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The Geography of Southwestern Wisconsin

By
W. O. BLANCHARD
University of Illinois
Formerly with the Department of Geography
University of Wisconsin

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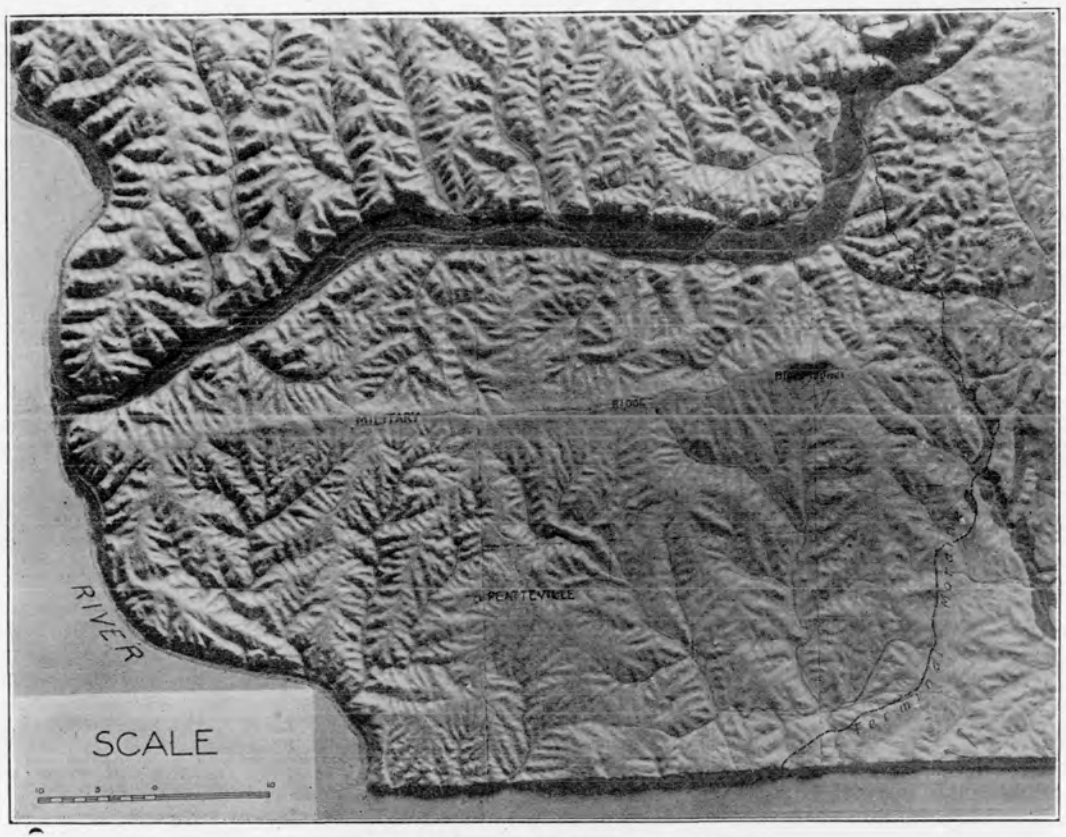

RELIEF MAP OF SOUTHWESTERN WISCONSIN

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INTRODUCTION

The *Geography of Southwestern Wisconsin* is the fourth in a series of regional studies of the state made under the direction of the Geological and Natural History Survey. The scope of the three former bulletins of the series, written by Prof. R. H. Whitbeck, is indicated by their respective titles: The Geography and Industries of Wisconsin, The Geography of the Fox–Winnebago Valley, and the Geography and Economic Development of Southeastern Wisconsin.

The present bulletin represents the results of a study made to determine so far as possible the character and influence of the various geographic factors of topography, soil, climate, mineral resources, and position upon the people of this region and their activities. The relative importance of these factors has differed widely at different periods. As a result the history of the development of this part of the state falls naturally into (1) the period of the fur trade, (2) the mining era, and (3) the agricultural period—each recording the dominance of a particular industry.

The work is based upon a personal knowledge of the region gained through four years' residence within it, through systematic field study in the summer of 1919, and through several trips for field study of the Cross Plains and Blue Mounds districts. The literature of the region, especially the publications of the Wisconsin Geological and Natural History Survey and the Wisconsin Historical Society, and the state and national census statistics have been freely used. The friendly coöperation of W. O. Hotchkiss of the State Geological and Natural History Survey has greatly facilitated the work. Helpful suggestions and criticisms by Prof. R. H. Whitbeck, under whose editorial direction the bulletin has been prepared, have been invaluable.

CHAPTER I

PHYSICAL GEOGRAPHY

Location and Extent

In this bulletin the region designated Southwestern Wisconsin is the unglaciated portion of the state south of the Wisconsin River.

Politically it comprises all of the counties of Grant, Iowa, and Lafayette, about one-third of Green, and about one-fourth of Dane County, a total area of approximately 3052 square miles. (See fig. 1.) Three small cities and a village lie near its four corners, each just without its margin: Prairie du Chien, Dubuque, Monroe, and Sauk City.

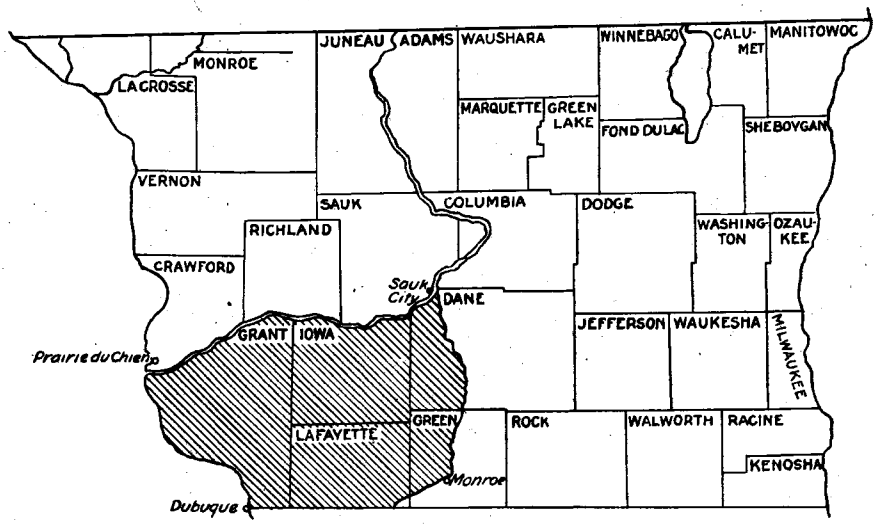

FIGURE 1. Map showing the location of the physiographic province of southwestern Wisconsin, a region at one time the economic center of gravity of the state.

Physiographically this region includes about one-third of the Driftless Area or unglaciated section of the Upper Mississippi Valley, though only on the east are the margins of the two coincident. To the north, west, and south the dissected topography characteristic of the unglaciated district continues across the Wisconsin and Mississippi rivers and the Illinois state line. (See fig. 2.) On the east, however, and

especially in that part just north of New Glarus, the boundary marks a sharp transition from the rough maturely dissected country with its bluffs and castellated rocks to the gently rolling topography with rounded hills and shallow valleys typical of the glaciated section. The

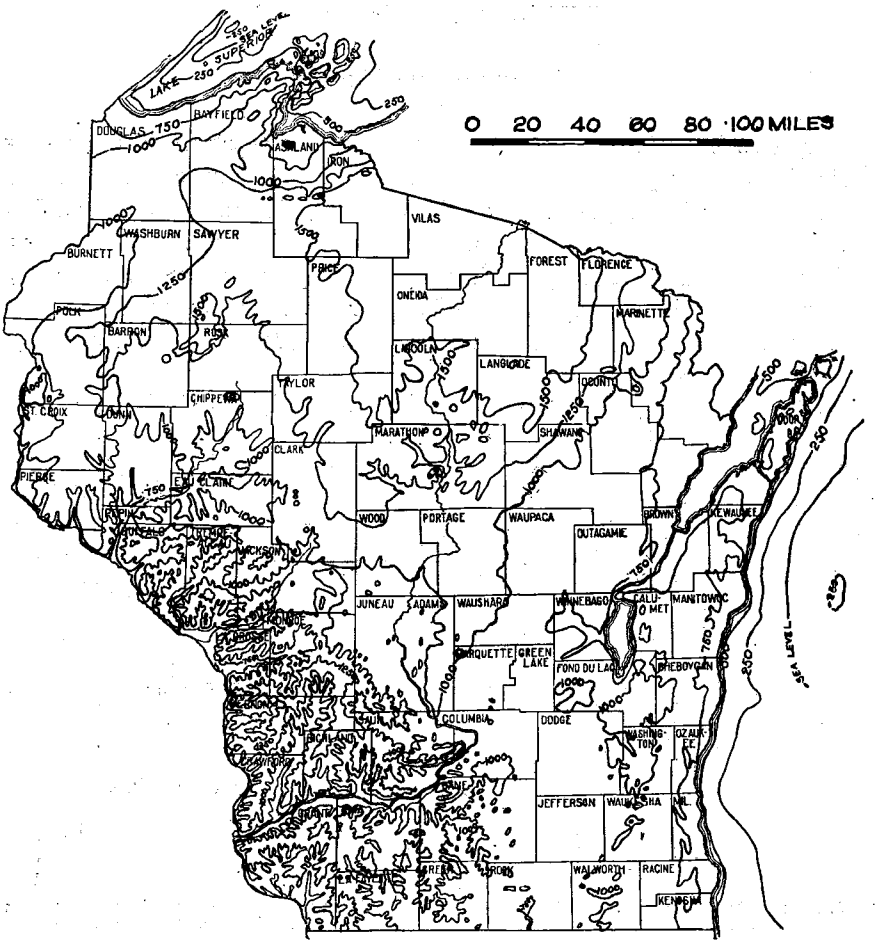

FIGURE 2. Topographic map of Wisconsin showing dissection of the Driftless Area. Note the greater dissection in the Driftless Area of the southwest as shown by crowded contours. (After Thwaites.)

contrast between glaciated and unglaciated landscapes is brought out strikingly by a comparison of figures 3 and 8.

