

Issued April 20, 1912.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY, E. A. BIRGE, DIRECTOR; COLLEGE OF AGRICULTURE, UNIVERSITY OF WISCONSIN, H. L. RUSSEL, DEAN. A. R. WHITSON, IN CHARGE SOIL SURVEY.

SOIL SURVEY OF IOWA COUNTY, WISCONSIN.

BY

CLARENCE LOUNSBURY, OF THE U. S. DEPARTMENT OF AGRICULTURE, AND T. J. DUNNEWALD AND EMIL TRUOG, OF THE WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY.

[Advance Sheets—Field Operations of the Bureau of Soils, 1910.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1912.

[PUBLIC RESOLUTION--No. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture "

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided,* That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the Congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C.; May 10, 1911.

SIR: In continuing the soil survey work in Wisconsin a survey was made of Iowa County during the field season of 1910. The selection of this area was made after conference with the State officials with whom the bureau is cooperating.

I have the honor to transmit herewith the manuscript report and map covering this work and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1910, as provided by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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SOIL SURVEY OF IOWA COUNTY, WISCONSIN.

By CLARENCE LOUNSBURY, of the United States Department of Agriculture, and T. J. DUNNEWALD and EMIL TRUOG, of the Wisconsin Geological and Natural History Survey.

DESCRIPTION OF THE AREA.

Iowa County is situated in the southwestern part of Wisconsin, in the second tier of counties north of the Illinois line. The Wisconsin River forms its northern boundary, separating it from Sauk and Richland Counties. On the east are Dane and Green Counties, on the south Lafayette County, and on the west Grant County. The county has an area of 482,560 acres, or 754 square miles, and is nearly square, being 30 miles broad from east to west and approximately 25 miles from the river to its southern boundary.

The topography is that of a deeply dissected peneplain, being characterized by elevated undulating prairies and rougher more rugged hill country. Military Ridge, which runs in a general way from east to west through the middle of the county as a broad, elevated ridge with mainly southward

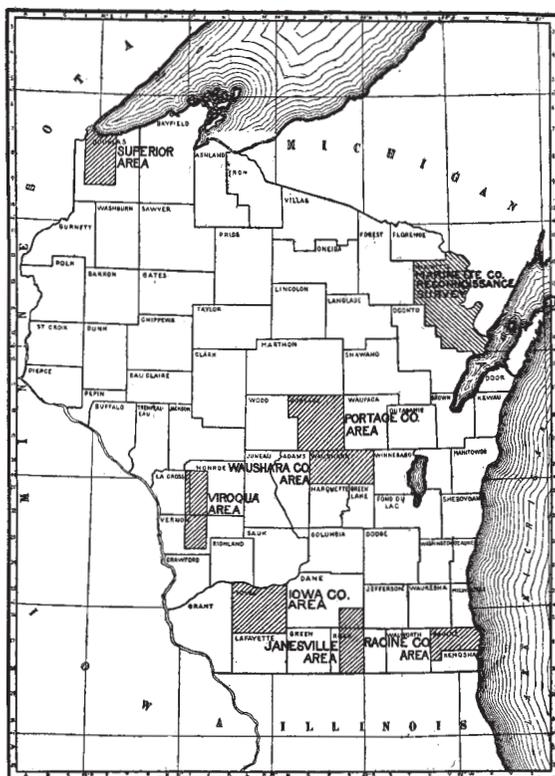


FIG. 1.—Sketch map showing location of the Iowa County area, Wisconsin.

projecting lobes, is a remnant of an original upland plain and divides the drainage of the county, sending it southward by tributaries of the Pecatonica River into Rock River and the Mississippi and northward into the Wisconsin River and thence into the Mississippi.

The main ridge widens out in the western part of the county into a nearly level plain, which is some 10 miles wide along the western boundary. The stream valleys just south of the ridge are bounded by gentle slopes, which become somewhat steep as the valleys widen in the southernmost part of the county. To the north of the ridge the valley sides are much more abrupt and the topography becomes rapidly quite rugged, culminating in the bluffs along the Wisconsin River. Rocky ledges and precipitous ravines and hollows are here common along the upper stream courses.

The central ridge and projecting lobes have an elevation of 1,100 to 1,200 feet. The Wisconsin Valley bottom has an elevation of slightly over 700 feet, while stream beds in the extreme southern part of the county have an approximate elevation of 900 feet. West Blue Mound, located on the ridge at the eastern edge of the county, is the highest point, both in the county and in this part of the State, and has an elevation of approximately 1,700 feet.

The larger streams emptying into the Wisconsin Valley retain an elevation of 800 feet or less 8 miles back from the river, their greatest descent being accomplished in the first 4 or 5 miles north of Military Ridge.

The Wisconsin River, which forms the north boundary of the county, is the largest river within the State, and but for the sandy character of its bed and of the valley in general could be made navigable. Shifting sand bars and a shallow, ever-changing channel have so far discouraged all navigation within the county. The streams in this county which flow into the Wisconsin River are small creeks supplied mainly by springs on the north side of Military Ridge. These streams from west to east, successively, are Underwood, Otter, Sneed, Wyoming, Mill, and Blue Mound Creeks. Streams flowing south from the ridge are tributaries of the Pecatonica River, which traverses part of the southern edge of the county.

The Chicago, Milwaukee & St. Paul Railway line follows the river valley on the north edge of the county. Fifteen miles south the Chicago & North Western Railway follows the prairie ridge from east to west through the county. A branch line of the Illinois Central Railroad traverses the county from its southwest corner to Dodgeville. The Mineral Point & Northern Railway follows a branch of the Pecatonica River from Mineral Point north to Highland. These railroads furnish good transportation facilities for the county.

The population of the county is 22,971, the foreign born being largely English, German, Norwegian, and Irish. Zinc and lead mining early attracted people to the county. Many of the first settlers were from the South; later many came from more eastern States.

Dodgeville, the county seat, with a population of 2,200, and Mineral Point, in the southern part of the county, with 3,200, are the most important towns. Cobb, Edmund, Rewey, and Ridgeway on the prairie, and Arena and Avoca in the Wisconsin Valley, are the more prosperous of the smaller towns.

Excepting when snow is deep in winter, the prairie roads are good the year around. Roads on the Knox silt loam are hard in dry weather, but become rather heavy in wet weather. On the sands they are often poor, but where surfaced with heavy material they are very satisfactory.

CLIMATE.

No weather records are available for points in Iowa County, but at Lancaster, about 15 miles west of the southwestern corner of the county, weather observations have been made covering a period from January 1, 1893, to December 31, 1903. The following table has been compiled from these records, and as the elevation of the station is 1,100 feet, the conditions are similar to those existing over most of Iowa County:

Normal monthly, seasonal, and annual temperature and precipitation at Lancaster.

