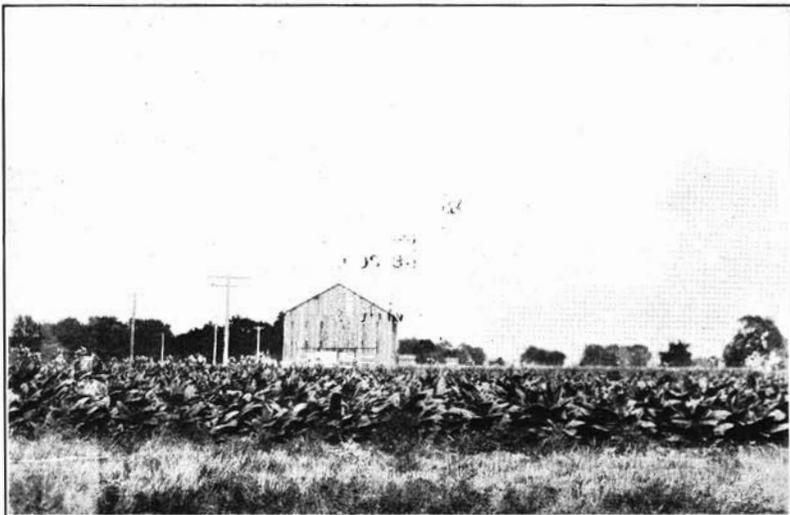


FIG. 2.—TOBACCO ON UNFERTILIZED SANDY SOIL AT BRODHEAD

becomes very sticky at depths of 30 or 32 inches. This is underlain by disintegrated limestone. The texture of the soil and subsoil is variable, though consistently lighter than that of Dubuque silt loam. This soil occurs chiefly in Jordan and Cadiz Townships, though other small tracts, too small to be shown on the soil map, are present in other parts of the county. This type of soil, with its steep phase, covers a total area of 3,648 acres.

The surface contour of this land is similar to that of Dubuque silt loam; it has the same native vegetation, is farmed in about the same way, and has practically the same agricultural value.

Dubuque loam, steep phase.—A steep phase of Dubuque loam is mapped where areas are so steep that ordinary agricultural practices are difficult. Only a few small patches, in the western and southwestern parts of the county, are mapped. Land of this kind has a lower value than typical Dubuque loam, and most of it is left in forest or used as pasture.

DODGEVILLE SILT LOAM

The surface soil of Dodgeville silt loam is from 6 to 10 inches deep, and consists of a dark-brown or almost black silt loam with a high content of organic matter. Quantities of fine sand are present in the surface soil in places, and small fragments of chert are common. The upper part of the subsoil is a heavy silt loam, considerably lighter in color than the surface soil, and at a depth of about 16 inches this grades into a reddish-brown clay loam containing numerous chert fragments, which become more numerous with increasing depth. This is underlain by heavy clay loam or clay. The usual depth to bedrock ranges from 2 to 3 feet, though outcrops of bedrock along the slopes are numerous. Within a few inches of the underlying rock, which is limestone, the color is variegated. Many small pockets of sand occur in the subsoil, and in a few small areas the surface material is a fine sandy loam. Such areas usually occur on the slopes, but many are too small to be indicated on the soil map.

Dodgeville silt loam, with its deep and steep phases, is the second most extensive soil and probably the most important in the county. Some of this soil is present in every township, and it is the predominating soil in Jefferson, Sylvester, Monroe, York, and Adams Townships. It is closely associated in many places with Dubuque silt loam and differs chiefly from that soil in the color of the surface soil and the content of organic matter.

The surface of areas of Dodgeville silt loam ranges from gently undulating to rolling. The undulating areas occur as ridge tops, and the rolling surfaces are found where streams have worked back into the land, carving valleys and leaving ridges, along the slopes of which rock outcrops are numerous. The natural drainage is well established, and is even excessive where the soil is shallow. On the steeper slopes some danger of erosion exists.

This soil is derived from the weathering of the underlying limestone, and its dark color is doubtless due to the decay of a rank growth of grasses under moist conditions. Dodgeville silt loam is a prairie soil, and the original vegetation consisted chiefly of prairie

grasses, with only a scattered growth of trees along some of the slopes and bordering forested soils.

Probably about 65 per cent of this soil is under cultivation, the remainder being used chiefly as permanent pasture. The type of agriculture most extensively followed consists of general farming and dairying. The chief crops are oats, barley, wheat, clover, and timothy. The rotation most commonly followed consists of corn, which may be grown for two or three years, followed by a small-grain crop possibly for two or three years, after which the land is seeded to timothy and clover and cut for hay for at least two years. Many farmers pasture the fields for a year or more before again plowing them for corn. Better results are obtained by reducing the length of the rotation.

The acreage of alfalfa is gradually increasing and this crop does well where the soil contains plenty of lime. The application of ground limestone is necessary in many places for success with this crop. In fact much of this soil is acid and is benefited by the use of lime.¹

Dodgeville silt loam, deep phase.—The surface soil of Dodgeville silt loam, deep phase, consists of a very dark brown or almost black friable silt loam, from 8 to 14 inches deep, with a rather high content of organic matter. The surface of the soil is free from coarse sand, gravel, and stones, and the texture is uniform. The subsoil consists of a yellowish-brown heavy silt loam which grades into a silty clay loam or clay loam at a depth of about 20 inches. Below this depth the color, in many places is a more pronounced yellow or the subsoil may be a reddish-brown or red clay, resting on limestone 3 or 4 feet below the surface. Where the soil section is deep, the yellow color usually prevails and where the soil mass is less than 3 feet deep, a reddish color is more apt to occur. The soil phase is developed most extensively on undulating ridge tops and on long gentle slopes.

Although Dodgeville silt loam, deep phase, is in general uniform throughout most of its extent, a number of variations were noted. The most marked of these is the difference in the depth of the surface soil and the depth of the soil mass to the underlying rock. The deepest dark-brown surface soil occurs on the smooth ridge tops and along gentle slopes, and on some lower slopes there are small areas where wash from the higher lands has accumulated. The dark soil is shallower on the more pronounced slopes and the red or yellow clay comes nearer to the surface. Along narrow ridge tops and on some of the steeper slopes where the soil is not so deep as typical, chert fragments occur on the surface and in the soil. In the eastern half of the county, a few glacial boulders may be present on the surface, and in isolated tracts limestone fragments may occur.

Accompanying these variations in the depth of the soil there is also a variation in the degree of acidity. On the ridge tops where the surface soil is deepest a medium degree of acidity usually prevails, and even where the limestone comes close to the surface an acid condition may exist. The least acidity is usually on steep places where the heavy limy subsoil is exposed, and on lower slopes where the soil receives wash from limestone ledges above.

¹ WHITSON, A. R., RICHARDS, GRIFFITH, and ULLSPERGER, H. W. Bul. No. 361, LIMING WISCONSIN SOILS, Agr. Ex. Sta., Univ. of Wis. 1924.

The surface is gently undulating or rolling, usually appearing as gently rolling prairie land. Natural drainage is well established, though on some of the more gentle slopes it is probable that tile drainage might be advantageous. On the steeper slopes some damage from erosion has taken place, but this can be checked by care in cultivation and in the selection of crops.

Dodgeville silt loam, deep phase, like typical Dodgeville silt loam is derived mainly from the weathering of the underlying limestone. On some of the hillsides the surface material has been removed by erosion and the reddish, residual material usually lying just above the limestone is exposed. This material is also seen in many road cuts. The small area of this soil, mapped in the south-central part of the county where the pre-Wisconsin glacial drift is present, may differ slightly in origin from the other bodies, being partly derived from glacial drift. But the old glacial drift is very thin, and the soil is practically the same as in the driftless area. A few crystalline boulders occur in this region, and their presence is usually the only indication of glacial action.

Dodgeville silt loam, deep phase, is a prairie soil, and the native growth consisted chiefly of prairie grasses. There are some trees, as oak, hickory, basswood, and some maple on some of the steeper slopes and along the edges of other kinds of land. Hazel brush is abundant in places. Probably about 90 per cent of this soil is in cultivation and the remainder in permanent pasture. The same crops are grown and about the same rotations followed as on the typical soil. Less steep land is included in the deep phase than in the typical soil, consequently less erosion has taken place and the average value is higher.

Dodgeville silt loam, steep phase.—The steep phase of Dodgeville silt loam occurs in small, usually narrow and irregular areas on stream breaks which are so steeply sloping that the land is not adapted to cultivated crops and is largely in pasture. Slopes of 10 or 15 per cent are subject to erosion when cultivated.

The soil of the steep phase of Dodgeville silt loam is essentially like the typical soil, except where erosion has carried away the surface silty layer and exposed the heavier subsoil. On uneroded areas the surface silty soil may be thinner than is typical, and the total depth of weathered material over the bedrock less.

The steep phase soil is associated with typical Dodgeville silt loam throughout its distribution in the county. The individual bodies are small but numerous, and the total area is 28.6 square miles.

DODGEVILLE FINE SANDY LOAM

The surface soil of Dodgeville fine sandy loam is a dark-brown or almost black fine sandy loam or loam about 10 inches deep. The soil is acid and high in organic matter. In places a small quantity of gravel and some limestone and chert fragments are scattered over the surface and mixed with the soil. The upper subsoil is usually a yellowish-brown fine sandy loam, grading at depths of 16 or 20 inches into a sandy clay loam or sandy clay, which prevails to a depth of 3 feet or more; but in many places the underlying limestone is within 3 feet of the surface, and is immediately covered by 4 or 6 inches

of reddish-brown, rather plastic sandy clay, containing particles of decomposed limestone. Both soil and subsoil are subject to numerous variations.