On the east and to a lesser extent on the north, as will appear later, the boundaries of the region may be said to be physiographic, that is

they separate regions of dissimilar physical features; whereas on the south and west the limits are purely arbitrary political boundary lines.

Surface Features

Southwestern Wisconsin as a whole is a low thoroughly dissected plateau whose most conspicuous topographic feature is the Military Ridge. The latter runs without appreciable break from east to west through the entire length of the region and terminates on the west in the high bluff of Nelson–Dewey Park at the junction of the Wisconsin with the Mississippi. North of this ridge the surface drops away rapidly to the flood plain of the Wisconsin River; to the south and southwest it descends more gently to that of the Mississippi and its tributaries.

Origin of the Surface Features

The explanation of the major physiographic features is found in (1) the character of the underlying rock formations and (2) the activities of erosional agents in shaping these rocks into their present form. Were the soil stripped from the upland surface of Southwestern Wisconsin, the Galena limestone would in most places be exposed. The valley walls where rivers have exposed still deeper formations show alternate layers of sandstone and limestone. In a few isolated places elevations or "mounds" rise above the Galena formation. They are composed of shale overlain by another limestone, the Niagara.

Careful measurements have shown that none of these beds is exactly horizontal but that all dip gently to the south and west. Because of this inclination of the beds and the difference in their resistance (the limestone being the more resistant), erosion has worked more rapidly in some places than in others. (See fig. 3.)

These shale, limestone, and sandstone formations were formerly continuous over the whole of Southwestern Wisconsin and extended much farther north. Because of their inclination the northward extension of these formations was at a higher altitude and was consequently removed more rapidly by erosion. The uppermost bed was of course partly removed before those below could be attacked. The general result is that from the south boundary of this region northward successively deeper and therefore older beds are exposed. As the centuries go by, the northernmost edge of each formation retreats slowly southward in much the same manner as a sea cliff worn by the waves

retreats inland. The effect produced on the several layers is much like that produced on a log from which a slab has been sawed, exposing the layers of bark, sapwood and heartwood in turn, the older layers being encountered successively toward the center of the log. Occasionally a particularly resistant part of a formation may be left

FIGURE 3. Photograph of the Oneota bluff north of Prairie du Chien showing the steep slope developed on resistant limestone and the gentle slope developed on less resistant sandstone. Fragments of the limestone called talus may be seen on the slope.

behind by the retreating edge as a sort of island mound or "outlier". Such outliers of the topmost limestone layer are conspicuous at Platteville, Sinsinawa, and Blue Mounds. The main escarpment or edge of the formation of which these mounds were formerly a part may be found farther south in Illinois and to the west in Iowa. These mounds,

like the knots in a well-worn soft wood floor, are prominences left after the removal of less resistant material around them. These mounds, as one might suppose, are in varying stages of extinction. For example, of the three near Platteville, two are of considerable size, still retain their capping of Niagara limestone, and possess therefore rather steep slopes; the third, lying between these two, represents a more advanced stage in the process of removal. It has lost its limestone cover and today appears as only a small hill with rounded top and gently sloping sides.

The general situation may be made clear by a study of figure 4. This represents a north-south cross section of the earth's crust in Southwestern Wisconsin. The rock formations are tilted toward the south. The bed marked "Lower Magnesian" at the extreme left is about 400 feet above the sea level and is about as many feet beneath the surface of the earth. North of the Military Ridge this same formation is about 1,000 feet above sea level and appears at the surface in the valley sides of Mill Creek. Fifty miles north of the Wisconsin River all the formations above the thick Cambrian have been eroded away.

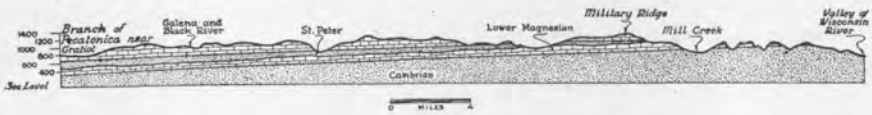

FIGURE 4. North-south section along the ninetieth meridian. Note the dip of the formations toward the south.

Where resistant layers overlie less resistant formations, erosion tends to develop steep slopes and bluffs. In this way a series of terraces or steps has been formed. The resistant rock forms the back slope with its gentle gradient; the erosion of the weak foundation at the northward edge produces the escarpment or steep slope.

Such ridges with one gentle and one steep slope developed in the manner described above are called cuestas from the Spanish term applied to a ridge having this form. The resistant formation in Southwestern Wisconsin responsible for the cuesta is the Galena–Black River limestone[1]; hence the Galena–Black River cuesta. The Military Ridge represents the highest part of this cuesta. To the south is the back slope on the surface of the Galena–Black River, to the north

[1] The Black River limestone lies just below the Galena, in places the two are hardly distinguishable. Strictly speaking, this Galena formation is a dolomite or lime magnesium carbonate. The Black River in this region is a magnesian limestone, in some cases a true limestone.

the steep escarpment slope exposing the edge of the limestones and underlying sandstones. Although the back slope is noticeably dissected, the escarpment is much more so. (See fig. 4.)

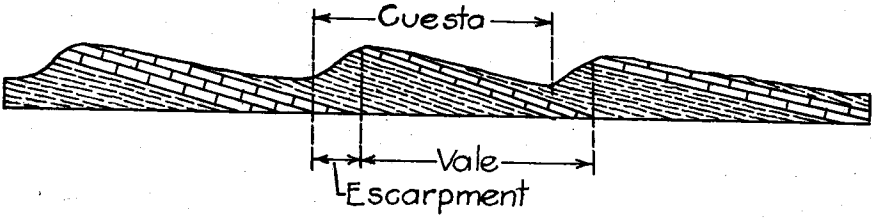

FIGURE 5. A series of cuestas and escarpments (Veach).

Figure 5 shows a cuesta in cross section. In this diagram the resistant formation is indicated by the block-like symbol. In the course of time as the weather layers exposed on the escarpment slope are eroded, the resistant formations lose their support and give way. As a result the escarpments slowly retreat toward the right. In figure 6 are two cross sections of the Galena–Black River cuesta, but the measurements in each case were made along two streams, one flowing north and the other south from the escarpment crest, the Military Ridge. Although the forms differ slightly, the north facing escarpment slope is seen to be considerably steeper in both cases. Figure 14 indicates the position of the parts of the cuesta in Southwestern Wisconsin[1].

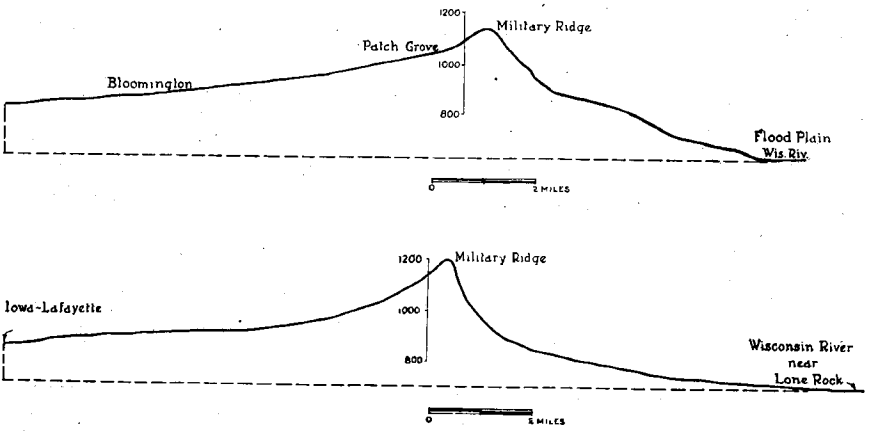

FIGURE 6. Profiles of streams flowing down the escarpment and back slope from the divide (Military Ridge). The relative steepness of the escarpment results in more rapid erosion of that slope and causes the divide to retreat gradually southward.

[1] The explanation given here is that suggested by L. Martin, Physical geography of Wisconsin: Wis. Geol. and Nat. Hist. Survey Bull. 36, 1916. For a somewhat different interpretation see Trowbridge, A. C., The erosional history of the Driftless Area: University of Iowa Studies in Natural History, vol. 9, No. 3, 1921.

Southwestern Wisconsin as Related to Glaciation

Southwestern Wisconsin is a part of the unglaciated region or Driftless Area and it is with respect to the glacial features to the east that its surface offers the greatest contrasts.

Fifty or seventy-five thousand years ago before the great ice sheets moved outward from the Hudson Bay region, the general topographic features of all southern Wisconsin resembled those of the Driftless Area of today. Ever since the region had emerged from the sea the winds and waters had been busy carving it into a great variety of hills and valleys. The work had proceeded so far that little of the surface was left level (fig. 7). Stream channels were well developed

FIGURE 7. View near Bridgeport. This shows the erosion characteristic of the Driftless Area. Considerable forest still occupies steeper slopes and narrower valleys.

and reached every part of the region. Lakes and swamps were drained and waterfalls disappeared as the obstacles in the stream beds were worn away.

With the cold of the glacial period came the great ice sheet from the north. The advance of the ice was not uniform on all parts of its front. Where there were depressions in the land, tongues or lobes moved forward more rapidly than the rest of the ice front; whereas intervening elevations served to make the movement there slower. As a result, the margin of the ice was very irregular indeed. Thus the sheet advancing southward encountered in northern Wisconsin and

peninsular Michigan highlands over which it could move only with great difficulty and at a very slow rate. Eastward lay the Lake Michigan depression, westward the valleys of the Red, Minnesota, and Des Moines rivers. The ice lobes moved southward in these valleys, spread over their margins, and eventually merged in Illinois. There was, however, a large area in the immediate lee of the highland still free of ice. Repeated advances interrupted by long intervals of recession of the ice sheet failed to cover all of this section.