Month.	Temperature.			Precipitation.			
	Mean.	Highest monthly mean.	Lowest monthly mean.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	20	27	13	1.2	1.2	0.2	6.7
January.....	17	22	3	1.2	.7	.9	8.7
February.....	15	22	9	1.1	1.1	1.1	8.8
Winter.....	17			3.5	3.0	2.2	24.2
March.....	31	38	22	1.6	2.8	2.0	6.7
April.....	48	52	42	3.2	1.1	3.6	1.1
May.....	60	65	55	3.9	2.9	2.7	.....
Spring.....	46			8.7	6.8	8.3	7.8
June.....	68	71	63	3.6	1.3	1.5	.....
July.....	72	80	70	4.5	1.6	9.4	.....
August.....	70	75	66	2.4	.6	4.0	.....
Summer.....	70			10.5	3.5	14.9	.....
September.....	61	68	56	3.3	3.3	4.8	.....
October.....	50	57	41	2.2	3.3	3.6	Trace.
November.....	32	41	28	1.5	1.3	1.8	4.5
Fall.....	48			7.0	7.9	10.2	4.5
Year.....	45			29.7	21.2	35.6	36.5

Average date of last killing frost in spring May 8, and of first in fall, Sept. 29.

From this table it will be seen that the annual rainfall averaged 29.7 inches, and that the average for the driest year is 21.2 inches. These data indicate that the precipitation is comparatively uniform and ordinarily sufficient for agriculture. The mean annual temperature is 45°, with a winter mean of 17° and a summer mean of 70° F.

AGRICULTURE.

The agriculture of Iowa County dates back about 80 years. Lead had been mined in the county by the Winnebago Indians for some time prior to this, and most of the early settlers were drawn hither by rumors of rich deposits of ore. The first recorded attempt at farming was in 1829, when 40 acres of land in the town of Linden, in the west-central part of the county, were put under the plow. In the same year farms were opened in the town of Dodgeville. The first crops of wheat and oats in the county were produced on the farm at Linden in 1831 from seed secured in Illinois. A grist mill was established in 1830, 2 miles northeast of the present site of Mineral Point. Here small grain was ground into feed and corn into meal, but flour was brought by team from Galena, Ill.

Wheat early became the most important crop and it soon gave rise to an improvident system of farming, this crop being grown year after year until the yields declined to a point where the profits were extremely small. The timber from the cleared lands was wasted and burned because there were no sawmills in the interior of the county and no good means of transportation to the river. Practically the only source of income on the farms was from the sale of wheat. In parts of the county much of the wheat land was later put into flax, until it also began to fail. The continued cropping of the land to wheat and flax caused it to become gradually less productive, and made it necessary to adopt a type of farming more profitable and tending less to deteriorate the soil. This necessarily led to stock raising and dairying. With the advent of this change, 30 years ago, agriculture became more diversified, and farmers began to handle their soils more rationally and to put more manure on the land.

Where this better treatment has been intelligently carried out, the soils have gradually regained much of their original productivity. This change was especially needed on the Knox silt loam, which naturally has less organic matter than the Dodgeville and Marshall silt loams or prairie, and which, owing to steeper topography, was subject to much erosion under the old type of farming. Most farmers now recognize that it is not advisable to plow the steeper phase of this type, but to allow such land to remain in pasture as long as possible. Iowa County is now distinctly a dairy county.

The State census of 1905 gives the area devoted to wheat as 1,786 acres, producing 23,502 bushels, and the acreage has probably decreased some since that year. The high tide in the production of wheat was about 1870, when the census reported a production of 760,165 bushels. The same authority reported a production of 1,310,035 bushels of corn from 43,603 acres in 1905. Corn has remained practically stationary both in acreage and yield for the last 30 years.

The production of oats and barley has gradually increased, and in 1905 amounted to 2,118,763 bushels of oats from 69,581 acres, and 99,719 bushels of barley from 3,396 acres. With the decline of wheat production, beginning about 1870, flax increased until 1880, when 120,061 bushels of flaxseed were harvested. Since then flax has become unimportant, only 211 bushels being reported in 1905. Rye is produced more extensively in the northern and eastern parts of the county, the total production being 64,291 bushels, and the acreage 5,330 acres. Buckwheat is comparatively unimportant. Tobacco was raised to some extent about 25 years ago, but none is grown now. Potatoes never have been important, and only a sufficient quantity for home consumption are produced. According to the authority cited, 126,335 bushels from 1,037 acres were produced in 1905. This is partly because the upland prairie soils are rather too heavy to be well adapted for potato production, and partly because of the tendency to erosion of areas of the Knox silt loam, otherwise favorable for the production in a rotation of potatoes and other cultivated crops. These conditions will prevent Iowa County from ever being a potato county. However, on the more level portions, even on the above-mentioned soil type, conditions seem favorable to the production of more potatoes than are now grown. In the same year, 94,759 tons of hay were produced as compared with 38,054 tons in 1880. Little of this is exported. Some sorghum, millet, and alfalfa are grown.

But little attention is paid to fruit growing. Only small home orchards are found and apples are practically the only fruit raised. Little or no care is taken as regards pruning, cultivation, spraying, etc. Peaches do not succeed, as they are very apt to winterkill. The Knox silt loam is probably more favorable for general fruit growing than the Dodgeville silt loam.

The production of cheese now far exceeds that of butter. In parts of the county cheese factories are located 2 to 3 miles apart. Moscow, Brigham, and Dodgeville Townships lead in number of factories. Most of them are cooperative. Some Swiss cheese is made, but the larger part is American cheddar. Nearly 6,000,000 pounds were produced in 1904. Most of it is marketed through Chicago dealers. Comparatively little butter is produced, and at some of the few

creameries cheese also is made. The butter is shipped to Chicago or St. Louis. There are in all about 90 cheese factories and 5 or 6 creameries. Creameries are located at Dodgeville, Mineral Point, Cobb, Avoca, and Arena, and a considerable amount of milk and cream is taken to creameries at Montfort and Livingston, in Grant County, just over the line.

As a matter of convenience some farmers prefer to patronize creameries rather than cheese factories, where milk has to be delivered daily, because they can separate the cream at home and deliver on alternate days, and besides have skim milk for calves and pigs. Butter production is not apt to increase much while the price of cheese remains relatively higher than that of butter. No milk is shipped out of the county as market milk.

The character and breeding of dairy cattle is gradually receiving more attention. The first cattle kept were the red native cattle, and these probably yet predominate. The Holstein-Friesian breed is finding favor, and well-kept herds of Jerseys and Red Polled cattle were also seen. In 1905 there were in the county 29,489 milch cows, valued at \$823,386, an increase of 18 per cent in 10 years and of 60 per cent in 25 years.