This soil is of small extent in the county, but is widely distributed. It occurs principally in Adams, Sylvester, Clarno, Washington, and Cadiz Townships.

The surface of this soil is rolling, but the slopes are not steep. Because of the loose, porous nature of the subsoil and the broken underlying rock, the natural drainage is excellent or even excessive. This condition also prevails where the limestone occurs near the surface.

This soil is largely residual from the underlying limestone, and in some places this rock is so sandy that it imparts a sandy texture to the soil material. Part of this soil occurs within the region which was glaciated, but the influence of the ice-laid material on the soils is slight, although some ice-deposited granitic boulders and some gravel occur.

This is a prairie soil, and the natural vegetation included only a few scattered trees and prairie grasses. About 80 per cent of this soil is under cultivation and devoted to general farming. It is considered a fair soil and easy to work, but is not equal in productiveness to Dodgeville silt loam. The general farm crops common to the region are grown, potatoes more extensively than on the heavier soils of the county. The acid condition of the soil in many places causes failures with clover and alfalfa.

Dodgeville fine sandy loam, steep phase.—Areas of Dodgeville fine sandy loam which are so steep as to be especially susceptible to erosion when cultivated are indicated on the soil map as the steep phase. They are small and irregular in shape, occurring on the steeper valley slopes in association with typical Dodgeville fine sandy loam, in the western part of the county. The total area is less than 1 square mile.

BOONE LOAM

The surface soil of Boone loam has a depth of about 10 inches, and consists of a light-brown or grayish-brown loam, having a comparatively low content of organic matter. It is underlain by a lighter-colored loam or fine sandy loam, which gradually becomes heavier with depth and grades into a sandy clay about 2 feet below the surface. This heavy subsoil may continue to a depth of 3 feet or more where it rests on bedrock; or it may grade into a fine sandy loam or fine sand where the bedrock is less than 3 feet below the surface. Immediately over the rock the subsoil, in many places, has a mottled reddish color. The soil is variable in texture, and the surface soil is generally acid.

This soil is of small extent but widely distributed. It occurs in Adams, Albany, Cadiz, Jordan, Exeter, and Washington Townships as well as in some other parts of the county. It occurs mostly on lower slopes below outcrops of sandstone rock.

The surface is rolling, and there is some danger of erosion on the steepest slopes. The natural drainage is good, or even excessive where the rock is near the surface.

This soil is derived largely from the underlying limestone and sandstone rock formations. The sandstone has contributed most largely to its formation.

The natural forest growth consisted of hickory, basswood, birch, some poplar, and several varieties of oak. The merchantable timber has been removed, but a large part of the land is still uncleared.

About one-third of this soil is under cultivation, largely for general farming, similar to that on Dubuque silt loam, with which it is frequently associated. Corn, oats, barley, and hay are the chief crops grown. The methods of cultivation, crop rotation, and fertilization followed are practically the same as on Dubuque silt loam, and this soil responds to the same treatment.

Boone loam, steep phase.—The steep phase of Boone loam includes those areas on slopes which are too steep for cultivation under present agricultural methods. The bodies are small and are associated with typical Boone loam, chiefly in the western part of the county.

At present the land is utilized for pasture or is forested.

BOONE FINE SANDY LOAM

The surface soil of Boone fine sandy loam, 8 or 10 inches deep, consists of a light-brown or brown fine sand or fine sandy loam, very low in organic matter and rather acid. The subsoil is a yellow fine sandy loam which becomes heavier with depth, at a depth of 20 or 24 inches it being a yellow sandy clay, which continues to a depth of 3 or more feet. Fragments of sandstone are present in places in both soil and subsoil. In some places, especially near the base of slopes, the surface soil is underlain by a layer of yellow fine sand, which may continue to depth of 24 or 30 inches before the yellow fine sandy loam is encountered. On the slopes immediately below sandstone outcrops irregular fragments of sandstone are scattered over the surface and mixed with the soil in sufficient quantities to hinder cultivation.

This soil is rather inextensive but the bodies are widely distributed, occurring in at least half of the townships of the county. Probably the largest body is in Albany Township directly west of the village of Albany and extends along the south side of Little Sugar River for a distance of several miles. Boone fine sandy loam, together with its steep phase, covers a total area of 14.1 square miles.

The surface of this soil is nearly level along the lower slopes and steep and broken on the ridge tops and hillsides, the larger areas on the steep slopes being mapped as the steep phase. It usually occurs on lower slopes below outcrops of sandstone or low secondary ridges from which the capping of limestone has been removed by erosion. On the steep slopes considerable damage is caused by washing, deep gullies having been developed in a number of places.

This soil has been derived chiefly from the weathering of sandstone, though, judging from the quantity of chert lying in places upon the surface, it is probable that some material from the limestone rock has been incorporated with it. Most of the soil derived from sandstone is deficient in lime, but there are some places where wash from

higher-lying limestone material has prevented this soil from becoming acid or has corrected acidity. Sorrel grows very generally over both this soil and the loam.

About 30 per cent of this land is cultivated, and the remainder is in forest and permanent pasture. Corn, oats, rye, buckwheat, and some hay are grown, but yields are rather low. The soil is deficient in organic matter and also in the mineral plant-food elements and requires special treatment to secure best results.

Boone fine sandy loam, steep phase.—Boone fine sandy loam, steep phase, includes areas of Boone fine sandy loam which are too steep for successful cultivation under the present system of farming. The soil is similar to typical Boone fine sandy loam, except where erosion has carried away the surface layers. This phase occurs in small, linear, irregular areas associated with Boone fine sandy loam.

The agricultural value of this soil is low and the best present utilization of it is for forest and pasture land.

CARRINGTON SILT LOAM

The surface soil of Carrington silt loam consists of a dark-brown or almost black, friable silt loam, comparatively high in organic matter. It usually contains some fine sand, and in many places a small quantity of gravel. Tests indicate that the surface soil is acid. The subsoil consists of a rather friable, dingy-brown silt loam material which grades downward into yellowish-brown silty clay loam material containing some fine sand and gravel. At a depth of 20 or 30 inches a sandy clay or a sandy loam material occurs. The deep subsoil usually grades into glacial till, composed of mixed clay, sand, gravel, and boulders. In some areas where the limestone bedrock is within 4 feet of the surface, the lower subsoil is a reddish-brown clay, carrying fragments of the weathered limestone from which it originated. In places limestone fragments occur in both soil and subsoil.

Where this soil borders Dubuque silt loam or Lindley silt loam, it is lighter in color and lower in organic matter than elsewhere; and where it borders fine sandy loam soils, both soil and subsoil contain more fine sand. On some of the steep slopes the soil has been removed by erosion and the underlying till exposed, and in other places the clay loam subsoil comes to the surface. The soil, as mapped, includes small areas of Carrington loam and fine sandy loam. This soil is similar to Dodgeville silt loam, but differs from that soil, chiefly in being underlain by glacial till.

Carrington silt loam is not so extensive in Green County as Dodgeville silt loam, but is widely distributed, occurring chiefly in Brooklyn Township in the northeastern corner of the county and in Clarno Township in the south-central part, both areas lying within the glacial region where the Carrington soils are developed. The surface of these areas varies from gently rolling to hilly, the surface features having been developed almost entirely by erosion. On account of the sloping surface and the open nature of the soil and subsoil, the natural drainage is good.

Carrington silt loam comprises prairie soils developed principally on glacial drift. The pre-Wisconsin glaciation is evident in this

region, but the amount of glacial till within this old glacial belt is small, and in many places seems to be lacking. In such places soil types representing the residual material are mapped, and it is evident that some of the material included with Carrington silt loam is also of residual origin from the underlying limestone. In some places the surface soil is developed on glacial drift, and the subsoil is residual material derived from limestone. Frequently the boundary between areas of Carrington and Dubuque soils is difficult to establish, as the change from one soil to the other is not marked. The parent glacial material is the distinguishing feature of the Carrington soils, and heavy red substratum is usually an indication of residual material.

Probably 80 per cent of Carrington silt loam land is under cultivation, the remainder being devoted to permanent pasture. General farming is practiced in conjunction with dairying. This is prairie soil, and the native growth consists almost exclusively of prairie grasses. Corn, oats, barley, and hay are grown successfully on this soil and it is handled and fertilized in the same way as Dodgeville silt loam.

Land of this kind ranges in price from \$100 to \$200 an acre, depending upon the location, improvements, and depth of soil.

Carrington silt loam, gravelly phase.—The surface soil of Carrington silt loam, gravelly phase, consists of a dark-brown or black fine sandy loam, loam or silt loam which prevails to a depth between 8 and 12 inches. A small amount of gravel is usually present on the surface. The yellowish-brown or chocolate-brown loam subsoil grades through gritty clay loam into gravelly sandy loam. In a few places a gravel bed occurs within 3 feet of the surface, and may even be exposed at the surface, whereas in other places the soil is nearly free from gravel. The parent material is largely calcareous glacial drift.