During the glacial era it remained an island in a sea of ice; today

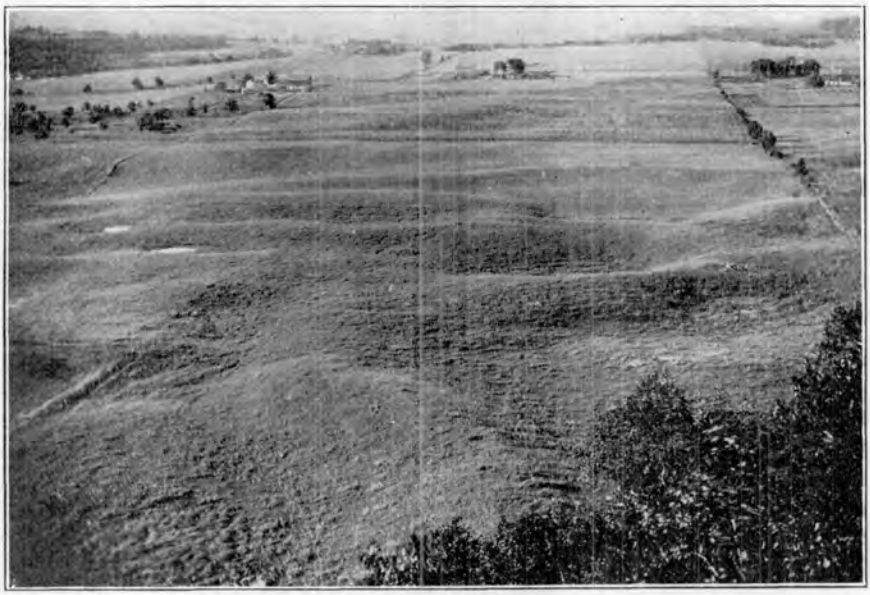

FIGURE 8. Surface of morainal drift north of Blackhawk Bluff in the Wisconsin River valley a mile northeast of Prairie du Sac. (Alden—Professional Paper 106, Plate XXII B, page 205.)

it stands out in marked contrast with the glaciated regions left buried in gravel, sand, and clay, or "drift".

The ice on the margin and surface of a glacier is constantly disappearing through melting and evaporation, but the forward movement tends constantly to replace this loss. If the destruction of the ice is more rapid than its replacement, the glacial front "retreats"; if the reverse is true, it advances; if the two processes are about equal, the position of the ice front is essentially stationary. When the ice front is stationary for a long time, the rock and earth debris dropped by the constant melting of the ice accumulates in great ridges known

as terminal moraine. On a retreating ice front the material is spread more uniformly over a large area and "ground moraine" is formed. Waters issuing from the ice front carry and deposit some of the debris in front of the ice. Such stratified or water-laid deposits are known as "outwash". As the Lake Michigan lobe and its tributary, the Green Bay lobe, moved westward to central Wisconsin, the tributaries of the Mississippi received the waters charged with sediment from the melting ice front. Much of the load of gravel, sand, and silt they were unable to carry far and consequently the old channels became filled to great depths with this outwash material. For centuries the front edge of the Green Bay lobe lay athwart the Wisconsin Valley where Prairie du Sac now stands and built up the prominent terminal moraine (fig. 8) which stretches southward. The channel of the Wisconsin below this point, as well as that of the Mississippi, was filled to great depths with outwash material. When the ice had disappeared the Wisconsin River was flowing over this deposit, high above the old channel bottom. In the centuries that have since elapsed the stream again reduced to its normal volume and sediment load has been busily engaged in removing this filling. The present channel cut in the outwash is still about 125 feet above the old one. The cross section shown in figure 9 illustrates such a filling in the Mississippi. This particular drawing represents conditons near Potosi, but they are essentially the same in the valleys of both the Wisconsin and Mississippi throughout this region. In this section the filling (Qot) made up mainly of gravel and sand is over 150 feet deep and rests upon the old rock bottom (Op).

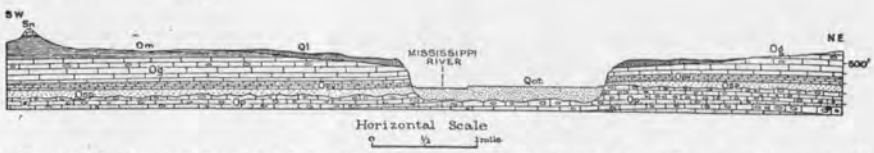

FIGURE 9. Section northeast on ridge from Sherrill Mound to ridge a mile east of Potosi. (Grant.)

As the post-glacial stream shifted about on its high flood plain, cutting first here and then there, step-like remnants of this old filling were left in various places. These features, known as river terraces, have frequently become sites of river towns, such as Mazomanie, Muscoda, and Boscobel. These terraces may be seen in figure 9 on the flood plain between the channel and the bluffs on the right.

Figure 10 shows one of the more prosperous sections of the Wisconsin flood plain near Lone Rock. In this picture may be seen the

economic effects of the glacier upon the people living in this region today. The level surface is highly advantageous to both agriculture and transportation. Near the bluffs the soil is likely to be finer, the elevation higher, and the drainage better. The wooded section near the river is swamp. Much of the Wisconsin flood plain, however, has sandy soils and suffers from drought. The wind often drifts this loose sandy soil and uproots young grain.

FIGURE 10. Typical flood plain of Wisconsin River near Lone Rock. Note the rectangular road pattern in this flat area.

The effects produced by the glacier upon the region over which it passed may be compared to those of a road drag moved over a rough dirt road. Hills were rounded, and many valleys filled with the debris scraped from the elevations. The whole surface was considerably smoothed. Natural drainage lines were deranged. The new surface was not at all like the one which the glacier had covered.

Water from the melting ice and from rains falling upon this new surface filled depressions and formed numerous lakes. (See fig. 11.) These in turn overflowed through the lowest places in their rims, seeking the sea by the lowest path available. In many cases the old valleys had been so completely obliterated that the new streams frequently flowed above buried cliffs and ledges. As a stream cut down through the easily eroded drift, it encountered these obstacles and had to flow over them in the form of falls and rapids. For this reason prac-

tically all of the water power sites of consequence in Wisconsin lie in the glaciated section.

One of the most important effects of glaciation is its influence upon

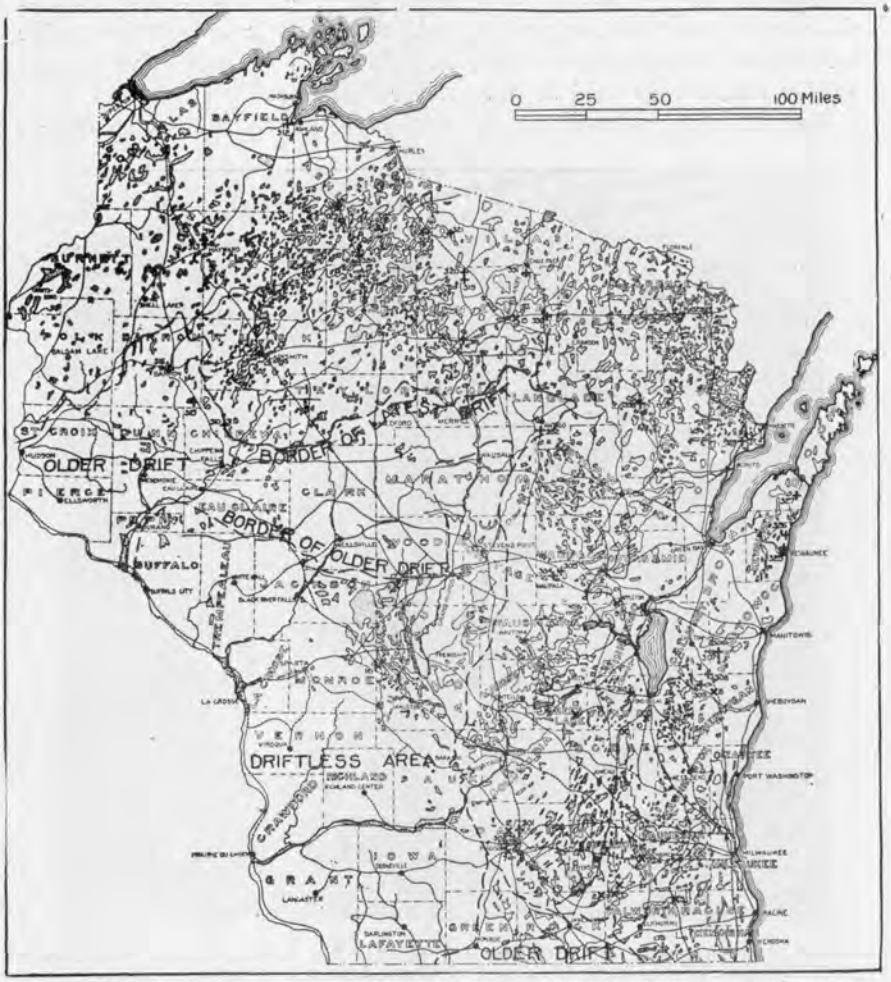

FIGURE 11. The swamps of Wisconsin—dotted areas. The Driftless Area and regions of older drift are largely without swamps and lakes. The only lake or swamp areas in southwestern Wisconsin are those on the flood plains of the larger rivers. (Martin.)

the character of the soils. In the Driftless Area the soil is for the most part residual, that is formed by the weathering of the rock beneath, the sandstone forming sandy, the limestone clayey soils. In some places this is modified by a covering of wind deposited soil or loess.

Over large areas the loessial cover is so deep as to constitute practically all that is of interest to the agriculturist. In the Wisconsin Valley the soils are made up of glacial outwash and alluvium. In the glaciated region, on the other hand, the ice so mixed and redistributed the mantle rock that the present soil bears little or no relation to the rocks upon which it was deposited. Thus the ice may have carried and deposited deep sand or gravel over limestone.