The raising of steers and beef cattle is not so prominent as it was a few years ago. Occasionally steers are brought from Chicago to be fattened. Hog raising is an important industry in connection with dairy and cattle interests. Mostly Poland-Chinas and some Duroc-Jerseys and Chester Whites are kept. In 1905, 94,605 hogs, valued at \$671,267, were sold or on hand. The number of hogs has increased with that of dairy cattle.

Sheep raising, though less important, is carried on more or less extensively. In the northern half and rougher part of the county this industry might be considerably extended. In 1905 there were 25,035 sheep and lambs, valued at \$83,253.

The Marshall silt loam, because of its level topography, high organic matter content, and greater depth, produces good crops of corn year after year without washing and without material decline in yield where fields are manured. For this reason the fattening of hogs and cattle is more extensively carried on in the west prairie section of the county, and cheese factories and creameries are least numerous there. In the eastern part of the county the Dodgeville silt loam, as well as the Knox silt loam in the northern part of the county, is much thinner and the present prosperous conditions are due in large part to the growth of dairying in the last few years.

The Knox silt loam almost invariably lies at such a slope that much of it washes badly during hard storms. Very little of it should be put into cultivated crops two years in succession. Farmers state that while the yield in bushels of oats and barley is much the same

in these two soils, the grain on the Knox silt loam is heavier and of better quality. Better pasture is also claimed for the latter soil.

When sufficiently drained the Wabash soils produce corn fully as well as the Marshall silt loam. Especially good crops are raised on them in dry, early seasons. Grain, especially oats, is likely to lodge badly and an excessive growth of straw is produced. The Wabash loam gives good yields of alsike and white clover. These soils are seldom acid and alfalfa may be grown on selected areas with little trouble in getting a catch.

The sand prairie of the Wisconsin Valley bottom is cropped only to rye, buckwheat, and corn. The sandy loams there produce fair clover and also grain crops.

On both the Knox and Marshall silt loams corn is planted on newly turned sod which has been manured. It is grown one or two years, followed by oats or barley one year, and the land then seeded to timothy and clover, which is allowed to remain three or four years. If the seeding does not catch well, oats or barley is sown again. When wheat or rye is introduced it usually follows oats or barley.

On the loose Plainfield sand of the Wisconsin Valley rye follows corn, and buckwheat is introduced as found most convenient.

Deep plowing and careful tillage are generally practiced for all crops. Corn, the principal intertilled crop, is well cultivated. It is usually planted with check-row planters. Before it is up the fields are usually harrowed lightly, which forms a mulch and arrests the growth of weeds. When the crop is well up, wheeled two-horse cultivators are used until the corn is too large for cultivating. The ears are often husked from the standing stalks, though frequently the corn is cut, shocked, and later husked. The corn and barley are used chiefly for feed. Much of the oats and some of the rye are consumed in the county, but a number of thousands of bushels are exported annually.

Here, as in most parts of the country, labor is scarce and hard to obtain at any price. Most of the farm work thus has to be performed by the farmer and his family. When men are employed by the month they usually receive from \$25 to \$30 and board. When employed by the day, they receive \$1.50 and board, and in harvesting from \$2.25 to \$2.50 and board. According to the census of 1900, \$246,944 was expended in 1899 for farm labor.

About 75 per cent of the 2,547 farms enumerated in 1900 were operated by the owners; 14 per cent by cash tenants, and a few by share tenants and part owners. The average farm contained 184 acres. Since 1900 the number of farms has decreased and the average size increased. The number in 1905 was 2,353, averaging 188 acres. In 1899, 34.9 per cent of the farms included between 175 and

260 acres and 16.7 per cent between 200 and 500 acres. Smaller percentages included farms larger and smaller than the classes stated.

In general, the types of farming now established and methods in common use seem well suited to the soils and present conditions in the county. Corn, the most important single crop of the county, could be materially increased in yield by more general attention to the selection and storage of seed.

Root crops for cattle feed and the use of silage should become more general as the dairying is increased. Alfalfa also should be more generally grown.

Alfalfa is not extensively grown in any part of the county, but has been tried with good success in small patches on the Knox silt loam, the Dodgeville and Marshall silt loams, the Wabash loam, and to a slight extent on some of the better quality of sandy lands in the Wisconsin Valley. This crop ought to become more generally produced as farmers become acquainted with it. Excepting portions of the Wabash the soils all have good surface and subsoil drainage. The Knox silt loam in many places has not sufficient depth to make a desirable soil for alfalfa, but most of the type is amply sufficient as to depth. The following suggestions may be of use in growing this crop:

A deep soil, and one in a good state of fertility, with plenty of organic matter, is needed to start a good growth of alfalfa. In many places the Knox, Dodgeville, and Marshall soils have become acid through lack of proper cropping. Eight to twelve hundred pounds of ground limestone applied with manure on plowed ground from a manure spreader, with subsequent thorough harrowing, should make a good seed bed for alfalfa on either of these soils. Inoculation will usually be found unnecessary if a pint of alfalfa seed be sown to the acre with the oats or barley crop a year before preparing the land for alfalfa.

The Wabash soils are not often acid, though they contain large quantities of organic matter. Lack of drainage is apt to be their only deficiency for alfalfa production. Where this crop is sown, a field with a distinct slope is desirable. Several good pieces of alfalfa seeding were noted on the Wabash loam where no attempt at inoculation was made.

SOILS.

As Iowa County lies in the driftless or unglaciated portion of Wisconsin, the upland soils are either residual in origin or to a greater or less extent modified by residual material. Not enough detailed geological work has been done within the area to justify definite conclusions regarding these matters. The Knox silt loam and the Marshall silt loam, as they have been recognized in other areas, are

known to have been derived from what geologists have concurrently described as loess. Some doubt exists, however, as to the exact geological origin of the brown silty soils occupying valley slopes and the upland prairies in the western portion of Iowa County.

In general appearance and color, as well as in peculiarities of structure and texture, there is marked similarity between the Knox silt loam and the Marshall silt loam, and the classification of the material as those types is based upon the soil similarity rather than upon strictly geological grounds. In the same way the Wabash and Lintonia soils are so classified because of the strong resemblance of their general characteristics to the soils of those series as previously recognized, though some obscurity of their geological origin from either loess or drift is recognized. The youngest rock formations known to exist in the area are the Niagara limestone and Maquoketa shales, which are represented now only on West Blue Mound at the eastern border of the county. Below these formations lies the Galena limestone, which is the chief source of lead and zinc deposits. Below the Galena are found successively the Trenton limestone, St. Peters sandstone, Lower Magnesian limestone, and Potsdam sandstone. The Galena limestone underlies the Dodgeville and Marshall silt loams and much of the Knox silt loam, but it is uncertain how much material it has contributed to these types. The Potsdam sandstone outcropping along the Wisconsin River bluffs and along some of the adjacent upland valleys gives rise to the Boone fine sandy loam. Outcrops of the St. Peters sandstone at higher levels gives a similar sandy loam, which is included with it.