This gravelly soil is very inextensive and therefore of minor importance. Most of it is associated with Carrington silt loam, though in some places it is associated with Dodgeville silt loam, the gravel ridges being all that give evidence of the old glaciation, whereas the surrounding soils appear to be residual. The gravelly phase of this soil occurs in Clarno, Monroe, Decatur, and Albany Townships.

Carrington silt loam, gravelly phase, occurs chiefly in long, narrow ridges, kames, and eskers, and in isolated gravelly hills forming parts of moraines. The natural drainage is good or even excessive. Because of its small total area, the soil is of little agricultural importance. Some of it is well suited to alfalfa, being well supplied with lime. The chief crops grown are corn, oats, barley, and hay, and the uncultivated portion of the land is mostly in permanent pasture. Crop yields are fair, though inferior to those on Carrington silt loam. Although the subsoil may be high in lime, the surface soil is sometimes so acid that liming may be necessary in growing clover or alfalfa.

Carrington silt loam, steep phase.—A very small total area of Carrington silt loam is indicated on the soil map as a steep phase. It differs primarily from the typical soil in its steeply sloping surfaces which restrict the usual farming practices and render the land better adapted to pasture than to cultivated crops.

LINDLEY FINE SANDY LOAM

The surface soil of cultivated Lindley fine sandy loam is light brown or grayish brown to depths varying from 8 to 12 inches. In a few places the texture approaches a fine sand, though in other small areas the material is nearly as heavy as a loam. The subsoil is heavier than the surface soil and usually consists of loam or gritty clay loam material. In some places sandy layers are present in the deep subsoil.

This soil is of small extent, covering only 4.1 square miles or 2,624 acres within the county. It occurs most extensively in Brooklyn Township, and in smaller patches in Albany, Decatur, Exeter, and Clarno Townships. The soil is closely associated with other soils of the same series and also with Dubuque silt loam.

The surface is undulating or gently rolling and the natural drainage generally good. The soil has developed largely from the same old glacial *débris* as Lindley loam and Lindley silt loam and it also includes some residual material derived from the underlying limestone. Chert and glacial gravel are common in the subsoil, and on slopes or knolls may also be present on the surface.

This soil is nearly all in improved farms and is devoted to general farming and dairying. About the same cultural methods and crop rotations are followed as on Lindley loam and Lindley silt loam. Fine sandy loam soils are considered better adapted to truck crops than Lindley silt loam.

LINDLEY LOAM

The cultivated surface soil of Lindley loam averages 9 inches in depth, and consists of grayish-brown loam, containing only a moderate amount of organic matter. The subsoil is usually yellowish-brown loam grading gradually into a gritty clay loam which may take on a reddish-brown color below a depth of 2 feet. Some gravel and chert fragments are rather abundant in the subsoil, and may be present on the surface on knolls and rather steep slopes. The soil varies in texture from silt loam to fine sandy loam, and sandy material may occur in the subsoil. In some places boulders are present on the surface, but not in sufficient numbers to interfere with cultivation.

Lindley loam occurs most extensively in Brooklyn Township, and also occurs in Albany, Clarno, Decatur, Exeter, and Mount Pleasant Townships.

The surface varies from nearly level to rolling and the natural drainage is good, though in a few places bordering the lowlands drainage is slightly deficient.

This soil, like the silt loam, has been derived chiefly from unsorted glacial material of the older Wisconsin or pre-Wisconsin ice sheet. This deposit was thin and considerable residual material from limestone rock now occurs with the glacial *débris*, resulting in soils which are partly glacial and partly residual. The soil material has been leached to a considerable extent and the surface soil in most places shows varying degrees of acidity.

Most of the Lindley loam is in farms and is highly improved. The farms are devoted to general farming and dairying, and the chief crops are corn, small grains, and hay. The same cultural

methods are followed as on Lindley silt loam and Dubuque silt loam, and suggestions for improvement of those soils will apply equally well to this soil.

Lindley loam, steep phase.—The steep phase of Lindley loam includes small areas on slopes so steep as to prohibit production of the ordinary cultivated crops of the region, and under present conditions, the land is best utilized as pasture.

LINDLEY SILT LOAM

The surface soil of Lindley silt loam consists of grayish-brown silt loam, 8 or 10 inches deep, which is low in organic matter. The upper subsoil is yellowish-brown heavy silt loam material, grading into silty clay loam, which at a depth of 18 or 20 inches is usually underlain by brown gritty clay loam or clay. In many places this material contains some rounded gravel and may also carry some chert fragments. A small amount of gravel and some glacial bowlders may be present upon the surface, especially on the knolls and steeper slopes. The soil is variable and in many places contains fine sand.

Lindley silt loam is confined to the glaciated part of the county, the largest tract occurring in Albany Township and in the adjoining part of Decatur Township. Other small patches are in Brooklyn, Mount Pleasant, Sylvester, and Clarno Townships. This soil is closely associated with Dubuque silt loam and closely resembles that soil type. The chief difference is the presence of drift stone and gravel in the Lindley soil.

The surface of this land ranges from nearly level to rolling, and the natural drainage is usually good, though near low places where the surface is nearly level, drainage may be slightly deficient.

Lindley silt loam is derived from calcareous glacial debris from the pre-Wisconsin or early Wisconsin ice sheet, and the deposit in Green County is very thin. The parent material is entirely lacking in many places, and elsewhere the glacial material has become so mixed with residual material that it is difficult to distinguish which material predominates. The old till has been thoroughly leached and an acid condition prevails in the surface soil in most places.

The native forest growth was chiefly of oak, basswood, maple, with some hickory, elm, and ash. Practically all merchantable timber has been cut and most of the land is in improved farms. The chief crops grown are corn, oats, barley, timothy and clover, and some alfalfa. The soil is of similar agricultural value to Dubuque silt loam, and the same farming practices and methods of improvement apply to both.

LA CROSSE SILT LOAM, LIGHT-COLORED PHASE

The surface soil of the light-colored phase of La Crosse silt loam consists of light-brown or grayish-brown silt loam, from 8 to 12 inches deep, which, owing to its very low content of organic matter has a whitish appearance when dry. The material is almost free from sand and gravel, and has an extremely smooth feel. The upper subsoil is brownish-yellow silt loam, grading at depths of 16 or 20 inches into yellow silty clay loam which may continue to a depth of 3 feet or more. In many places a silty fine sandy loam is encountered between

depths of 2 and 3 feet. It is underlain by stratified beds of sand or gravel.

This soil is inextensive and occurs chiefly in the valley of Sugar River in the eastern part of the county. A few scattered areas occur elsewhere but are practically all within the region covered by the ice sheet.

The surface is level or very gently undulating, and the natural drainage is sufficient except where the underlying beds of sand and gravel are 3 feet or more below the surface. In many places, bordering areas of Clyde soils, the drainage is deficient.

The original forest growth consisted of oak, elm, hickory, and some ash, but practically all of this land is now cleared and forms parts of highly improved farms. The chief crops grown are corn, oats, barley, and hay. The same systems of farming and cultural methods are followed as on Lindley silt loam and Dubuque silt loam and the soil has about the same degree of productiveness.

LA CROSSE LOAM, LIGHT-COLORED PHASE

La Crosse loam, light-colored phase, consists of a brown loam, passing at a depth of about 10 inches into a heavy, yellowish-brown loam or light sandy clay loam, which grades downward into yellowish-brown or brownish-yellow gravelly sandy clay. In general, at a depth of 30 inches stratified beds of yellow gravel and sand are encountered, though in some places the beds of gravel and sand are within 20 inches of the surface, whereas in other places they do not occur within a depth of 3 feet. Some areas of La Crosse silt loam and La Crosse fine sandy loam too small to map separately are included with this soil.

Most of this soil is in the eastern part of the county within the glaciated region and chiefly in the valley of Sugar River, in Brooklyn, Exeter, Albany, and Decatur Townships. It is associated with other members of the La Crosse series, and in places merges into them. Patches of fine sandy loam are included in mapped areas of this phase of La Crosse loam. In these patches the soil consists of about 10 inches of light-brown or brown fine sandy loam, underlain by pale-yellow sandy loam which becomes heavier with depth. The pale-yellow subsoil encountered at a depth of 12 or 14 inches, ranges in texture from heavy fine sandy loam to sandy clay. In some places it prevails to a depth of more than 3 feet, whereas in others a bed of stratified medium and fine sand or gravel is encountered at a depth of 2 or 3 feet.

The surface ranges from almost level to gently sloping or undulating, and the natural drainage is usually good. The soil is open and porous and readily absorbs the normal rainfall.

Nearly all of this land is under cultivation, and is devoted chiefly to corn, oats, barley, rye, and hay. The methods of cultivation followed and yields secured are similar to those on La Crosse silt loam. The soil is deficient in organic matter and is somewhat acid.

LA CROSSE FINE SANDY LOAM

La Crosse fine sandy loam consists of a mellow dark-brown or nearly black loam or fine sandy loam about 10 inches deep, with a

high content of organic matter. The subsoil grades through chocolate-brown loam or fine sandy loam to a yellowish-brown material of about the same texture. At a depth of 2 feet the subsoil is either a gritty clay loam or sticky sandy loam material and grades into stratified sand and gravel not more than 3 feet below the surface.

This soil is of small extent and is confined chiefly to the eastern part of the county in the valley of Sugar River. The areas are small and widely scattered.