The difference between the two is brought out by comparing figures

FIGURE 12. Transported soil. Glacial till in Baraboo region, bowlders and clay brought from distant sections and dropped in a heterogeneous mass.

12 and 13. In the first there is a mixture of clay, bowlders, and pebbles. There is no regularity in their arrangement and the different materials are thoroughly mixed.

Contrast this condition with the materials shown in figure 13. Here there is a regular gradation in size of material above the solid rock, the coarsest being next the parent rock. Furthermore, all the ma-

terials are derived from the limestone. Undoubtedly the original limestone represented by the disintegrated materials shown was much thicker than that which remains as much of the stone has been carried away in the course of weathering.

Residual soils are often deficient in one or more plant foods for two reasons. As they are formed from the rock which happens to occur in that vicinity, their composition is determined by the nature of that particular rock, and its deficiencies, in so far as plant needs are

FIGURE 13. Residual soil. Weathered limestone in the Driftless Area grading downward into solid rock. This mantle rock represents the remains of a limestone layer above that shown.

concerned, are naturally found in the soils made from it. Again, the ordinary weathering of such rocks requires a tremendous amount of time. During this period many of the soluble constituents may be leached out and carried away. Glacial soils, on the other hand, are more likely to be made up of debris from many different types of rocks, all commingled. Thus deficiencies from one source may be made up by contributions from another. Besides, recent glacial deposits represent fresher materials with their plant foods still largely intact.[1]

[1] It is not intended to imply, of course, that glacial soils are *always* more fertile than those of residual origin.

Since the glacial period was comparatively recent, geologically speaking, the features mentioned above are still much as the ice left them. This is especially true of those due to the last ice advance. The boundary of Southwestern Wisconsin north of New Glarus is marked in many parts by a terminal moraine formed as described above. The drift here is in many places over 100 feet thick. South of New Glarus the glacial features are very much subdued, for the glaciation in this region was considerably earlier and erosion has destroyed or modified the form of many of the ice deposits.

In general, then, Southwestern Wisconsin differs from the glaciated

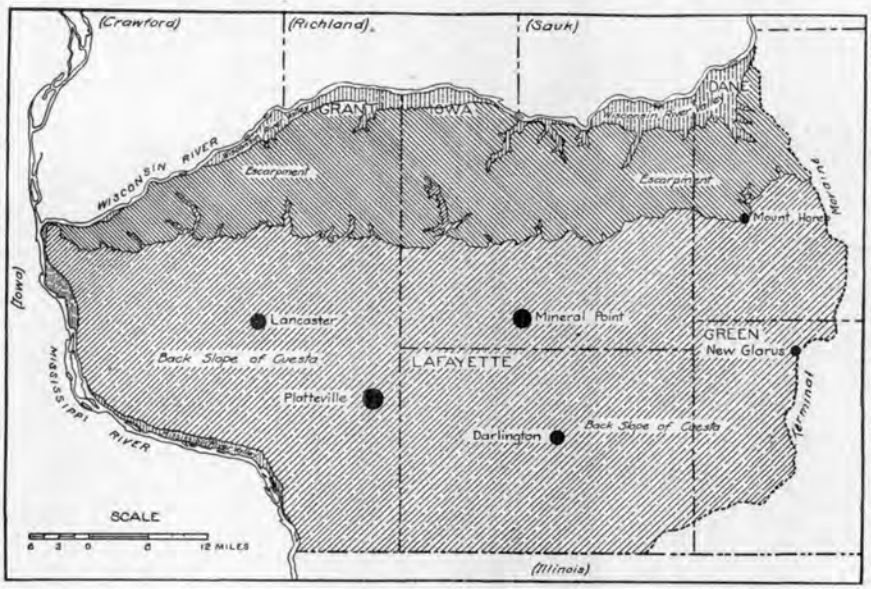

FIGURE 14. Physiographic divisions of southwestern Wisconsin.

region to the east in possessing (1) a much more dissected topography, (2) no lakes, swamps, or falls of consequence, and (3) residual soils bearing a rather close relationship to the underlying rock.

MINOR PHYSIOGRAPHIC DIVISIONS

Southwestern Wisconsin may be divided into three minor dissimilar physiographic regions. They are (1) the Wisconsin–Mississippi Valley,[1] (2) the escarpment, and (3) the back slope. (See fig. 14.)

[1] The term "valley" here is used in a very limited sense and is applied only to the portion included between the bluffs.

The Wisconsin-Mississippi Valley

The Wisconsin Valley in Southwestern Wisconsin lies at the northern margin of the region. It is a flat alluvial plain bordering the Wisconsin River on either side. Precipitous bluffs 300 to 400 feet high shut it in—4½ miles apart at Sauk City, but narrowing to half a mile at Bridgeport. This pecularity of narrowing as one goes down stream is due to the difference in the rocks through which the river has cut.

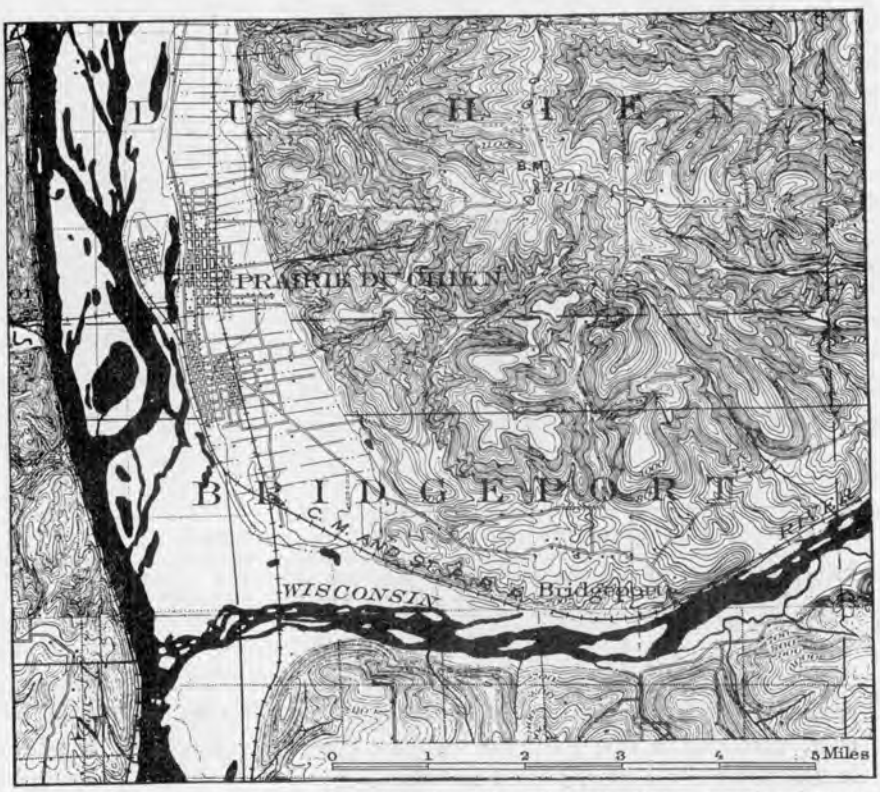

FIGURE 15. Topographic map of the mouth of the Wisconsin River, a region famous in Wisconsin history. Prairie du Chien occupies the best site for a city near the junction. Note the utilization of the valley passes by the railroads. Nelson Dewey State Park occupies the bluff at the junction south of the Wisconsin River.

Because of the dip in the layers of the rock, a weak sandstone occurs upstream, but a relatively resistant limestone is found below Bridgeport. (See fig. 4.) The same phenomenon may be observed in the Mississippi, Pecatonica, and other valleys.

The valley floor between the bluffs is flat and generally sandy. (See

figs. 10, 15, and 16.) The shallow channel full of shifting bars renders navigation impracticable for vessels larger than pleasure launches. The gentle uniform gradient and relatively broad flat valley make damming for power development out of the question. (See figs. 17 and 18.) It is significant that the only waterpower development of

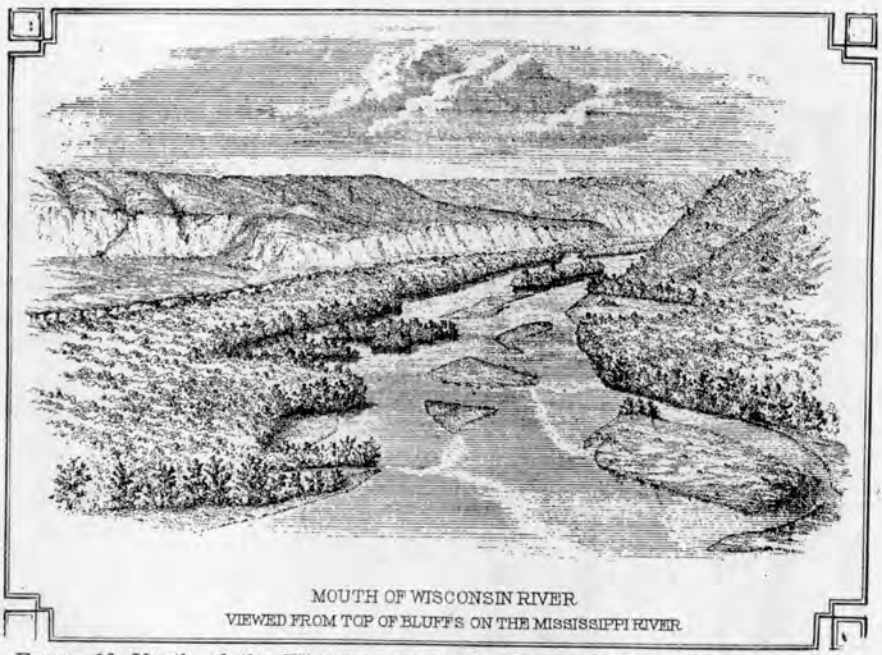

FIGURE 16. Mouth of the Wisconsin River showing sand bars. Prairie du Chien is on the terrace farther to the left. These sand bars shift about and make it extremely difficult to keep the channel charted (Warren). Compare with figures 17 and 18.

any importance in this territory is found where the terminal moraine crosses the Wisconsin River at Prairie du Sac. The valley has, however, provided a low pass through the western uplands of considerable value for highways and railroads.