The alluvial soils are of more recent origin and were formed as depositions along the Wisconsin River and the other streams of the county. Excepting the Dunesand, the sandy lands of the Wisconsin Valley are included in the Plainfield series. Those of the tributaries, and to a slight extent in the river bottom, are included in the Wabash and Lintonia series. The Wabash silt loam has been produced almost entirely from local material, while the Plainfield soils have probably been largely brought down by the Wisconsin River from other portions of the State. The Wabash loam is derived principally from local material, but is modified by some admixture with coarser material common to the Wisconsin River valley, to which the type is largely confined. Associated with the Plainfield sand and derived chiefly from it are wind-blown ridges and expanses mapped as Dunesand.

Low-lying, wet, swampy areas adjacent to the Wisconsin River and subject to periodical overflow are classified as Meadow.

In the valleys opening into the Wisconsin Valley are found nearly level terracelike formations apparently of alluvial origin, but otherwise resembling the Knox silt loam, which have been separated and designated Lintonia silt loam.

The following table gives the names and extent of the several types of soil. Their distribution is shown by means of colors in the accompanying map.

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Knox silt loam.....	177,856	51.3	Boone fine sandy loam.....	5,440	1.1
Steep phase.....	69,504		Plainfield sandy loam.....	4,864	1.0
Rough stony land.....	57,280	11.9	Wabash loam.....	4,160	.9
Dodgeville silt loam.....	56,128	11.6	Muck.....	2,432	.5
Marshall silt loam.....	46,080	9.6	Lintonia silt loam.....	2,368	.5
Wabash silt loam.....	36,288	7.5	Dunesand.....	2,240	.5
Plainfield sand.....	9,920	2.0			
Meadow.....	8,000	1.6	Total.....	482,560	.....

KNOX SILT LOAM.

The soil of the Knox silt loam consists of a grayish colored to light-brown silt loam, ranging in depth from 8 to 12 inches and having a soft, floury feel. The subsoil, extending to 36 inches, is a light-brown compact silt loam, often more silty than the surface soil. It becomes more compact with depth, often changing to a clay loam in texture. On the narrower ridges, the soil tends toward shallowness, commonly being less than 3 feet deep, and in such positions the surface material has often been washed off, exposing the heavy clay-like subsoil.

While this soil is quite compact and somewhat difficult to plow, it is subject to severe erosion on the steeper slopes. Hard rains start ditches in cultivated fields which subsequently become so deep that the land is ruined for the production of cultivated crops. When the ditches are once started it is difficult to prevent their progress. Brush and straw are sometimes thrown into them to catch the soil as it crumbles away, and to retard further washing, but with only partial success. On the map the steep and rougher parts of the type are indicated by cross-lining over the color for the main body of the type. The land included within this cross-lining should not be put in a regular rotation or cropped oftener than is absolutely necessary and had better be kept in permanent pasture. This is quite generally practiced on this phase, as dairy and live-stock interests are well established and these steeper areas can conveniently be devoted to pasture.

While a distinct silt loam, this soil type possesses many characteristics of a clay soil. It should be carefully handled, especially observing the proper time for plowing and tillage, because when wet it can easily be puddled and the resulting hard clods do not break down for a year or more. The soil also forms clods if plowed when dry and baked.

The type is locally called "clay," and this term is in some ways justified. Its compact structure is largely due to low content of organic matter, the incorporation of which will improve the soil structure and create greater retentiveness of moisture.

The Knox silt loam is far the most extensive type in the county, covering about 51.3 per cent of the area. It predominates on the uplands north of Military Ridge. South of the ridge it projects into the Dodgeville and Marshall silt loams along stream depressions, widening from such places into broad areas. Elevation does not seem to be a controlling factor in its development, for it is found on some hills and ridges equal in elevation to those of the prairie types. It is found about and west of Mineral Point and predominates in the southeastern part of the county.

The surface is quite irregular, varying from gently rolling to hilly, and, as a whole, it is the roughest type in the county except the nonagricultural, stony type hereinafter described. The topography is more rough and broken in the northern than in the southern part of the county. The drainage is good. Tile drains will doubtless never be necessary on this type.

The uniform silty character of this type and the buff color of the subsoil, together with other field characteristics, suggest the derivation of the soil from loess. The material is very much like the loess in character, though as previously mentioned its exact geological origin is not thoroughly understood and it is not impossible that it is considerably modified at least by residual material derived from the consolidated rocks of the region.

Originally the Knox silt loam was all timbered, and portions still have a growth of forest in which white, bur, and black oaks predominate. Maple, poplar, hickory, white birch, and basswood are also common species, Hazel bush is abundant.

Dairying is the chief interest on this type of soil. Corn yields 30 to 60 bushels per acre, averaging 40 bushels. Where corn is grown on the same land more than one year in succession, washing, as previously stated, takes place even on comparatively gentle slopes. Consequently, careful rotation and intelligent cultivation are necessary. Oats and barley yield 25 to 50 bushels per acre, averaging 30 bushels. Barley is regarded as a surer crop than oats. Wheat is now but little grown, though yields of 10 to 20 bushels can be secured. One to 2 tons of hay per acre is the ordinary return. Alfalfa has been tried in small patches with some success. Where the soil is deep and fairly productive this crop should succeed. The pastures are in general excellent, but on bare ridges, where the soil is apt to be thin, they are likely to fail in dry weather.

Clovers are generally seeded with other grasses and are also made use of in maintaining and increasing the productiveness of the land.

Some farmers complain of poor stands of red clover and get better results with alsike. Medium red clover is, however, the most common and is more beneficial to the land than alsike.

Occasionally this soil gives acid reaction to litmus, and applications of lime are recommended. Farm manures are well utilized and usually applied with manure spreaders. No commercial fertilizers are used. Farmers, as a rule, are prosperous, fences and buildings are in good repair, and a large number of modern barns are being built. Silos can not be said to be in general use, though many farms have them. Dairying has resulted in marked improvement in the conditions on this type.