La Crosse fine sandy loam is derived from alluvial deposits laid down by streams when the water was at a much higher level than at present. Though much of the material may have originated from limestone, the soil has been leached to so great an extent that an acid condition has developed. In farming the land limestone is needed; especially for clover and alfalfa.

La Crosse fine sandy loam is a prairie soil and the natural growth was largely prairie grasses, though practically all of this soil is now in improved farms and producing fair crops. Corn, hay, and small grains are the chief crops, although the soil is also well suited to special truck crops, and would respond well to special fertilization. The improvement of this soil should be conducted along the same lines as the other prairie soils of the county.

La Crosse fine sandy loam, light-colored phase.—The surface soil of the light-colored phase of La Crosse fine sandy loam consists of light-brown or grayish-brown fine sandy loam, from 6 to 10 inches deep, underlain by a yellowish-brown material of about the same texture. Below 18 inches a gritty clay loam or sandy clay layer prevails in many places, and at a depth of about 2 feet this grades into stratified sand and gravel.

The soil is somewhat variable and contains small tracts of loamy soil and also some sandy areas. It is confined mainly to the valley of Sugar River. It occurs principally in Brooklyn, Exeter, Albany, and Mount Pleasant Townships, and is closely associated with La Crosse loam, La Crosse silt loam and La Crosse sandy loam.

The surface is level or nearly so and because of the open nature of the subsoil, it is well drained. The areas are situated well above the present flood plains and seldom suffer from excess water.

This soil has developed from water-laid material and nearly always occurs on terrace formations along streams. The material has been leached to a considerable extent and the surface soil is usually somewhat acid.

La Crosse fine sandy loam, light-colored phase, is a good soil and is devoted principally to general farming and dairying, corn, oats, and hay being the chief crops.

LA CROSSE SANDY LOAM

La Crosse sandy loam consists of a dark-brown or almost black sandy loam underlain at a depth of 16 or 20 inches by a brownish-yellow sandy clay loam. This becomes lighter in texture with increasing depth and grades into yellowish sandy loam at a depth of about 28 inches. This is underlain by gravelly sand, and at a depth of about 3 feet by stratified beds of gravel and sand. The topsoil is acid. The surface layer of this soil varies in texture from sand to

loam, and the stratified beds of gravel and sand are within 18 inches of the surface in some places and below a depth of 3 feet in others.

This soil is confined to the valley of Sugar River and occurs most extensively in the southeastern part of Decatur Township in the vicinity of Brodhead. In fact, the city of Brodhead is situated on a terrace of La Crosse sandy loam.

The surface of this land is level or undulating, and the natural drainage is good or excessive because of the coarse open nature of the lower subsoil.

This is an unforested prairie soil and prairie grasses constituted the native vegetation. Practically all of this land is devoted to general farming in conjunction with dairying. Potatoes are grown more extensively than on the heavier soils and fair yields are usually obtained. Yields of general farm crops are somewhat lower than on La Crosse loam and La Crosse silt loam and the soil has lower agricultural value. More tobacco is grown on La Crosse sandy loam than on any other soil in the county. Rye is also grown to a greater extent than on the heavier soils.

La Crosse sandy loam, light-colored phase.—The topsoil of La Crosse sandy loam, light-colored phase, consists of brown sandy loam of medium texture 8 or 10 inches deep. The soil is rather loose and open, and as a rule the supply of organic matter is low. The subsoil is a yellowish sand or sandy loam material, which may contain sufficient clay in places to make it somewhat sticky when wet. Below a depth of 2 feet beds of stratified sand with some fine gravel usually are present. Mapped areas of this type of soil contain patches of La Crosse loam and La Crosse fine sandy loam. Where it borders the typical La Crosse sandy loam and the Waukesha soils, it is darker in color than usual and contains more organic matter.

La Crosse sandy loam, light-colored phase, is most extensive in the eastern part of the county, and is confined chiefly to the valley of Sugar River. It covers a total area of 3.4 square miles, and is closely associated with other soil types and soil phases of the La Crosse series.

The surface of this land is level or gently undulating, and the natural drainage is good or somewhat excessive. The soil occurs on terraces well above present overflow. The soil material is of alluvial origin, and was probably deposited during glacial periods, when much larger quantities of water were carried by the streams than at present. The soil has been leached considerably, and an acid condition prevails.

La Crosse sandy loam, light-colored phase, has a somewhat lower agricultural value than La Crosse loam and La Crosse silt loam, but it may be considered a fair soil. It is devoted to general farming and dairying, and some tobacco is grown. Corn, rye, and some hay and oats are produced, but yields are lower than on the heavier soils.

In the improvement of this kind of land the organic-matter content of the soil should be increased by growing more legumes and by adding mineral elements of plant food. A good rotation for such land consists of small grain, followed by clover, then by corn or potatoes. The second crop of clover should be plowed under as green manure in each rotation until the humus content has been materially increased. The use of lime may be necessary in insuring a good stand of clover.

LA CROSSE SAND

The surface soil of La Crosse sand consists of light-brown fine sand, 8 inches deep, which contains only a low percentage of organic matter. This is underlain by a yellowish fine sand which prevails to a depth of 3 or more feet. Some of the soil is coarser in texture, and gravel commonly occurs in the subsoil.

This soil is confined to the valley of Sugar River and is most extensive in the northeastern corner of Spring Grove Township. A smaller body is in Decatur Township.

The surface of this soil is flat or very gently undulating, but the natural drainage is excessive. Although the water table comes closer to the surface than in the upland soils, this soil is inclined to be droughty.

Most of this land is cleared and under cultivation. The remainder is in brush and second-growth forest and is used to some extent for pasture. Most crops common to the region are grown, but yields are low. Tobacco of fairly good quality is grown to some extent on this soil, though yields are low. The soil is deficient in organic matter as well as in the mineral plant food elements, but the texture of the soil is such that its productivity may be improved.

To improve this soil, legumes should be grown and commercial fertilizers used where necessary. From 200 to 300 pounds an acre should be used. When clover is well established the second crop may be plowed under to supply the needed organic matter. Where acid, the soil should be limed before best results can be expected, and the use of lime will help to insure a good crop of clover. By following a short rotation, which includes a legume, part of which crop is plowed under, and by supplying the mineral plant-food elements through commercial fertilizers, good crops may be secured. A rotation consisting of clover, corn, and a small grain is well suited to this soil.

CLYDE SILT LOAM

Clyde silt loam may consist of a 12 or 14 inch layer of dark-brown or black silt loam, very high in organic matter, underlain by a subsoil of dark-gray silt loam material mottled with drab and yellow. At a depth of about 24 inches the material is mottled brownish-yellow or drab silty clay loam material which may continue to a depth of 3 or more feet.

This soil as mapped is not uniform. In many places the first 8-inch layer consists of peaty material. In flood-plain areas a layer of peaty material, from 1 to 10 inches thick, may occur in either the upper or lower part of the subsoil. Here and there along streams black silt loam has been deposited over loam and fine sandy loam, and in other places the surface material, to depths ranging from 1 to 10 inches, is a light-brown silt loam, underlain by black silt loam or peaty silt loam material, made up of wash from adjoining high land. The uniform features of this soil are poor drainage, dark color, and high content of organic matter. Much of the parent material has been deposited by water or has been modified to some extent by water action since its deposition by other agencies. The Clyde soils are confined to the region influenced by glacial ice. Since most of the material came originally from limestone, the soils are

not usually acid, and as the waters draining into the lowlands usually carry some lime from the higher lands adjoining, the soil material is somewhat calcareous.

Clyde silt loam is developed most extensively in the eastern part of the county and is confined chiefly to the valley of Sugar River and its tributaries. The largest areas are in Brooklyn, Exeter, Albany, Decatur, Spring Grove, and Sylvester Townships.

The surface of this soil is low lying, flat, or basinlike and the natural drainage poor. The land usually has a very slight slope toward the drainage way along which it occurs.

The original forest growth consisted of elm, ash, soft maple, willow, some sycamore, and some bur oak. Most of the merchantable timber has been cut, but in a few places where the land has not been drained timber of good quality is still standing.

Some of this soil has been reclaimed by drainage, but the major part of it is too wet for the successful production of cultivated crops. With proper drainage, however, this would be one of the best corn soils in Wisconsin, and on drained areas corn is the chief crop, though hay is also extensively grown. Alsike and timothy are the most common hay grasses.

This soil is also well suited to sugar beets and to cabbage, but these crops are grown but little. Small grains make a rank growth, but are apt to lodge, and the quality of the grain is never so good as on the light-colored heavy upland soils.

CLYDE LOAM

The surface soil of Clyde loam has a depth of about 12 inches and consists of black or nearly black loam or fine sandy loam which contains a high percentage of organic matter or humus. The subsoil is variable in texture but is usually lighter in color than the surface soil. In many places it consists of drab or bluish loam or fine sandy loam material which may become a silty clay loam or sticky sandy clay at a depth of 18 inches. The deep subsoil may contain considerable sand, and stratified material occurs in many places below a depth of 2 feet.

Clyde loam is confined largely to the eastern part of the county, chiefly in the valley of Sugar River in Brooklyn, Exeter, Albany, and Decatur Townships. Other small areas are in some of the adjoining townships. The total area is only 1,216 acres.

The soil is low, the surface is level or slightly depressed, and the natural drainage poor, though the land is seldom flooded. It is usually on low, poorly drained terraces, though in a few places it comprises depressions in the upland.