The Mississippi Valley included in Southwestern Wisconsin duplicates in the main the features characteristic of the Wisconsin Valley. It is not, however, so well adapted to agriculture, for a large proportion of the valley bottom is occupied by lagoons and marsh. Figure 19. A few villages on terraces at the mouth of tributary valleys, as Wyalusing and Glen Haven, serve as railway shipping points for western Grant County. In general the chief value of this valley lies in the fact that it facilitates transportation by affording an easy path

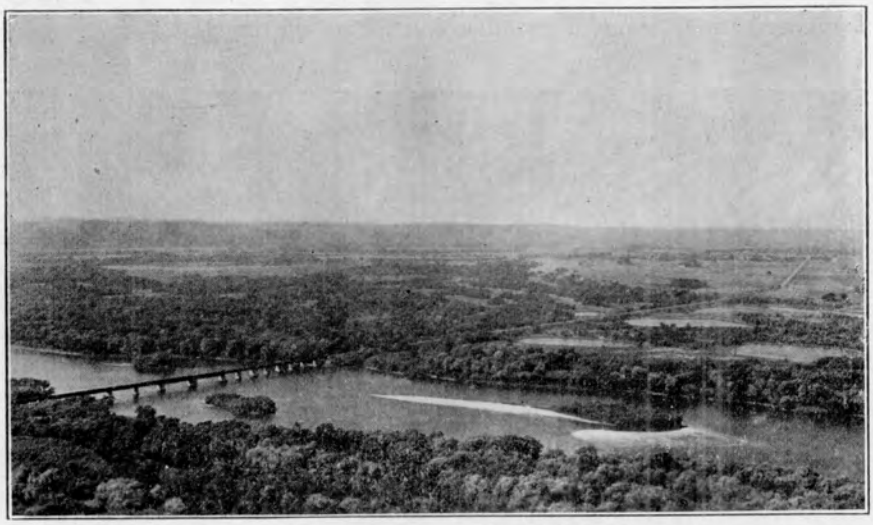

FIGURE 17. Looking north across the Wisconsin River from Nelson Dewey State Park. Note the sand bars in the river.

FIGURE 18. Looking northeast across the Wisconsin River from Nelson Dewey State Park. The sand bar is one of many in its course and shows why the river is not practicable for navigation.

for two railways, the Chicago, Burlington & Quincy on the east bank and the Chicago, Milwaukee & St. Paul on the west.

FIGURE 19. The Mississippi River in southwestern Wisconsin. Shows the braided character of the river and the difficulties of Potosi Station and Cassville in maintaining water communication.

The Escarpment

The Military Ridge trends almost straight east and west at a distance for the most part of 10 or 12 miles from the Wisconsin Valley. As this valley is 500 feet lower than the ridge, the north flowing tributaries of the Wisconsin River rushing down this slope possess great erosive power, though too small and uncertain for any extensive power development. The rate of down-cutting in the stream channels is very rapid because the streams cut across the edges of the rock formations, erode the weak, and undermine the resistant. As a result, the escarpment slope represents the most thoroughly dissected portion not only of Southwestern Wisconsin, but of the whole state. Level land is at a premium; only the lower slopes and narrow valley bottoms are cultivated, the remainder is used as woodland or pasture. Not only is agriculture limited, but roads are expensive both in construction and maintenance.

The Back Slope

The back slope comprising an area almost three times that of the escarpment represents, on the whole, a region in a less advanced stage of dissection than does the northern slope. It is a broad rolling upland which slopes southward from the Military Ridge to the Illinois–Wisconsin line, a fall of 400 feet in 35 miles or only one-fourth that of the escarpment.

Into this upland the Platte, Pecatonica, and Grant River systems have cut valleys from 100 to 300 feet deep. The valley walls are steep and the flood plains narrow, though, where they reach the weak sandstone, the valleys widen. Above this upland rise the "mounds," outliers of another previously mentioned escarpment farther to the south.

The topography of certain parts of the upland approaches that of the escarpment in degree of dissection, as for example that west of Lancaster or southwest of Mineral Point. However, the proportion of level land is considerably greater—a most important factor in influencing the agricultural development in the two sections. (Fig. 20.)

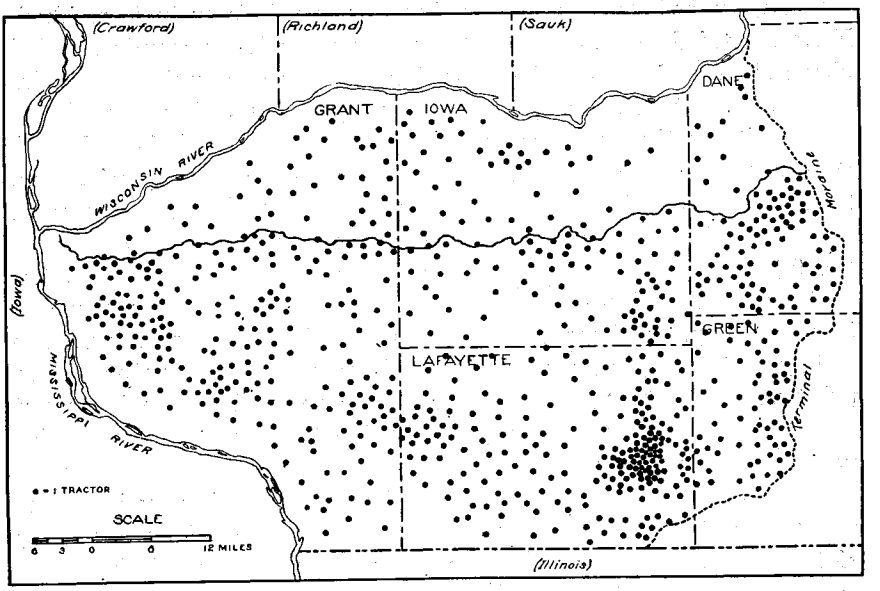

FIGURE 20. Distribution of tractors, which are most sensitive to topographic influence. They are not practicable for use on slopes with a 15 to 20 foot rise per 100 feet. Division of Agricultural Statistics, State Capitol, Madison, 1920.

CLIMATE

The climate of this southwestern part of the state is not markedly different from that of neighboring regions in the same latitude. The elevation of the eastern two-thirds gives that section a temperature slightly lower and a precipitation a trifle greater than in the Rock or Mississippi valleys on either side. The lower temperature and heavier precipitation shorten the growing season on the uplands by three or four weeks, and in some of the ravines and narrow valleys as much as five weeks. The elevation increases the average precipitation in La-

fayette County (and in Richland County just across the river to the north) to 34 inches, the highest in the state. The combination of cool temperatures, relatively greater precipitation, and rough topography has resulted in an unusually large percentage of the land being devoted to pasture. The influence of these slight climatic differences may be still further seen in the type of dairy product and again in fixing the limits of large corn production, relationships discussed later in connection with agriculture.

Soils

The main body of the soils of Southwestern Wisconsin is residual. From one-third to one-half of this soil, however, has a mantle of wind blown silt called loess. The latter is confined to the uplands and increases in depth from east to west. In many parts of western Grant County it constitutes the main upland surface soil. In the tributary valleys the alluvial deposits are composed of all kinds of material from the slopes above, whereas the main part of the filling of the Wisconsin and Mississippi valleys is glacial outwash—sand and gravel. (See fig. 9.) The loessial deposits rank next to the residual soil in importance. Their fertility and excellent water-retaining capacity add body and depth and make an excellent soil for cereal growing. The residual soil is naturally thickest in the valleys and on the broad flat uplands. Steep slopes which have a thin residual soil and are not covered the loess are especially susceptible to drought and unfit for grain production.

The character and distribution of the residual soil may be determined from the map showing the underlying rock. Over five-sixths of the total surface is clay, derived from the disintegrated limestones and shales, and less than one-sixth is sand. On the whole the soils are very well adapted for general agricultural purposes in so far as quality is concerned. The chief handicap lies in the topography which in many cases does not allow cultivation because of the danger of washing.

Though practically all of the soils of the region are capable of supporting tree growth, at the time of white settlement much of the area was unwooded. (See fig. 39.)

Minerals, Rock, and Ground Water

This region includes the most important part of the Upper Mississippi lead and zinc district. The deposits are found scattered about

in an area covering some 1776 square miles in southeastern Grant and adjacent portions of Iowa and Lafayette counties. These ore bodies have been deposited by underground waters in the Galena formation either as veins or as particles scattered throughout the rock. They are most extensive horizontally and vary from 100 to 5,000 feet in length, from 10 to 1500 feet in width, and from 4 to 80 feet in thickness. Some of the richest deposits yield one-sixth to one-fifth of the weight of the rock in pure mineral.

The lead ores are usually found above the water table, seldom lower than 250 feet, and often so close to the surface as to be easily mined from open pits or slope diggings. The zinc ores, on the other hand, generally occur below the water table. The zinc carbonate ores are found just above and also just below the water level, whereas the zinc sulphide ores are practically all found below. The latter are by far the most important sources of zinc in this region. The dissection of the region, though tending to retard agriculture and make communication difficult, has served to expose these mineral deposits and facilitate their mining.

Similarly the absence of glacial drift and the thorough dissection of the region by exposing the underlying limestone in so many places have made this rock readily available for building and road purposes. At the same time much of the region lacks the gravels, sands, and clays distributed so abundantly over the glaciated section. The influence of this condition upon costs of building and road materials is important.