Farm values vary with the amount of rough land included, improvements, etc. In the more broken northern part of the county some of the type is valued as low as \$25 to \$30 an acre, but in the more gently rolling areas the land sells for \$80 to \$100 an acre.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Knox silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21192, 21786, 21788, 21790.	Soil.....	0.0	0.5	0.5	1.5	17.1	65.7	14.3
21193, 21787, 21789, 21791.	Subsoil.....	.0	.2	.3	1.0	7.5	67.3	23.5

MARSHALL SILT LOAM.

The Marshall silt loam is a dark-brown or occasionally black silt loam, from 8 to 12 inches in depth, resting on a subsoil of compact silt loam of a light-orange, brown, or buff color, which gradually becomes somewhat lighter and the texture more compact with depth. Often the lower subsoil, though silty, has a close, rather compact claylike structure, and a layer of heavy, reddish-brown clay, containing angular cherty limestone fragments, lies next to the rock. Where this type of soil is relatively thin, the clay stratum over the rock is in places displaced by 1 or 2 inches of yellowish sandlike material, due to the locally granular, crumbly character of the underlying Galena limestone. The soil is free from stones, gravel, or coarse materials. It is generally friable, loose, and easy tilled, and contains a relatively large proportion of organic matter.

This type of soil occupies the upland prairie sections of the county, which consist of elevated ridges and level to gently rolling plains. None of the type in the county is found below an elevation of 1,000 feet above sea level. It is confined to the western portion of the county. The boundary between it and the Dodgeville silt loam,

which is placed between Dodgeville and Edmund on Military Ridge, is a more or less arbitrary one, as the two types grade imperceptibly into each other with no sharp line of demarcation. As indicated on the map, the Chicago & North Western Railway forms a fairly good boundary on the north of the type, except below Highland. An elevated ridge bearing this soil projects north from the main prairie area to Highland. Another level ridge extends southward along the western border of the county. From near Dodgeville westward the prairie soil becomes deeper. The soil material ranges in depth from 3 to 4 feet near Dodgeville to 15 or 20 feet in depth west of Edmund. A depth of 30 feet is reported in many places in the western part of the county.

The surface is usually undulating or gently rolling, though on the broader divides it may be nearly level. There is good natural drainage, and little or no necessity for artificial drainage on any of the type.

The Marshall silt loam in this area is derived from an intermixture of residual soil from the underlying Galena limestone and transported silty material having the appearance of loess. This loess-like material becomes increasingly thicker westward from Dodgeville to the western boundary of the county.

The Marshall silt loam is well adapted to the production of corn, which is grown extensively. Corn yields from 50 to 70 bushels. In some localities it has been grown continuously for many years on the same fields, with no diminution of yield, care being taken to manure the land each year. Oats and barley yield from 40 to 50 bushels, barley producing a little better than oats. Hay is of good quality, yielding 1½ to 2 tons. Wheat and rye are not extensively grown. Wheat will yield 15 to 20 bushels per acre. A few years ago the chinch bug became so troublesome as to discourage wheat growing. Most of the wheat grown is sown in the fall, though some spring varieties are grown. Hog and sheep raising are quite largely carried on.

Land of this type is generally considered very valuable and desirable for general farming purposes. Prices range from \$60 to \$100 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of this type:

Mechanical analyses of Marshall silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21794.....	Soil.....	0.0	0.5	0.3	0.6	23.1	54.0	20.9
21795.....	Subsoil.....	.0	.2	.2	.3	.3	68.0	31.1

DODGEVILLE SILT LOAM.

The soil of the Dodgeville silt loam is a dark-brown to nearly black silt loam ranging from 8 to 10 inches in depth. The subsoil is a compact silt loam of a light reddish brown or yellowish color, becoming more compact in structure with increase in depth. This type is often less than 3 feet deep, and in such cases the subsoil next the rock often consists of a heavy, dense, reddish-brown clay, containing angular, cherty limestone fragments. Again, this clay stratum may be nearly absent and immediately over the rock there occurs an inch or two of material having the appearance of a yellowish sand, but which is really composed principally of sharp calcium-carbonate crystals, easily disintegrated.

The soil where there is a depth of 2 feet or more is free from stones, gravel, or coarse materials. It is generally friable, loose, and easily tilled, and contains a fair amount of organic matter.

This type of soil occupies the upland prairie sections of the eastern portion of the county, and consists of high plains and ridges. None of the type is found below 1,000 feet elevation. It extends east from Dodgeville across the county on what is known as Military Ridge. Its continuity, however, is broken at Ridgeway, where a strip of the Knox silt loam cuts through. It will be noticed from the map that the Chicago & North Western Railway forms a fairly good boundary for the type. A strip extends south from Dodgeville and broadens out east of Mineral Point where it continues southward into Lafayette County.

On the eastern edge of the county this soil is rather shallow, probably averaging less than 3 feet in depth, though in many places it is more than 3 feet deep. The areas east of Mineral Point will average rather more than 3 feet in depth. Frequently on hills and on slopes near stream courses the rock is either exposed or covered with a few inches of soil usually mixed with cherty limestone fragments. Southeast of Barneveld, in the vicinity of Barber, the rock gathered from the fields is sufficient to build some fences. Although the Dodgeville silt loam resembles closely the Marshall silt loam, it is because of this shallowness and apparent lack of transported material that the type is considered separately.

The surface is undulating to gently rolling, and rarely hilly, while some of the broader areas are nearly level. The type has good natural drainage, and there is little or no need for artificial drainage anywhere.

In origin the Dodgeville silt loam is essentially a residual soil, derived from the decay of rocks once superimposed above those now existing. It is possible that there is incorporated with this a small amount of the loesslike material referred to in the chapter on Soils. The dark color of the surface soil indicates the presence of organic

matter, the accumulation from the decay of prairie grasses which formed the chief original vegetation.

The thinness and stony character of portions of this type have had an effect upon the kind of farming adapted to and developed in this part of the county. South and southwest of West Blue Mound the prairie type is 4 or 5 miles wide north and south. Here the thinness of the soil has rendered it susceptible to drought and corn and the cereals are not as sure or as profitable crops as they are on the Marshall silt loam type. Cutworms seem to damage the corn crop here more also. Much land is devoted to pasture and dairying seems to be the type of farming best adapted to this part of the county.

There has been great improvement in buildings and in general prosperity in this section since dairying was introduced. Creameries and cheese factories are much more numerous here than on the Marshall silt loam type in the western part of the county. American cheddar and some Swiss cheese are manufactured. The product is shipped largely to Chicago, St. Louis, and other large centers. Many farmers make butter, which for the most part is consumed in the locality where it is produced. Few farmers ship cream or milk. Dairy herds consist of 15 to 40 cows. Corn is grown for fodder and silage purposes largely. Alfalfa has been successfully grown by some farmers and this crop will be more widely utilized in the future. Some difficulty has been experienced in securing a good growth of clover, owing to unfavorable weather conditions in winter and early spring.