This soil is of little agricultural importance because of its small extent. Most of it is undrained and is utilized chiefly for pasture. When thoroughly drained it will make excellent farm land well suited to corn, grass, and hay, as well as to truck crops.

WAUKESHA SILT LOAM

The topsoil of Waukesha silt loam is about 12 inches in depth and consists of a black velvety silt loam containing a high percentage of organic matter. The upper part of the subsoil is choco-

late-brown heavy silt loam or silty clay loam material, which gradually becomes yellowish brown with increasing depth. Below a depth of 24 inches the subsoil in many places is clay loam material slightly mottled in some places, and elsewhere the soil mass may contain some fine sand. At depths ranging from 2 to 5 feet stratified beds of sand and gravel are present, the depth to the coarse material usually being more than 3 feet. The surface soil is rather uniform and is free from gravel, stones, and boulders.

This is an important soil in the county but not so extensive as other black prairie soils. It is most extensively developed in the eastern part of the county in the valley of Sugar River and its tributaries, although it may occur in small patches along any of the water-courses within the county. Some of the most important bodies are in Decatur and Spring Grove Townships on what is known as Jordan Prairie. Others are in Sylvester, Exeter, and Mount Pleasant Townships, as well as in other localities.

The surface of this land is level or very gently undulating and the natural drainage fair or good, except that, where the surface is flat or slightly depressed and where the depth to sand and gravel is 3 or 4 feet, the drainage is somewhat deficient. Waukesha silt loam occurs chiefly on terraces or outwash plains, the material doubtless having been worked over by ice action and carried out from the front of the ice sheet by water. This débris was deposited in the flood plain of glacial streams and constituted the parent material from which this and several other soils of the county have developed. It is certain that the stratified portion was deposited as indicated above, but the extremely silty covering forming the surface soil and part of the subsoil may be of different origin, since it has some of the characteristics of wind-blown or loessial material. The dark color is due to the growth and decay of a rank grass vegetation. The surface soil is acid. This is a prairie soil and the native growth consisted chiefly of grasses.

Waukesha silt loam is the highest-priced farm land in the county. It is practically all tillable and is all in well-improved farms, devoted to general farming and dairying. Corn, oats, barley, and hay are the principal crops, corn having the largest acreage. Some wheat also is grown. This land sells from \$150 to \$300 an acre, depending upon improvements and location.

Though this is highly productive land, it can be improved for growing clover and alfalfa by the use of lime. The soil also responds to the use of phosphate fertilizers.

WABASH SILT LOAM

The surface soil of Wabash silt loam has a depth of about 14 inches and consists of black or dark-brown silt loam containing a high percentage of organic matter. It is underlain by brownish-drab or bluish silt loam or silty clay loam material which is mottled with iron stains below a depth of 18 inches. This material prevails to a depth of over 3 feet and usually becomes heavier in texture with depth. Variations in this soil are common, occurring especially along the smaller streams. In some places the black surface soil continues to a depth of more than 2 feet, and in other places the surface soil is light brown, and the black silt loam occurs a few

inches below the surface; in other localities there is a peaty covering, a few inches deep, over the silt loam, and in some small patches both soil and subsoil are rather sandy. All these variations mentioned are of such small extent that they could not be indicated on the soil map. The soil is usually slightly acid.

This soil is developed along practically all streams, and comprises the most extensive first-bottom land in the county. The largest tracts occur along Sugar River in Spring Grove, Decatur, Albany, Brooklyn, and Exeter Townships, and also along the smaller tributary streams such as Jordan Creek and Little Sugar River. In the western and southwestern parts of the county it occurs along Pecatonica River and its tributaries.

The surface of the land is level, or gently sloping toward the stream; it is subject to overflow and the natural drainage is poor. Before cultivated crops can be grown successfully much of the land will require tiling.

Wabash silt loam is of alluvial origin, the alluvium having been washed from the adjoining higher land carried by the streams and deposited within the present flood plain. The decay of rank vegetation developed under moist conditions accounts for the dark color and the high organic-matter content of the soil. In some of the narrow valleys it is partly colluvial in origin.

The original forest growth consisted of willow, sycamore, elm, soft maple, and ash. Some of the timber is still standing, but the best has been cut.

On account of the poor drainage and the danger from overflow, this soil is not used extensively for farming. It affords good pasturage, however, and is highly prized for this purpose where dairying is carried on extensively. In a few places where the soil is properly drained, crops yield well, corn averaging as much as 60 bushels an acre. The chief need of this land is drainage, and with the construction of open ditches and tile drains, it should become one of the most productive soils of the county.

Wabash silt loam, colluvial phase.—The areas of Wabash silt loam which have better drainage than the typical soil are mapped as a colluvial phase. Most of this land occurs along intermittent streams where there is less danger from flooding and where much of the land can be cultivated without tiling. The soil is partly colluvial and partly alluvial and in some places extends up the lower slopes for a short distance so that the natural drainage is fair in many places. The soil is practically the same as typical Wabash silt loam but the black surface layer frequently continues to a depth of 2 or 3 feet where wash from adjoining dark-colored upland soils has accumulated. This land is excellent and parts of it are in cultivated crops each year.

WABASH LOAM

The topsoil of Wabash loam has an average depth of 14 inches and consists of dark-brown or black loam. The subsoil usually is a drab or somewhat bluish loam or fine sandy loam material, mottled with yellow in the lower part. The soil is extremely variable and in some places the surface soil has a fine sandy loam texture; but because of its small extent and variability, this soil was mapped with

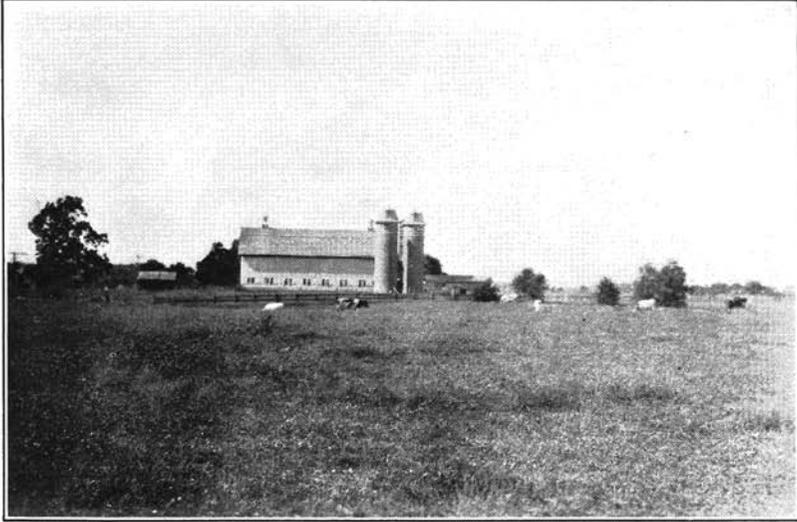


FIG. 1.—A TYPICAL FARM VIEW IN ALBANY TOWNSHIP

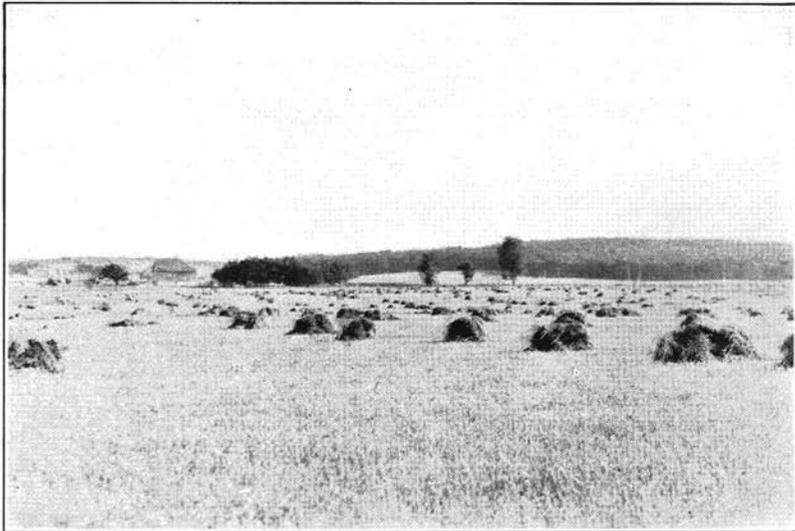


FIG. 2.—AN AREA OF BERTRAND SILT LOAM, EXETER TOWNSHIP

the loam. There is a thin covering of peat over the surface in places, and fine gravel frequently occurs in the lower subsoil.

This soil is developed along the first bottoms of streams, most of it in the valley of Sugar River in the eastern part of the county. It is of much smaller extent than Wabash silt loam and of minor importance.

The surface of this land is low and flat, or has only a gentle slope toward the stream along which it occurs, and the natural drainage is poor. The land lies within present flood plains and is subject to overflow. The moist conditions have favored a rank growth of vegetation, the decay of which accounts for the dark color of the soil. The original growth, in addition to grasses, consisted chiefly of elm, ash, soft maple, and willow.

On account of its low position, poorly drained condition, and the danger from floods, this soil is used only for pasturage and to a small extent for marsh hay. If drained this soil would be suited to the same crops as Wabash silt loam and may be managed in the same way. In its present condition its use as pasture land is probably the most practicable. Draining and protecting the land from floods are the first steps necessary in improving this soil.