As might be expected in a high, thoroughly dissected region, the water table, or the level below which the soil and rock are saturated, lies deep below the surface. Most of the wells on the uplands must be drilled 100 to 200 feet, though in valleys water may be obtained from the alluvium at a few feet below the surface. Were it not for the presence of numerous beds of shale in the rock formations, the water table would lie much deeper. Since these layers are impervious, the water is retained nearer the surface. The water above these underground beds appears as springs where the shale outcrops on the valley sides. Blue Mounds has several springs at its base just above the Maquoketa shale. Most of the streams are fed by such springs. The gentle inclination of these beds tends to imprison water between shaly layers often under considerable pressure, much as it would be near the lower end of a piece of tilted pipe filled with water. If one drills through the impervious sealing shale near the lower end, an artesian

well may be produced. In some of these the pressure may make the water spout high into the air, in others the water must be pumped to the surface. In figure 4, for example, a well drilled deep enough to reach the St. Peter sandstone near the south end of the section shown might result in an artesian well. The surface of the land here is lower than the outcrop of the St. Peter near the Iowa County line where the water, falling as rain, could enter. Many of the villages and cities depend upon wells of this sort for their water supply. Again the valley 4 miles south of the Military Ridge, in the same drawing, shows an outcrop of the St. Peter underlain by limestone. This is an excellent arrangement for the occurrence of springs.

Scenery

This portion of the state possesses a scenic beauty found in few other places in the state. Steep slopes covered with grass or oak forest and often crowned with a cap of limestone are found on all sides. The Sinsinawa, Platte, and Blue mounds are perhaps the best types and are not only striking features from a distance, but afford impressive views of the whole country from their summits. On a smaller scale, but even more picturesque are some of the lesser features, such as the isolated rock column northeast of Fennimore, known as Castle Rock. The bluffs of the Wisconsin, the Mississippi, and many of the smaller streams are strikingly beautiful, especially in the fall when the brilliant colors of the oak and maple have appeared. The grassy slopes free of the taller trees are dotted with huge green patches of juniper, whereas on the river flood plains birch, both red and white, offers pleasing contrasts. A trip from Madison to Fennimore on the railway or on the highway occupying the Military Ridge affords a most excellent general view of the whole area. To the north the wooded escarpment slope with an occasional cleared passage along some tributary valley leading to the Wisconsin is in marked contrast with the comparatively level farm land, mostly cleared, stretching to the south. Beyond Fennimore, and still following the escarpment crest, is the only state park found in this section.

The Nelson Dewey State Park occupies the high bluffs south of the Wisconsin River in the angle formed by it and the Mississippi. (See fig. 15.) It consists of about 1600 acres of rugged land at the westernmost end of the Military Ridge. From the edge of the bluffs there is a magnificent view of the junction of the Wisconsin with the Father of Waters 500 feet below. Forests cover the precipitous slopes which

drop away on the north and west sides to the flood plain of the two rivers. Figures 17 and 18 are views of the Wisconsin flood plain bordering the park on the north. The bluff is dotted with Indian mounds, Indian village sites, planting grounds, and trails. It is easy to believe that this may have been a noted rendezvous of tribesmen. Though admirably located from a scenic and military standpoint, it is relatively inaccessible from the river and so the trading post of Prairie du Chien grew up on the terrace of the Mississippi about two miles to the north. The historic and scenic interests are bound to make this beauty spot a mecca for tourists, although at present poor roads make it rather difficult of access in bad weather. It communicates with Prairie du Chien via Bridgeport where a toll bridge spans the narrowed river.

CHAPTER II

HISTORICAL SKETCH

The Indians

Compared with that of the Fox Valley the Indian geography of the southwestern part of the state was insignificant and uninteresting. The marshes which in the former were a means of defense to the Red Man as well as a source of his game supply, and the numerous falls in the Fox River frequented by large numbers of fish gave this part of the state at one time the densest Indian population known to exist anywhere in this part of the country.[1] The southwestern part of the state lacked these features and possessed the added disadvantage of exposure by reason of its location on two important canoe routes, the Wisconsin and the Mississippi. As a result, the Indian population was migratory for much of the time during the period of white settlement. The chief tribes which occupied it at the beginning of the nineteenth century at the time of the white man's settlement, and which therefore exercised an influence on its later development, were the Winnebagoes and the Sacs and Foxes.

It is now supposed that the progenitors of the Winnebagoes were the builders of the mounds which dot the region in such large numbers,[2] principally along the streams. Evidently Nelson Dewey Park, as one would judge it would be from its position, was a favorite rendezvous since it is lined with rows of these mounds. The Winnebagoes were quarrelsome and treacherous. Their resentment of the white man's intrusion retarded settlement and led in 1827 to an outbreak of brief duration. After they were subdued, they engaged in no more open hostilities, unless a very insignificant disturbance in 1846 be so considered. Their covert aid and sympathy with the Sacs and Foxes in the Black Hawk War, however, probably protracted that struggle.

The Sacs and Foxes came into this part of the state about the middle

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[1] Hebberd, S. S., Wisconsin under French dominion, pp. 31–35, Madison, Wisconsin, Midland Publishing Company, 1890.

[2] Kellogg, L. P., The story of Wisconsin, 1634–1848: Wisconsin Mag. of Hist., vol. 2, p. 417, 1919.

of the eighteenth century. They worked the lead mines and jealously guarded them from white intrusion until 1804 when they entered into a treaty by which they relinquished their claim in favor of the United States Government. Their resentment at white encroachment of their domain was responsible for the Black Hawk War of 1832.

Contrary to popular belief, these Indians depended for much of their food upon the products of the field rather than entirely upon those of the chase.[1] Various travelers[2] tell of the large fields of corn, pumpkin, squash, and melons which the Sacs and Foxes cultivated for a time at Muscoda and Cassville. Seed was selected with care[3] and cultivation was done by clam shells attached to sticks.[4] Corn was dried and buried in caches for winter use.

Supplies from these gardens helped make it possible for the early traders to maintain themselves in so isolated a region. The hostile attitude later exhibited by the Indians counteracted this favorable effect upon the settlement of this section. Thus the influence of the Indian on the settlement of this part of the state was, as Professor Turner says, both favorable and unfavorable.

Fur Trade

The absence of a large Indian population, the lack of an abundant supply of game, and the lack of sites particularly well suited to trading posts made the fur trade of little importance in the southwestern corner of the state. Furthermore, the proximity to Prairie du Chien with its peculiar advantages for trading purposes made a rival post in this region unfeasible. Skirted on the north by the Fox–Wisconsin route to the Mississippi, which the French used principally in their trade and explorations, the borders of this area were probably familiar to white men shortly after the middle of the seventeenth century, but the interior was left undeveloped and practically unsettled until the first quarter of the nineteenth century, almost 200 years later.

There is a tradition of a very early trading post at one time near the present site of Muscoda, which at the behest of an Indian deity was transferred to Prairie du Chien. More probably its transfer was due to the initiative of some enterprising white trader who saw greater

[1] Hibbard, B. H., Indian agric. in southern Wisconsin: Wis. Hist. Soc. Proc., 1904, p. 145.
[2] Schoolcraft, Henry, Narrative journal of travels, p. 319, 1821.
[3] Hibbard, B. H., op. cit., p. 155.
[4] Brown, C. E., Some little-known Wisconsin implements, Wisconsin Arch., vol. 9, No. 1, p. 17, 1910. Whittlesey, Charles, Recollections of a tour through Wisconsin in 1832: Wis. Hist. Colls., vol. 1, p. 74.

possibilities or convenience in Prairie du Chien. A Frenchman by the name of Rolette is thought to have had a post at the former place[1] in later years and Marin, who won fame by subduing the Foxes on Lake Butte des Morts had in 1725 a place of collection and deposit of furs near the present site of Wyalusing.[2] It is also thought that LaSalle possibly had a trading post on the Wisconsin near or at Prairie du Chien for dealing in hides of buffalo,[3] which were very numerous in this part of the state. Besides buffalo, there were deer, and Cassville for a long time was called Penah (Turkey) from the abundance of wild turkeys there. These the Indians killed and hauled on sleds in winter to the white settlers at Prairie du Chien. Small game, such as muskrats, mink, and beaver was much less abundant than in the glaciated regions.

Mining

By the beginning of the nineteenth century the exhaustion of the wild game was turning the more enterprising Indians to working the lead mines. Their knowledge of the existence of lead, of which at first they were apparently not so jealous, led to the opening by Perrot and also by Le Suer of mines near Snake Hollow (Potosi) and other places along the Mississippi as early as the last decade of the seventeenth century. With such tools as were at hand the methods of the Indians were necessarily the crudest. From the fact that buckhorns have been found in mines beyond where whites had reached, it is inferred that the Indians extracted ore even before the advent of the French, but it was not until this time that lead in any amount was taken out. Buckskin bags drawn by a leather thong were used to pull the ore to the surface through the drift, or opening, which had been made in the hillside. In baskets woven of birch withes or made of buckskin, squaws[4] carried this ore to the smelting place, a pile of logs upon which the ore was emptied. As the logs burned, the mineral melted and sank to the bottom, where it was gathered up the next morning as a lump from the ashes.[5]

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[1] Thwaites, R. G., The fur-trade in Wisconsin: Wis. Hist. Colls., vol. 20, p. 197, (Note).

[2] Strong, M. M., The Indian wars of Wisconsin: Wis. Hist. Colls., vol. 8, p. 245.

[3] Turner, F. J., Character and influence of the Indian trade in Wisconsin: J. H. Univ. Studies, vol. 9, Nos. 11 and 12, p. 30.

[4] Meeker, Moses, Early history of lead region of Wisconsin: Wis. Hist. Colls., vol. 6, p. 281.

[5] Thwaites, R. G., Notes on early lead mining in the Fever (or Galena) River region: Wis. Hist. Colls., vol. 13, p. 281.