The average farm in this section contains well above a hundred acres. Land sells at \$50 to \$90 an acre.

The following table gives the average results of mechanical analyses of samples of the soil and subsoil of this type:

Mechanical analyses of Dodgeville silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21194, 21792.....	Soil.....	0.0	0.3	0.7	0.9	14.7	59.5	23.7
21195, 21793.....	Subsoil.....	.0	.1	.1	.4	2.6	68.7	28.1

BOONE FINE SANDY LOAM.

In the Boone fine sandy loam are included the sandy soils derived through the weathering of the Potsdam and St. Peters sandstones, the latter influencing their formation only to a minor extent. This type is found principally in the bluff country in the vicinity of the Wisconsin River where the Potsdam sandstone outcrops along the slopes. Of those portions of the type derived from the St. Peters sandstone, small areas are located in the southwestern part of the

county along the Pecatonica River, and another tract was found in the town of Moscow.

The type is variable both as to topography and nature of soil material. Adjacent to the Wisconsin River Valley, especially in lower Otter and Sneed Creek Valleys, the soil lies fairly low but at a higher elevation than the Plainfield sands. On the tops of the ridges along the river are found small sandy areas usually shallow and merging into the Knox silt loam. That portion mapped just west of Hillside has a rough hilly surface, a generally shallow soil, and is not very valuable agriculturally save for pasture. The area mapped in Moscow Township lies well elevated on a lobe of a hill. This area also is somewhat shallow and stony, but some of it has been cultivated. Those tracts mapped in the southwestern part of the county are in a valley and generally have a smooth surface and good depth.

The low-lying areas above mentioned and derived chiefly from the Potsdam sandstone are more or less colluvial and consist of a very fine to medium sand or sandy loam, usually of a buff or brown color for 8 or 10 inches. Below this there is a sandy loam of a lighter brown color and of more compact structure. Most of the elevated phase from the St. Peters formation has a light-brown surface with somewhat lighter colored subsoil. The texture probably will average a little coarser than those portions near the Wisconsin River Valley.

The Boone fine sandy loam is in general considered a productive soil, but in dry years crops are apt to suffer from drought, and particularly so on the ridges, where it is often thin and rather stony. Good crops are raised where the soil has sufficient depth and is properly managed, particularly with reference to conservation of moisture. It has the advantage as compared with the heavier silty soils in the ease with which it can be worked and the earliness with which it can be plowed in the spring. The relatively small extent and irregular distribution of this type make it unlikely that any single farm is composed entirely of it. It thus varies the soil conditions on many farms. On the better phases of the type good corn, grain, clover, and mixed hay are produced, with yields varying not much from those stated for the Knox silt loam.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Boone fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23855.....	Soil.....	0.0	6.1	16.6	39.5	11.8	19.0	7.1
23856.....	Subsoil.....	.0	3.2	9.6	30.0	15.6	28.0	13.5

WABASH SILT LOAM.

The Wabash silt loam consists of alluvial deposits, chiefly along the upland streams. The areas are quite narrow, varying from strips too small to map up to areas one-fourth mile or more wide. Because of its stream deposition in narrow bands and the meandering of the streams, it is not very uniform. Generally it consists of a grayish or light-brown silt loam to about 18 inches, below which as far as the auger will reach, occurs a black, mucky, silty loam. In certain places, however, these conditions may be reversed. Occasionally the soil is sandy, gravelly, or stony.

Much of this type has poor drainage and almost all of it is subject to one or more overflows each year, and consequently can not be depended upon for cultivation. It is used almost exclusively for pasture and mowing land for which it is especially valuable. Occasionally a fairly well drained patch is cropped, corn doing especially well on it, yields of 75 to 90 bushels per acre being reported. Hay will yield from 2 to 3 tons per acre. Owing to the narrowness of most of the areas and the low position of the land it is doubtful if much of this type could be successfully drained. Some of the broader expanses where there is sufficient slope could be much improved by installing tile drains.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Wabash silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21796,21798.....	Soil.....	0.0	0.4	0.9	4.4	2.9	77.5	14.0
21797,21799.....	Subsoil.....	.0	1.1	2.4	7.1	16.8	51.7	20.8

WABASH LOAM.

The soil of the Wabash loam is a dark-brown to black heavy loam, from 14 to 18 inches deep, underlain by a light-brown to orange or buff-colored heavy loam.

Areas of this type are found in the wider stream bottoms entering the Wisconsin River Valley, where it occurs as an outwash from these streams over the sand at the base of the bluffs in the main valley.

At the mouth of Underwood Creek, at Avoca, is an area of this type about 3 square miles in extent. Here the soil varies in depth from a few inches near the outer margin of the area to 5 or 8 feet next the bluffs. The type is most typically developed in this area. Areas of small extent occur near Arena at the mouth of Rays Valley and Blue Mound Creek Valley.

This soil is very productive, yielding 60 to 90 bushels of corn, 25 to 50 bushels of barley and oats, and 1½ to 3 tons of hay per acre. The land ranges in price from \$70 to \$100 an acre. Parts of it are subject to overflow, though not to the great detriment of crops.

In Wyoming, Hillside, and Blue Mound Creek Valleys this type requires drainage. It is very productive, but is apt here to be a rather cold, late soil in wet years, though its natural drainage is slowly improving. Small grains, especially oats, produce rank straw growth and are apt to lodge badly.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Wabash loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21800.....	Soil.....	0.0	0.4	1.5	5.1	28.1	42.3	22.3
21801.....	Subsoil.....	.0	.2	.4	6.7	31.3	40.2	20.8

PLAINFIELD SAND.

The Plainfield sand is a loose brown sand of about medium grade for 18 to 20 inches. Below this it becomes lighter in color till at about 30 inches it is a bright-yellow sand, continuing without change to undetermined depths. The deposit has been found in wells to a depth of 50 feet. Frequently in the subsoil there is found a small percentage of smooth rounded pebbles mixed with the sand. In the subsoil below 3 feet layers of dense material a few inches thick are found, but these are seldom sufficient to affect moisture conditions.

The loose, incoherent nature of the sand renders it specially subject to drifting, and scattered through the areas are ridges piled up by the wind, which are mapped separately and discussed under the head of Dunesand.

The Plainfield sand is confined to the Wisconsin River Valley along the northern boundary of the county. It occupies much of the valley bottom near the river, areas of Meadow generally intervening between it and the stream. The surface is level. Owing to its looseness and depth, it usually has good drainage, the water table being 3 to 10 feet below the surface. South of the railroad, between Helena and Arena, water is occasionally found within 3 feet, and in a few places the surface is so wet as to approximate a marshy condition. In general, a lack of moisture is apparent in the type.