BERTRAND SILT LOAM

The surface soil of Bertrand silt loam, to a depth of about 10 inches, consists of brownish-gray, friable silt loam which becomes lighter in color when dry and frequently has a whitish appearance. The quantity of organic matter present in the surface soil is comparatively small, and accounts in part for the light color of the soil. A slight acid condition has developed in places in the topsoil. The subsoil consists of yellowish-brown or buff-colored material having a silt loam texture, which usually becomes somewhat heavier and more compact with depth and at depths between 24 and 30 inches may grade into a silty clay loam. Below a depth of 3 feet considerable stratified sandy material containing some gravel exists and may prevail to depths varying from 4 to 6 feet. The depth to this sandy material varies between 2 and 6 feet, but averages about 3 feet. This soil closely resembles Dubuque silt loam in texture, structure, and color of the soil to a depth of 3 feet.

Bertrand silt loam occurs in several parts of the county, but is confined chiefly to the valley of Sugar River. The largest tracts are in Clarno, Decatur, Brooklyn, Albany, Exeter, and Cadiz Townships. (Pl. LXII, fig. 2.) The soil is developed on stream terraces and the surface is for the most part level or has a gentle slope toward the stream along which it occurs. It frequently occurs on narrow benches varying in width from a few rods to one-half mile, between the bottom land subject to overflow and the steep slopes forming the valley walls. The terraces are above present flood plains and the natural drainage is usually fair or good. However, in places where the depth to sand is more than 3 feet and the surface level, the natural drainage may be deficient. Gullies and ravines have been cut across the terraces by water rushing down the valley slopes. The material composing Bertrand silt loam is largely of alluvial origin,

though it is probable that the surface material, especially close to the foot of the bluffs, is partly colluvial, having been washed down the steep slopes from areas of Dubuque silt loam lying at higher elevations.

Although the surface soil is slightly acid in places the land nearest the bluffs is slightly calcareous, especially where it occurs adjacent to uplands underlain by limestone from which there is a wash.

Most of the original timber has been cut and this land is practically all highly improved and very desirable. It is devoted to general farming and dairying, as is Dubuque silt loam. The same crops are grown and about the same yields secured; the same methods of improvement regarding fertilization and rotation will apply to this soil. It is of slightly higher value than Dubuque silt loam land.

ROUGH BROKEN LAND

Rough broken land includes rock exposures, cliffs, and land which is too steep and rough to plow or cultivate. It may be considered nonagricultural and is of value only for the small quantity of timber and pasturage it supplies.

This land occupies many of the steep walls bordering the valleys and forms a border between the valley bottoms and the high land of the ridges. It is developed in narrow bands, many miles in extent, winding in and out with the valleys and coves, but confined to the steep slopes. A part of it occurs as narrow ridges upon which are areas of arable land too small to be mapped. The bluffs and cliffs are highest along the western border of the county and many of them attain an elevation of 200 or 300 feet above the valley bottoms.

Rough broken land is rather uniformly distributed throughout the central and western parts of the county and is intimately associated with Dubuque silt loam and also with Boone soils. The greater part of the rock consists of St. Peters sandstone, Trenton limestone, and Galena dolomite.

The remaining forest growth consists of white oak, red oak, pine, and hickory, with considerable undergrowth and brush in places.

PLAINFIELD SAND

Plainfield sand has a surface soil about 6 inches deep of brown sand of medium texture, containing only a moderate amount of organic matter and having a loose open structure. The subsoil is light-brown or yellowish medium sand with which there may be mixed a small amount of fine gravel. It is loose and open in structure and very pervious to water. The soil is very uniform in texture and color, though in a few places the texture approaches a fine sand and in others the material is slightly loamy at the surface. Near heavier soils a small amount of clay occurs here and there in the subsoil.

This sand is of very small extent and is confined largely to a few areas in the valley of Sugar River. The largest tracts are in Decatur, Albany, and Exeter Townships. A number of smaller tracts are in the eastern part of the county.

The surface of Plainfield sand is level or only very gently undulating, and the natural drainage is usually excessive. In many places

the soil suffers from lack of moisture during the latter part of the growing season. It occurs on terraces or bench land and is well above the present flood plain of streams. It is all of alluvial origin and has been carried and deposited by streams. The material was originally derived in part from sandstone formations, and the surface is usually acid.

Virgin land of this kind was forested with oak and some pine, but practically all of the timber has been cut and the land placed under cultivation. Most of the general farm crops of the region are grown on this soil, but yields are usually low. The land has a low agricultural value, and lime and commercial fertilizers are needed to improve it. The growing of clover will greatly improve this land. A crop rotation well suited to sandy soil of this kind consists of corn, small grain, usually rye, followed by clover, the second crop of which should be turned under.

COLOMA SAND

Coloma sand consists of light-brown medium sand containing only a small amount of organic matter, underlain by yellowish sand of medium texture intermixed with some fine gravel. The sand prevails to a depth of over 3 feet. This soil is of very small extent, covering less than one-half square mile of land. One small tract occurs in Decatur Township and a few other small tracts are scattered through the eastern half of the county, mostly east of Sugar River. It is a soil derived from glaciated sandstone material which has been affected to some extent by a mixture of material from limestone formations. The soil is acid.

The surface of this land is gently rolling and the natural drainage is excessive, owing to the loose open character of the soil material and to the surface contour.

This soil is of low agricultural value, differing from Plainfield sand only in the surface configuration. The same crops are grown and the soil will respond to the treatment suggested for Plainfield sand.

RODMAN GRAVELLY LOAM

The surface soil of Rodman gravelly loam consists of brown gravelly or sandy loam, 8 or 10 inches deep, and is underlain by brownish-yellow sandy or gritty loam, which gradually becomes yellowish with depth and is yellowish brown below 15 inches. The gravel content increases with depth and beds of stratified sand and gravel usually occur about 2 feet below the surface, and continue to undetermined depths. Some gravel appears upon the surface and glacial boulders are not uncommon.

This soil is of very small extent and covers a total area of less than 1 square mile. It is rather widely distributed, however, and is mapped in Decatur, Albany, and Mount Pleasant Townships, with a few other small tracts in the eastern half of the county. It occurs in small patches usually of less than 40 acres, and frequently on knolls only a few square rods in extent. It is developed chiefly on kames and eskers whose surfaces are bumpy and irregular, and whose slopes are usually steep and seldom cultivated. These hillocks occur in groups, and areas of the Rodman soil are separated by patches of

Lindley silt loam. Because of the rough surface and the gravelly nature of the subsoil, this soil is well drained, and where the soil is shallow, the drainage is excessive.

Some of the areas are forested, mostly with oak, and others are used for pasture land. This land can best be utilized for pasture since most of it is too steep to be used for cultivated crops.

Being underlain by deposits of gravel, this soil is one source of supply for gravel for road building. Good quality gravel for road construction enhances the value of this land.

PEAT

Peat, as mapped in Green County, consists of vegetable matter in various stages of decomposition, mingled with varying proportions of mineral matter. It consists of black or dark-brown, fibrous or rather finely divided vegetable matter, mixed with a small amount of fine sand and silt, and ranges in depth from 1½ to 10 feet, but averages 4 feet. Most of the peat is fairly well decomposed, and when dry resembles a black, carbonaceous clay. In areas of sandy soils peat is generally underlain by sandy material, whereas in regions of heavy upland soils the underlying material is clayey. Most of the peat in Green County is underlain by material as heavy as or heavier than loam.

Peat is widely distributed in Green County and is mapped in nearly every township, occurring in tracts ranging from a few acres to one-half square mile or more in extent. In many cases peat occurs in long narrow strips along stream channels; in fact, most of the peat is in such places, and only a small proportion occurs as depressions in the upland, old lake, and pond beds, being very scarce in this old glacial region of the pre-Wisconsin drift. It is most extensively developed in the valley of Sugar River and its tributaries in Decatur, Albany, Brooklyn, Exeter, and New Glarus Townships, and some is mapped along Pecatonica River and its branches in the southwestern part of the county.

The surface is low, level, and very poorly drained. During early spring some of the marshes are entirely covered with water, but later in the summer many areas of peat are dry and firm, and can be used for pasture or the wild grasses cut for hay.

Peat has been formed through the growth and partial decomposition of a rank vegetation in the presence of water. Around the margins of the larger marshes, and over the greater part of the smaller ones, varying quantities of mineral soil from the adjoining higher land have been washed in and incorporated with the vegetable matter. Although most of the peat occurs within the region where the upland soils are made up, in part, of limestone material, some of it, particularly in the larger marshes, is acid.

The native growth in these marshes consists of several varieties of grasses and sedges, arrowhead, cat-tail, various reeds and rushes, and sphagnum moss. Tamarack grows in a few marshes.

Only a few of the peat beds have been ditched and reclaimed, but where thoroughly drained and properly handled, they produce good yields of corn, mixed timothy and alsike hay, oats, potatoes, onions, celery, and cabbage.

Peat, shallow phase.—The shallow phase of peat consists of black or dark-brown vegetable matter in varying stages of decomposition, ranging in depth from 8 to 18 inches, and mixed with more or less sand, silt, or clay.

The shallow peat is much less extensive than the other, and occurs chiefly in Albany, Brooklyn, and Exeter Townships, in association with the deeper peat and soils of the Clyde series. It covers a total area of 640 acres. It is similar, in topography, drainage, and character of vegetation, to typical peat, though some of the marshes are underlain with clay, clay loam, or silt loam at a depth of only 12 or 15 inches. When these are first drained many areas show a marked need of potash fertilizer or barnyard manure for a few years, but later this need partially or entirely disappears. This seems to be due to the settling of the mucky layer upon being drained and worked, allowing the underlying material, which contains a good supply of potassium, to become mixed with the organic material so as to supply plants with potash.