A few years later (1819) a slightly improved method was used by the Indians. A hopper, consisting of a hole two feet deep and as wide at the top, was dug into a slope and lined with flat stones. Those at the bottom were arranged like a grate. Leading from the bottom of this hopper to the side of the hill was a small trench. The lead ore was placed in the hopper and heated by the brush put in this trench, the melted metal ran out of the trench and at the end dropped into another hole, or bowl-shaped mould.[1] This held about 70 pounds—"a plat"—the weight of the later "pig" of lead.

Naturally much mineral was wasted by such methods. Nevertheless it is estimated that 400,000 pounds of lead were raised and extracted in this crude fashion in 1810.[2] The use of lead in barter soon supplanted that of hides and the fur trade in this region thus lost itself in the lead trade.

Early White Settlement

Immigrants from the South

Although Wisconsin as a whole has a large foreign population, the southwestern part of the state has always been and is today decidedly American in tone—more so than any other part of the state. Figure 21. Until 1823-24 only a few roving traders might be found in this section, chiefly employees of the Northwestern Fur Company, or of the American Fur Company at Prairie du Chien[3] of which John Jacob Astor was the founder.[4] Unlike the settlements about Prairie du Chien and Green Bay, almost no French population was found south of the Wisconsin River with the exception of a small group at Potosi. By far the largest number of settlers who came into these counties after the British relinquished their control of the territory were native Americans, but they were of a type distinctly different from the agricultural settlers in the Fox Valley and also from those who settled in the southeastern counties of Wisconsin—a fact which produced more or less friction in the politics of territorial days.[5] Since the easiest way of reaching the southwestern part of the state during the first quarter of the nineteenth century was by way of the Mississippi River, the earliest immigrants came from the south, from Virginia and Mary-

[1] Thwaites, R. G., Notes on early lead mining in the Fever (or Galena) River region: Wis. Hist. Colls., vol. 13, p. 281.
[2] Thwaites, R. G., Wisconsin, p. 200, 1908.
[3] Thwaites, R. G., The fur-trade in Wisconsin: Wis. Hist. Colls., vol. 20, p. xi.
[4] Butterfield, C. W., History of Crawford and Richland counties, pp. 435, 437, 1884.
[5] Paxson, F. L., A constitution of democracy—Wisconsin, 1847: The Mis. Val. Hist. Rev., vol. 2, p. 9, 1915-16.

land, Illinois and Tennessee, but more especially from Kentucky and Missouri. In one sense the settlements were an expansion of those in northern Illinois, a widening circle of adventurers, who, not finding the "hoped for" wealth in the mines about Galena, pushed on into South-

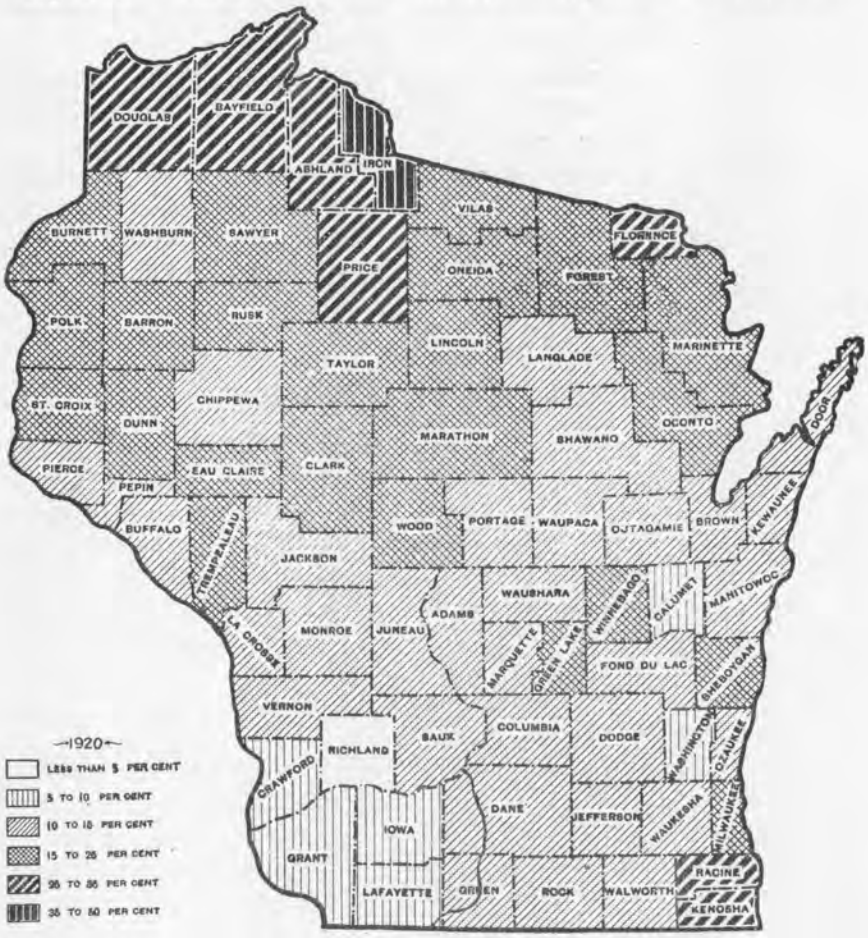

FIGURE 21. Per cent of foreign-born white in total population, by counties, 1920 (U. S. Census).

western Wisconsin to seek for richer "leads." This circle of settlements or small villages, beginning in 1824 with Hazel Green, at first known as "Hardscrabble,"[1] and New Diggings,[2] gradually spread until

[1] Copeland, L. A., The Cornish in southwest Wisconsin: Wis. Hist. Colls., vol. 14, pp. 304, 317.

[2] Conly, P. H., The early history of Lafayette County: Wisconsin Mag. of Hist., vol. 2, p. 320, 1919.

it reached the Military Ridge five or six years later and by 1830 included all of the lead mining region of Wisconsin. For the first few years many of them migrated south for the winter and returned north with the spring to "team" or work the mines. They thus earned the sobriquet of "Suckers," after a native fish of similar migratory habits.

Cornish Miners

During the two decades from about 1830 to 1850 the mining population was considerably augmented by an influx of Cornish.[1] The gradual exhaustion of the mines in Cornwall, England, was making it more and more difficult for the miner to make a living. Twelve or thirteen dollars a month, about half what he could make in the lead district of Wisconsin, was his average wage. Up to 1845 the Cornish usually came to Galena by way of the Mississippi. Finding this region pretty well occupied and many of the mines worked out, they moved on into the newer mining districts in Wisconsin. After 1845 the majority came by way of the St. Lawrence–Great Lakes and drove overland from Milwaukee. This tide of Cornish immigration reached its height about 1850, at which time the California gold rush not only diverted the stream to the Pacific coast, but in addition drew off about a half of those who had already settled in Wisconsin.[2] It is estimated that in 1850 there were about 6,000 native Cornish in Wisconsin, making up about one-sixth of the total population of Grant, Iowa, and Lafayette counties. By 1890, their principal settlements were at Mineral Point and Dodgeville where they made up over a third of the population, Linden and Hazel Green one-half, and Shullsburg one-fourth.

Though for the most part uneducated and superstitious, the Cornish were resourceful and religious, industrious and thrifty; although few became really wealthy, the most of them made a comfortable living. In spite of an illiteracy of 75 per cent, this immigration did not, as is often the case with equally ignorant immigrants, mean a corresponding degree of pauperism. His caution and conservatism, however, made the Cornishman loath to give up mining as an occupation, and long after others had abandoned the search for minerals in favor of the more lucrative agriculture, he stayed on at the mines and worked many of those which the Americans had abandoned as unprofitable. As

[1] Copeland, L. A., op. cit., p. 301 ff.

[2] About two-thirds of these immigrants returned when the gold fever had passed its climax. Idem, pp. 318-319.

the accessible ores finally became exhausted, lack of means to work the deeper deposits or exploit the zinc ores compelled him at last to turn to farming for a living.

Irish and Welsh

In the late twenties and early thirties came an influx of Irish, also chiefly miners, who settled in southern Lafayette and Green counties.[1] Similarly a considerable number of Welsh settlers found their way to this part of the state and settled at Dodgeville, Linden, Hazel Green, and Mineral Point.

The Environment of Settlers

When the miners came in, their settlements were necessarily made among the Indians. At first there was the ever-present meance of attack, so that several forts were built throughout the lead region, at Dodgeville, Wiota, Blue Mounds, and other strategic positions. To these the whites flocked whenever there were any suggestions of hostility on the part of the Indians. During the Winnebago troubles of 1827 and the Black Hawk War five years later the white population was concentrated in these forts. As elsewhere, the Indian withdrew as settlement progressed, but occasionally one remained and made his living by hunting or by performing for the whites tasks for which his woodcraft and primitive mode of life had especially fitted him, such as the tanning of hides and making of moccasins and other articles from dressed skins.

Living Conditions

The homes of these pioneers[2], built of logs and plaster, were equipped with the crudest of home-made furnishings. The bed was made by inserting one end of a log six feet long into the wall four feet from the corner. The other end rested upon a forked stick thrust into the ground, upon which also rested the "foot" of the bed, which was another log four feet long inserted in the adjacent wall six feet from the corner. The two walls served as the other sides of the bed. Willow thongs or split boards fastened to the logs and walls served for springs, and a "mattress" of grass or leaves completed the sleeping accommodations. Chairs consisted of rough boards nailed together and fastened to a log in place of legs.