The Plainfield sand has been deposited during overflow of the river, probably during one of the glacial epochs when the volume of the water was considerably greater than at present. The coarseness of

the sand and lack of material finer than sand is due to deposition in relatively swift currents.

The area covered by this sand is locally known as prairie. Naturally, it supports a sparse growth of wild grasses and sand bur, which are about all that will grow. Timber never grew upon these areas. Only a limited number of crops are successfully produced. These are corn, rye, and buckwheat. Rye succeeds best, though the yield is low. In a good year corn yields 25 bushels per acre; in dry seasons it is a complete failure. The yield of rye is 10 to 15 bushels, and of buckwheat 5 to 20 bushels per acre. Oats and barley are not successful on this type of soil. It is impossible to make improved grasses and clover profitable crops. Rye follows corn and is often sown on the stubble among the corn shocks. To lessen blowing by the wind the surface is left rough and ridged as much as possible, as wind-blown areas are very difficult to control.

Because of its limited usefulness much of this land sells for \$8 to \$12 an acre. Farmers possessing land of this type only must cultivate large areas to make a living. Many farms include areas of adjacent better soils.

PLAINFIELD SANDY LOAM.

The Plainfield sandy loam is a brown sandy loam 16 to 18 inches deep, resting on a subsoil which becomes lighter in color and if anything a little lighter in texture with depth and passes, usually at about 30 inches, into a yellowish sand. The lower part of the soil section thus resembles that of the Plainfield sand. As the soil proper is more loamy and has more body than the Plainfield sand there is not much trouble from drifting with this type. There have been included certain small areas, which had they become more extensive would have been mapped as a separate type. The soil in these areas is more loamy and sometimes quite heavy, though the soil is generally sandy. Most of this phase is found in the areas west of Avoca and at the mouth of Mill Creek Valley.

Like the Plainfield sand, the Plainfield sandy loam is confined to the Wisconsin River Valley. It is found in large areas more often nearer the bluffs of the uplands than the river. In the northwestern part of the county near Avoca the areas are rather small and detached, while farther east the tracts are larger.

The surface is quite uniform, being nearly level. In parts of secs. 12, 13, and 14, R. 5, T. 8 there is a plateaulike area, considerably above the level of the rest of the type. As a rule the type has good drainage.

This soil is of alluvial origin and has been formed in the same manner as the Plainfield sand. Its more loamy character is evidently due to the fact that deposition has taken place at some distance from the

river, where the velocity of the currents were less than where the Plainfield sand was laid down. In places the upland streams undoubtedly have contributed some finer material in times of overflow.

It is said that this type formerly had a sparse growth of timber consisting of oak, soft maple, and considerable brush. The sand bur is a characteristic plant, as it is on the Plainfield sand.

Almost all crops grown locally succeed well, although on much of the type in years of less than normal rainfall crops are likely to suffer from drought. Corn yields vary from 35 to 70 bushels, with an average of probably 45 bushels per acre. Oats are not a sure crop, but yield about 20 bushels in normal seasons, though in years of more than average precipitation yields as high as 30 to 35 bushels may be secured. Barley is seldom grown. Rye produces from 12 to 20 bushels with an average of about 15 bushels per acre. The yield of hay is not large, probably about 1 ton to the acre. Not much trouble is experienced in getting a catch crop of clover, and it will generally grow satisfactorily. On the more productive areas alfalfa should be successfully grown.

This type of soil is generally considered desirable land, and the farms composed of it are usually in a prosperous condition. Dairying is important, though the farmers do not always depend entirely on this type of soil for pasturage. Some farms on this type include areas of the Wabash soils or Knox silt loam and these give good pastures. From \$30 to \$40 an acre is considered a fair valuation for land of the Plainfield sandy loam type.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Plainfield sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23849.....	Soil.....	0.5	8.2	37.4	38.4	1.7	9.6	4.0
23850.....	Subsoil.....	.3	7.5	41.8	41.0	1.3	4.0	3.8

LINTONIA SILT LOAM.

In the lower and broader portions of the creek valleys opening into the Wisconsin River Valley are found generally level, terracelike areas of from 50 to 200 acres each, which, because of their low-lying position, level character of surface, and alluvial origin, are separated from the upland soils and mapped as the Lintonia silt loam. In general characteristics, in texture, structure, and color, the soil resembles closely the Knox silt loam and the two are difficult to distinguish. The Lintonia silt loam differs from the upland type in having greater

depth, and like the other alluvial soils extends down to unmeasured depths.

The soil material constituting this type was probably deposited by the streams along which it occurs during an earlier geological period. The streams have subsequently cut down into this material and built strips of overflow land mapped as Wabash loam and Wabash silt loam.

The Lintonia silt loam is a desirable soil and all of it is available for cultivation. Its level surface makes washing a negligible factor. The surface also favors the use of all kinds of labor-saving farm implements. In crop value the type is probably superior to the Knox silt loam, especially for corn. Those areas mapped in Blue Mound Creek Valley generally are more productive and compare well with the Wabash loam. Where this type is well elevated and has good drainage, it seems to be especially adapted to alfalfa.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Lintonia silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23857.....	Soil.....	0.0	0.2	0.4	1.0	13.2	73.6	11.2
23858.....	Subsoil.....	.0	.0	.0	1.5	7.6	78.8	12.2

DUNESAND.

Dunesand consists of irregular areas of wind-blown sand from 1 to 150 acres or more in extent. They are formed of a succession of small knolls and ridges, 10 to 12 feet high, with shallow intervening depressions, from which the sand has been excavated by the wind.

Most of the Dunesand areas are covered with a growth of bur oak, soft maple, locust, or jack pine. They are found in the Plainfield sand area and, in places, at the immediate base of the bluffs along the side of the valley.

The sand is low in organic matter and of little agricultural value. The dunes should be kept protected by trees and binding grasses, because they are continually shifting where left bare and are a menace to surrounding fields. High winds drift the sand quite rapidly and adjoining crops may be badly cut by the fine, sharp particles.

The sites of many of these areas are said formerly to have been as desirable land as any of the Plainfield sand, but the wind has brought many of the areas beyond control. Where protected some of the dunes support a meager growth of grass, which furnishes some pasturage. Where covered with trees, the dunes serve as wind brakes for farm buildings.

MEADOW.

Meadow comprises the low-lying, marshy areas immediately adjoining the river. The areas alternate with the Plainfield sand areas; that is, where the sand area broadens out the Meadow is of small extent, but where the sand area narrows down the Meadow, including the grass-covered areas discussed under Muck, covers a considerable proportion of the valley bottom.