SUGGESTIONS FOR THE IMPROVEMENT OF GREEN COUNTY SOILS

SOIL EROSION

One of the most important problems in soil management in Green County is that of soil erosion. Much of the land in the county is steeply sloping, and the soil on these slopes is heavy. Those soils on areas particularly subject to erosion include Dubuque, Dodgeville, Boone, and Bertrand soils. Bertrand soils, existing on bench lands, are especially subject to severe gullying by swift-running water from the ridges and slopes above.

Furthermore, because of improper methods of plowing and cultivation and injudicious location of the fields, much soil material is leached out or removed from the surface, even on gently rolling areas. Contour cultivation of crops planted in rows crosswise to the slopes prevents rain water collecting in the rows, and retards the movement of surface water and the removal of valuable soil material. Erosion may also be checked by keeping the exposed places in sod, or in alternate strips of crops and sod across the slopes.

Crop rotations, in which two cultivated crops do not follow in succession, also aid in controlling erosion. A cover or catch crop of rye or peas planted between the corn rows helps to protect the soil after harvest and furnishes pasturage until winter.

Deep plowing and plowing under straw, manure, or a second crop of clover to increase the organic matter in the soil also give the surface of the field greater absorbing capacity and increase resistance to erosion.

Gullying occurs where greater volumes of water collect and form cutting streams, where steeper slopes cause the water to flow faster, and in places where the soil has an unstable foundation of sandy material which is easily undermined when the water once cuts through the surface soil. In some situations large gullies one-half mile or more in length are cut during a single season. Most small gullies may be controlled in the beginning by filling them with straw

or manure and plowing. Shallow drainage ways should be left in permanent sod. On the level terraces, or where a heavy topsoil is underlain by light sand or sandy gravel, small ditches or gullies must be immediately controlled. Where the subsoil is clay and where clay or silt is brought down by the flood water, large gullies may be filled by constructing a dam of stumps, brush, and logs; but where the subsoil is sandy much greater care is required, as dams built in such locations must be carefully constructed to prevent the water from cutting around or under them. Dams of concrete, stone, wire mesh, and brush have been successfully used, and flume devices have been employed to carry the water over the head of the ditch and down into it, thus preventing backward cutting. In many places planting willows and bushes on the sides and bottom of ditches too deep to fill arrests the growth of the ditch. Sorghum, sweet clover, or rye are good emergency crops on eroded spots and fields which later should be seeded to grasses and left in permanent sod.²

ROTATION OF CROPS

In this discussion of crop rotations, farm crops are grouped into three classes; (1) grain crops, which add little humus or organic matter to the soil and which tend to favor the growth of weeds; (2) hay crops, such as legumes, timothy, and other grasses; and (3) cultivated crops such as corn and potatoes. A good rotation should necessarily include crops belonging to each of these three classes. The value of such rotation is apparent in its effect on the physical condition of the soil, on weediness, on the supply of organic matter and nitrogen, and on plant diseases. Better yields therefore, are obtained where crops are rotated than where a single-crop system is practiced. Crop rotation tends to stabilize farm business and makes possible the most efficient use of labor and equipment on the farm.

It should be understood, however, that crop rotation is not a means for maintaining the supply of plant-food elements in the soil, though it is an important factor in maintaining yields. It is often said that certain crops are "hard" on the soil in the sense that they remove more plant-food elements than other crops. This is only partly true; but the more important factor is that some plants remove more of the nutrient elements than other plants. Potatoes require a good supply of potassium; corn draws heavily on nitrogen; whereas such crops as alfalfa and red clover require much lime (calcium) and also large quantities of phosphorus, potassium, and nitrogen. By properly rotating crops, therefore, the draft on the soil is varied. Rotation is highly desirable, but can not take the place of other necessary farming practices, such as liming and fertilizing.

There is no one best rotation. The rotation adopted by a farmer depends largely on the crops he desires to grow. The fact that much of the land in Green County is very steep and subject to erosion, makes it necessary to give both rotation and choice of crops careful consideration. A rotation suited to this condition and one which is commonly practiced, consists of corn, followed by small

² WHITSON, A. R., and DUNNEWALD, T. J. Bul. No. 272, KEEP OUR HILLSIDES FROM WASHING, Agr. Exp. Sta., Univ. of Wis. 1916.

grain, then followed by hay for two years. In some parts of the county grain tends to lodge. This tendency may be overcome somewhat by growing grain two years in succession on the same fields, and where the slope is not too great, this may be done safely; or two crops of corn may be grown where the slope will allow. A three-year rotation, consisting of corn, followed by a small-grain crop, and the grain followed by clover, may also be used and is followed on much of this land. Where the fertility of the soil is rather low, the second clover crop, or rowen, may be plowed under as a green-manure crop. Where the surface of the field has a slope of more than 18 or 20 feet in every 100 feet, it is questionable if corn should be grown at all, because of the danger of serious erosion. In such places the fields should be kept in grass as much as possible and made into permanent pasture, or seeded to alfalfa.

On the gently rolling prairies and uplands with light-colored soils a four-year or five-year rotation may be followed. The following rotations are suggestions, which may be altered to suit varying conditions:

Five-year rotations: (1) First year, corn; second year, corn; third year, small grain with clover; fourth year, clover; fifth year, wheat with clover; (2) first year, corn; second year, small grain with clover; third year, clover; fourth year, wheat with clover; fifth year, clover; (3) first year, corn; second year, cowpeas or soy beans; third year, wheat with clover; fourth year, clover; fifth year, wheat with clover.

Four-year rotations: (1) First year, grain; second year, corn; third year, oats with clover; fourth year, clover; (2) first year, corn; second year, corn; third year, wheat or oats with clover; fourth year, clover.

Three-year rotation: (1) First year, corn; second year, oats or wheat with clover; third year, clover.

In some of the rotations suggested it may be desirable to substitute rye or barley for wheat or oats. Clover should include the different kinds of clover, such as red, alsike, and sweet clover. The value of sweet clover is more appreciated than formerly and its importance in a crop rotation may well be emphasized.

In the sandy parts of the county somewhat different rotations are followed. The following is probably best for most sandy farms: First year, clover with perhaps a light seeding of rye or oats; second year, clover for hay, leaving the second crop to be turned under either in the fall or spring; third year, corn or potatoes; fourth year, soy beans, which may be used for feed, for hay, or for green manure. Another rotation which is frequently followed on sandy soils consists of small grain, followed by clover, and clover by potatoes. The second crop of clover in this rotation should be plowed under as green manure. Mammoth clover is better than red clover on sandy soils.

Tobacco may be grown on the same field for two or three years, followed by corn for two years and small grain seeded with clover for one year. With tobacco, a phosphate fertilizer should be used to supplement the manure. Peas for canning could be made an important crop in this section and could be readily introduced into a four-year rotation. Such a rotation might consist of small grain, clover, cultivated crops, followed by peas. This may be made a five-

year rotation by adding timothy with the clover and cutting the hay for two years. This rotation would be best suited to the parts of the county where the soils are heavy.

It is of great importance in selecting crops to be grown that careful consideration be given to climate. This is about the only factor which the farmer can not control. A poor soil may be improved, better markets may be procured, and better labor obtained, but the farmer is powerless to change climatic conditions. He must, therefore, select such crops as are suited to the climate as well as to the soil.

As marsh lands are reclaimed, the question of crop rotation should also be considered. Reclaimed marsh soils are adapted to livestock raising or dairy farming and truck gardening. Grain crops are not suitable for marshy soils at the present time. A four-year rotation of hay, sugar beets, cabbage, and grain could be practiced. On dairy farms two or three crops of corn may be grown in succession, though danger from frost must be taken into account. Corn may be followed by grain and this by alsike clover and timothy. The hay may be cut the first year and pastured the second. Potatoes may also be grown on low land, but here again the danger from frost must be considered. Although a rotation of crops on such land is not absolutely essential, a change of crops is desirable to aid in the control of weeds and insect pests.

LIMING AND FERTILIZATION

Liming.—Most of the land in Green County is in need of lime. Nearly all of the soils show an acid condition, ranging from slightly to strongly acid. The heavy light-colored upland soils are usually acid at the surface, but the subsoil may be free from acid and even contain some lime.

Failure of clover and alfalfa is in many places an indication of the need of lime. About 3 tons of ground limestone to the acre is the usual application on soils where alfalfa is to be grown and 2 tons where clover is seeded. The amount to be used, however, may vary with the degree of acidity, the character of the soil, and the crop to be grown. Such crops as alfalfa, sweet clover, peas, cabbage, onions, and lettuce have a high lime requirement; clover, garden beans, barley, hemp, turnips, and radishes have a medium lime requirement; and vetch, white clover, oats, rye, bluegrass, potatoes, and sorgo (sweet sorghum) a low lime requirement. As a rule heavy acid soils need more lime than sandy soils showing the same degree of acidity.

Ground limestone is doubtless the most economical form of lime for extensive use in Green County. Lime should be applied to plowed land in fall, winter, or spring, previous to planting, and thoroughly worked in by harrowing. Lime or manure spreaders may be used. Lime is needed only every four or six years. Phosphorus is also needed with lime on most acid soils. In many places the application of phosphorus alone to an acid soil will result in larger yields than the use of lime alone.

The use of fertilizers.—Nitrogen is the most important element that plants receive from the soil. Most of the nitrogen needed for food by the crops in this region can best be secured from legumes and stable manure. Legumes in turn require phosphorus, and this

element should be supplied by broadcasting phosphates when legumes are seeded. Some of this phosphorus will become available, along with the nitrogen stored by the legume, to the succeeding crop of corn, potatoes, sugar beets, tobacco, or other crop, all of which, on upland soils at least, should be grown in rotation with legumes or on manured land. Any additional phosphorus and potash needed can be applied to these crops in the hill or drill.

Where it is necessary to use commercial fertilizers which contain nitrogen, it is highly important that this fertilizer be applied with a fertilizer attachment on the planter, or in such manner that it will come within a root-feeding radius of the plant. Fertilizer attachments are used in the application of fertilizers to potatoes and corn. For sugar beets the fertilizer should be applied at the time of planting with a regular fertilizer beet drill. Fertilizer for tobacco and cabbage is usually broadcasted previous to setting, although it has proved desirable to apply a small quantity with an attachment on the tobacco or cabbage setter, and to broadcast the rest after the crop has developed a more extensive root system. For onions and other truck crops it is usually desirable to broadcast the fertilizer previous to planting.

Soils vary greatly in the total quantity of plant-food elements they contain in available form, and especially in the proportion of the various elements required by crops. Sandy and light-colored soils are generally low in most elements. Light-colored clay soils are comparatively low in nitrogen and are moderately well supplied with phosphates. Prairie soils are high in nitrogen, but are usually acid, and respond to phosphate fertilizer. Heavy soils contain potash in comparative abundance.

In the relation of crops to soils, the relative proportion of the different plant-food elements required and the total quantity needed are deciding factors in fertilization. Although there are undoubtedly slight variations in the requirements of each individual crop, crops can be grouped into classes fairly well. Such crops as small grains and grasses, including timothy, require a comparatively large amount of phosphates and moderate amounts of potash and nitrogen. Such crops as corn, potatoes, tobacco, and sugar beets require large amounts of nitrogen and potash and moderate amounts of phosphate. Peas, clover, and alfalfa require large amounts of phosphate, potash, and lime, but under proper conditions can secure most of their nitrogen from the air. The total quantity of plant food needed depends largely on the total weight of the crop produced.

In determining the proper fertilizers to use all of these factors must be considered. Commercial fertilizers should be used only to supplement the natural fertility of the soils. Acid phosphate should be used on the heavier soils in a system of general farming where a sufficient amount of manure is produced to cover the cultivated land every fourth year. From 125 to 350 pounds to the acre of this phosphate fertilizer should be used and should be broadcasted or applied with a fertilizer grain drill at the time of seeding. If the soils are acid and in need of lime, this condition must be corrected before the phosphate fertilizer can be expected to be effective.

Mixed fertilizer high in phosphoric acid may be used on lighter soils where there is a small supply of organic matter. From 200 to

400 pounds of these fertilizers to the acre may be applied with small grains. From 75 to 125 pounds an acre may be used on corn and should be applied with fertilizer attachments on the corn planter. Fertilizer applied to corn in this manner should only supplement the usual manurial treatment.

Mixed fertilizers high in potash may be used for truck crops where barnyard manure is not plentiful. It is imperative that some legume, such as clover or soy beans, be grown with these crops in order to supply the necessary amounts of organic matter and some of the nitrogen needed. For potatoes from 400 to 1,000 pounds of fertilizer an acre should be applied, and for onions, cabbage, beets, and tobacco the fertilizer may be broadcasted at the rate of from 400 to 1,500 pounds to the acre.

Phosphate and potash mixtures should be used on the dark-colored soils having no need for nitrogen in the fertilizer.

WEED ERADICATION³

Millions of dollars could be saved to the farmers of the State annually by the use of a few simple methods of weed control. Successful eradication of weeds is dependent upon a knowledge of the life periods and habits of these plants. Annual and biennial weeds may, for purposes of eradication, be treated alike. Scattered weeds are best eradicated by cutting or pulling up by the roots while in full bloom. Where they occur in large patches, cultivation, rotation of crops, and chemical sprays should be employed, as the main object is to prevent the weeds from going to seed.

Perennial weeds offer the greatest resistance and require more thorough and persistent effort. Two of the most troublesome weeds in this region are quack grass and Canada thistle, and both may be destroyed by the same methods. Fallowing, or cultivation without planting a crop, is the most certain method of weed eradication on large areas, and may be used to good advantage except on sandy soils and those continuously wet or very porous. Success depends upon the depth of plowing and frequency of cultivation, as the prevention of all leaf growth in weeds means their certain death. Certain cropping systems will usually prove successful with quack grass. Small areas may be freed of perennial weeds by covering with paper or by close cultivation.

The growing of alfalfa, the seeding down of fields to perennial grasses, salting the weed plants, or applying gasoline or carbolic acid, are advantageous methods for eradicating thistles.

IMPROVEMENT OF PEAT SOILS

At present only a very small proportion of the peat soil in Green County is improved. The actual value of marshland depends upon the crops which can be grown on it, which, in turn depends on the extent of drainage and the danger from frosts. When only a main outlet and lateral drainage ditches have been installed, only hay can be safely grown. When tilled crops such as corn, cabbage, potatoes,

³ STONE, A. L. HOW TO RID OUR FARMS OF WEEDS. Circ. No. 48, Agr. Exp. Sta., Univ. of Wis.

or small grains, are to be grown, the drainage must be more certain, and on the greater portion of the marshlands this necessitates the installation of open lateral ditches or tile drains not more than 10 or 15 rods apart. In the case of peat land underlain by sand, the drainage by well constructed and sufficiently deep ditches from 40 to 80 rods apart will, in most cases, give adequate drainage. When the peat soil is underlain by silt or clay, however, ditches not more than 20 rods apart are necessary and these must lower the water in the ditch to a point 4 or 5 feet below the surface during part of the growing period.

Marshlands are more subject to early fall and late spring frosts than are uplands, partly because of their low-lying situation, and partly because the loose, spongy nature of the peat soil prevents the heat of the sun from penetrating much below the surface. This looseness of the soil can be somewhat improved by the use of a heavy roller which compresses the soil and gives it better heat conductivity. This tendency to frost reduces somewhat the availability of marshland for tender crops, but in Green County potatoes and corn on marshlands are seldom injured by frost.

Commercial fertilizers containing phosphorous and potassium are more satisfactory than stable manure on marsh soils. Lime is not needed. Of the staple crops, hay and corn are best suited to such land. Special crops such as cabbage, hemp, and sugar beets also do well, but these will require larger quantities of potash and phosphate fertilizers.

SUMMARY

Green County is in the southern part of Wisconsin, bordering the Wisconsin-Illinois boundary line. It has an area of 585 square miles or 374,400 acres.

The county lies within the drainage basin of the Rock River system, but the drainage waters first flow into Pecatonica and Sugar Rivers and their tributaries. The surface contour is level on the river terraces, gently rolling over some of the prairie lands, and rough and broken in the hilly regions. The smoothest and the most nearly level land is in the eastern half of the county, and the roughest in the western part. Considerable steep land prevails in the county, but most of this is utilized as pasture land in connection with the dairy industry. The highest elevation in the county is about 1,200 feet and the difference in elevation between the highest and lowest points is about 440 feet.

Green County was established in 1836. Settlement began about 1828 when miners began prospecting for ore in this region. The most extensive single settlement in the county was made by a colony of Swiss immigrants who settled at New Glarus in 1845. The population of the county in 1920 was 21,568, of which about 14 per cent were foreign born. The county is fairly well supplied with railways and has a good system of highways, which are gradually being improved by the State and by county organizations.

The climatic conditions are especially favorable for the development of general farming and dairying. The records of the Weather Bureau station at Brodhead show the mean annual temperature to be 47.3° F. The average rainfall is 33.77 inches, well distributed

throughout the growing season. The prevailing winds are from the southwest.

The agriculture of Green County is highly developed and dairying is the most important branch of farming. The county is one of the leading cheese-producing centers in the world. The chief crops grown are corn, oats, barley, clover, timothy, and alfalfa, with some wheat and buckwheat. A little tobacco is grown. Special crops, such as cabbage, peas, and sugar beets, are not raised to any great extent. Hog raising is carried on in conjunction with dairying and a few beef cattle are raised.

The soils of the county are derived from old glacial drift formations, from the underlying rocks consisting mostly of sandstone and limestone, and from water-laid materials. Thirteen series and 24 types of soil, exclusive of subordinate phases, peat and rough broken land, were recognized and mapped in this county.

Suggestions are given for the improvement and proper management of the soils of Green County.

Accessibility Statement

The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at <http://offices.sc.egov.usda.gov/locator/app>.

The USDA Target Center can convert USDA information and documents into alternative formats, including Braille, large print, video description, diskette, and audiotape. For more information, visit the TARGET Center's Web site (<http://www.targetcenter.dm.usda.gov/>) or call (202) 720-2600 (Voice/TTY).

Nondiscrimination Policy

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the basis of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, whether all or part of an individual's income is derived from any public assistance program, or protected genetic information. The Department prohibits discrimination in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081_wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to

U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).