The largest area of Meadow lies in the northwest corner of the county, where it covers 5 or 6 square miles. The soil material varies from deposits of white to yellowish, coarse sand and mottled, silty clay, deposited by the annual spring floods, to patches of mucky material too small to show on the map. Here and there are sloughs and wet spots which persist even in time of low water. The Meadow is sometimes wooded, though much of it has very few trees, as north of Avoca.

This type, while unfit for cropping, serves as much-needed pasture and hay land for the farmers living on the Plainfield sand, which supports but a sparse growth of grass. The hay is brought up on the terrace of Plainfield sand and stacked there in dry weather.

Owing to its low-lying position, it is doubtful if any system of drainage would avail much, though open ditches would often give some relief. The soil is, therefore, not very valuable for agriculture.

MUCK.

The largest areas of Muck are found along the Wisconsin River in close proximity to the Meadow areas, though several quite extensive bodies occur in the smaller bottoms along Otter and Blue Mound Creeks. The largest body is represented by a marshy tract bordering the river northeast of Arena. It is a flat, level expanse of 2 square miles, elevated from 2 to 4 feet above Blue Mound Creek. The soil is mucky, from 4 to 20 feet deep, with occasional bars of sand running through it. The surface is generally clear of brush, stumps, etc., and a large crop of marsh hay is gathered there annually. Though of slightly inferior quality this hay is very valuable to farmers on the ridges when their hay and pasture fail, as they do in dry years. It brings from \$8 to \$12 a ton.

Small, slightly elevated areas of Muck bear white clover. It might be possible to drain parts of the type and make it useful for some crop during the summer months.

In Blue Mound Creek Valley there is an area of about 300 acres of Muck which is being tile drained. The area is kept wet by springs. The soil is not acid, is more than 4 feet deep, and in the past has served as pasture land in dry weather. When drained it will make a very productive soil, particularly for corn.

The small area of Muck at the mouth of Otter Creek has a thin covering of silty material, but is too low to be benefited much by efforts to drain it.

ROUGH STONY LAND.

The Rough stony land consists of rock exposures, cliffs, and steep, precipitous land too rough to plow or cultivate profitably. It occurs largely along ravines and valleys within the main body of the Knox silt loam, practically none of it having been mapped within or adjacent to the Dodgeville or Marshall silt loams. Comparatively little of it occurs in the southern part of the county, but it is quite extensive in the northern part.

A large part of the Rough stony land is covered with such timber as is mentioned in the discussion of Knox silt loam, though it is often cleared and used for pasture. Occasional patches too small to show on the map are cultivated. Where there are a few inches of soil it is usually silty, being the same material as that giving the Knox silt loam. The St. Peters sandstone outcrops on many of the slopes, and the soil near by is likely to be sandy as a result of the disintegration of this rock.

Owing to the steep, rugged character of this type, its use is confined to pasture. It is largely allowed to remain in forest.

SUMMARY.

Iowa County, with an area of 754 square miles, is situated in the driftless area in southwestern Wisconsin.

The topography is that of an elevated to rolling plain in the middle of the county, becoming slightly hilly and rougher to the south, and deeply cut on the north, becoming rougher as the Wisconsin River is approached.

The drainage eventually reaches the Mississippi River, either by way of the Wisconsin and its tributaries on the north or the Pecatonica to the south.

Four railroad lines traverse portions of the county, giving good transportation facilities.

The population of the county is 22,971 (1900), or 30 people to the square mile. It is well distributed over the entire county.

The climate is healthful and the rainfall generally sufficient for all crops.

Agriculture dates back to 1830, wheat being the first important crop. With the decline of wheat production about 1870, dairy and live-stock interests developed. The county is now distinctly a dairy section. Corn is an important crop. Cheese, cattle, and hogs are important products. Lead and zinc are mined in the southern and western parts of the county. Alfalfa, root crops, and silage

should come into more general use as dairying develops. Seventy-five per cent of the farms are operated by owners.

The soils are residual and alluvial, the latter lying along small streams and in the Wisconsin Valley. Thirteen types of soil are shown on the soil map.

The Knox silt loam occupies about 51.3 per cent of the area of the county. It is especially subject to erosion when put into cultivated crops. It is well adapted to pasture, grain growing, and the dairy type of farming. This land sells at \$35 to \$100 an acre, depending upon the amount of rough land included.

The Marshall silt loam is a prairie soil, especially adapted to corn growing and live stock and dairy interests. There is very little rough land in this type, and it sells for \$60 to \$100 or more an acre.

The Dodgeville silt loam is not so well adapted to the cereals as the Marshall silt loam, and is principally devoted to pasture and the growth of silage crops. Dairying is well developed on this type, butter, cream, and cheese being produced.

The Boone fine sandy loam is of small extent and is found mainly along the bluffs of the Wisconsin River and tributaries, with a few smaller areas along the Pecatonica in the southwestern part of the county. It produces good corn, small grain, and hay crops.

The Wabash silt loam is an alluvial soil, often poorly drained and found in the smaller valleys and stream courses. The soil is variable; small portions are mucky. It is mainly used for pasture, though more elevated areas give good corn and hay crops.

The Wabash loam is more uniform than the silt loam, is somewhat better drained, and is found in the wider stream bottoms and as an outwash deposit over the Wisconsin Valley sands. It is a very productive soil, usually benefited by tile drainage. It often produces 90 bushels of corn per acre and sells at \$70 to \$100 or more an acre.

The Plainfield sand occupies a large proportion of the Wisconsin Valley bottom. It is not a very valuable soil and is inclined to be droughty. It gives fair crops of corn, barley, and buckwheat in favorable years.

The Plainfield sandy loam is the better type of sandy soil of the Wisconsin Valley bottom. It produces good grain crops and clover will grow on it.

The Lintonia silt loam is an alluvial soil found on elevated, well-drained, and level terraces along the sides of the larger stream bottoms entering the Wisconsin River Valley. It resembles the Knox silt loam in texture and is slightly higher in agricultural value.

Dunesand consists of irregular, generally small, areas of the Plainfield sand which has been blown into ridges by the wind. This is hardly an agricultural soil; it is very poor and is generally kept wooded.

Meadow includes the marshy portions of the Wisconsin Valley adjoining the river. Part of it is wooded and part is clear and furnishes pasture and good crops of marsh hay.

The Muck is found closely associated with the Meadow. In some of the larger stream bottoms some of it can be readily and profitably drained.

The Rough stony land consists of rocky cliffs and steep, stony hill land too rough to plow. It is found mostly within the Knox silt loam type in the northern half of the county. Much of it is useful for pasture and forestry.

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