Hominy was a popular food. Corn was grated on a piece of iron

[1] Butterfield, C. W., History of Green County, p. 147, 1884.
[2] Conly, P. H., The early history of Lafayette County: Wisconsin Mag. of Hist., vol. 2, pp. 322, 323, 1919.

or other metal with holes pierced in it or pounded between stones. Mills were few. The first one, established by the Murphys at Benton in 1827, was patronized by residents from Dubuque, Rockford, and the Wisconsin Valley 40 miles away.[1] After spending two or three days on the road to the mill, it was frequently necessary to wait a day or two for a "turn" in getting the grist ground. The distance to the mills was increased by the lack of roads and the poor condition of the few laid out. Many difficulties were encountered because of lack of bridges and grading. One settler in traveling from his home in the town of Waterloo to Paris, a distance of 16 miles, went 45 miles to get there. In attempting to make a short cut on his homeward journey he was obliged to ford a creek, which as a result of high water, was a mile wide. For a part of its width it was over a man's head in depth. In descending the bluff along Grant River the wheels of the wagon had to be locked and a tree 15 inches in diameter chained to the wagon to check the descent.[2] In many cases travel to the main highway was made over the Indian trail, and the farmer considered himself fortunate if his section had even this much connection with the outside world.

Economic Conditions

The majority of the miners were poor. Some found rich "leads" and accumulated modest fortunes, often making $100 in a week,[3] but the average earnings were little if any above ordinary miners' wages. In many cases the week's earnings were gambled away over the card or roulette table Saturday night, and Monday morning found the miner with empty pockets ready to start anew. Perhaps one of the most significant features in the development of the mines was that it was by individual rather than corporate enterprise. As the character and accessibility of the deposits made elaborate machinery unnecessary, the miner could go in with his own simple tools of pick and shovel and get out the ore. By the forties, this state of affairs had changed, for the mining had passed for the most part into the hands of a few large companies.

Though the miners as a rule were poor, there was not the abject poverty of an old settled community. It is a significant fact that the panic of 1837 caused little distress in the lead mining communities be-

[1] Conly, P. H., op. cit., p. 320.
[2] Holford, C. N., History of Grant County, pp. 39-40, 1900.
[3] Kellogg, L. P., The story of Wisconsin, 1634–1848: Wisconsin Mag. of Hist., vol. 3, p. 34, 1919.

cause the miners had refused to take anything but specie in payment for their lead.[1] By 1873 when the population had become dominantly agricultural, the panic was severely felt. This was because the immigrant farmer had no such prejudice against paper money. Changes in the tariff and in market conditions for lead had, it is true, brought the temporary periods of depression or prosperity common to a mining region.[2]

The policy adopted by the Federal Government regarding the mineral lands produced much friction respecting titles and held back agricultural development considerably. In 1807, three years after the Indian Treaty ceding the region to the United States, the government ruled that all mineral land was to be held as the property of the government. Individuals could acquire the privilege of working or prospecting on these lands by obtaining a lease. As the price of lead declined, the tax for the lease was felt to be a hardship and called forth a protest on the part of the miner. This tax was especially resented when those who had taken up lands not entered as mineral lands escaped payment of it, although they mined the lead. Since the government's knowledge as to the location of the mineral was not very exact, more or less confusion and injustice resulted. Preëmption acts were passed in the thirties to protect the "squatter" in his claims, but difficulties and disputes continued until the government changed its policy of ownership and sold the lands at public sale in 1846.[3]

Social Conditions

The social conditions were those characteristic of mining communities with the later added element of the pioneer farmer. With a heterogeneous population of all stations and degrees of culture thrown together from such widely removed sections, it is to be expected that there would be much disorder. Until territorial days, 1836, the settlers were for the most part a law unto themselves[4] and even after the organization of the territory, so-called justice was frequently dealt out by ignorant or vicious officials, themselves little better than many of the offenders brought before them.[5] On the other hand, there was the

[1] Rodolf, T., Pioneering in the Wisconsin lead region: Wis. Hist. Colls., vol. 15, p. 364.
[2] Kellogg, L. P., The story of Wisconsin, 1634–1848: Wisconsin Mag. of Hist., vol. 3, p. 36, 1919.
[3] Idem.
[4] Brunson, Ira B., Early times in old northwest: Wis. Hist. Soc. Proc., 1904, p. 157.
[5] Pratt, Alex., Reminiscences of Wisconsin: Wis. Hist. Colls., vol. 1, p. 127.

hospitality of the frontier, together with its open-handedness and wholesome respect for other's property. Doors were never locked and what one had was at the disposal of all.

Taverns dotted the highways and furnished a social center for the male population, especially from Saturday night until Monday morning. Besides the bar, which was the conspicuous feature of every tavern, there were card tables and perhaps roulette tables, and a faro bank in the bar room, all haunted by the nightly throngs of miners. At some such place as Mineral Point, or "Shake Rag,"[1] as it was at first called, the crowd would include the principal men of the region, officials as well as private citizens.[2] Aside from the taverns, liquor might be purchased at the numerous "groceries" which were really saloons.[3]

Along with the illiterate mining element was a cultured and educated minority. The rapid growth of the mining communities and the lure of possible easy wealth offered an attraction to young business and professional men not felt in the more slowly growing agricultural communities. One of the first two banks in the territory of Wisconsin was established at Mineral Point. William Hamilton, son of Alexander Hamilton and founder of the town of Wiota, was for many years a prominent figure in the mining and smelting enterprises of the lead region. Among many others of culture and means were the Gratiots, who established at Gratiots Grove[4] a school where the pupils studied Latin and Greek in addition to the common branches.[5]

Undoubtedly it was the presence of this element that enabled the southwestern part of Wisconsin to furnish many of the early political leaders in the newly organized territory and state. From this section came Governor Dodge, first governor of the territory, and Governor Nelson Dewey, first governor of the state. The home of Governor Washburn was at Mineral Point. Charles Dunn, the first chief justice

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[1] So called because the signal to meals was the waving of a rag. As the miners were at the base of the hills, it was often called "Shake Rag under the Hill." Most of the miners being unmarried, they took turns in doing the cooking for the party. Taylor, Stephen, Mineral Point and Richland County: Wis. Hist. Colls., vol. 2, p. 486.

[2] Pratt, Alex., op. cit., p. 145.

[3] Taylor, Stephen, op. cit., p. 487; also Palmer, Strange, Western Wisconsin in 1836: Wis. Hist. Colls., vol. 6, p. 300 ff.

[4] Gratiots Grove was for a time the most important place between Chicago and Galena and is said to have had a population of 1500. Campbell, H. C., Wisconsin in three centuries, 1634–1905, vol. 2, p. 269, 1906. Conly, P. H., The early history of Lafayette County: Wisconsin Mag. Hist., vol. 2, pp. 320, 327, 1919.

[5] Rodolf, T., Pioneering in the Wisconsin lead region: Wis. Hist. Colls., vol. 15, p. 344.

of Wisconsin, and Moses Strong, Sr., spokesman for the mining region, were other early political figures from this locality.

The comparatively dense population of the southwest part of the state, the presence of influential political leaders, and its connection for a time with the territory of Iowa made it at first seem the most appropriate section for the state capitol.[1] Belmont, the present Leslie, was, after much discussion and heated rivalry, chosen as the site and a modest building erected for the legislative hall.[2] Figure 22. It is an interesting fact that the timber for its construction was brought from Pittsburgh down the Ohio and up the Mississippi River. Other influences, however, located the permanent capitol at Madison. Only one session convened at Belmont.

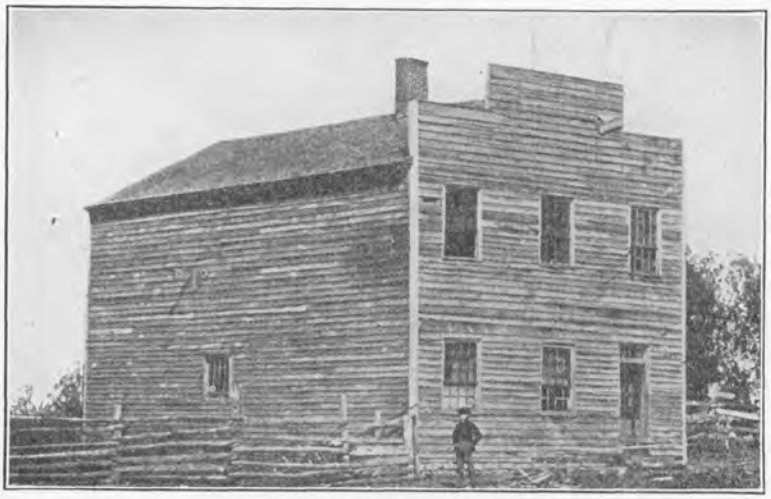

FIGURE 22. Old state capitol at Belmont. Courtesy of the Wisconsin Historical Society.

Because of the large number of immigrants from the south a decidedly southern tinge was given to social and other institutions in the lead region, especially in the first two decades. Slave owning was not uncommon.[3] The census of 1840 showed 11 slaves in Grant and Iowa counties and at one time or another probably fifty or sixty slaves were

[1] Davidson, John N., Some distinctive characteristics of the history of our lead region: Wis. Hist. Soc. Proc., 1899, p. 190.

[2] This building long used as a barn has been moved back to its original site and is being repaired because of its historical associations.

[3] Davidson, J. N., Negro slavery in Wisconsin: Wis. Hist. Soc. Proc., 1892, pp. 82-86.

owned in this region[1]—this in defiance of the Ordinance of 1787 which, it will be remembered, expressly forbade slave owning in this territory. Governor Dodge, himself a southerner, held slaves for a time. He did not sympathize with the institution, however, and before coming had promised the slaves emancipation at the end of five years.[2] Charles Dunn, the first chief justice, was born in Kentucky and favored slavery and "state rights." Public sentiment, however, early discouraged the custom,[3] and it died a natural death.

The first settlers, in accordance with southern practice, adopted the county rather than the town as the political unit.[4]

Ferry boat rates were fixed according to French and Spanish coins in use in St. Louis and New Orleans,[5] which were the chief markets of the region. Since most of the traffic was in that direction, newspapers were southern in their sympathies and political ideals southern in cast. Many of the homes were copied from southern styles and were not adapted to the northern climate.[6]

Later Settlement

Eastern Immigration

The overland teams seeking a shorter route via the Great Lakes marked a pathway for the eastern immigrants which in 1857 culminated in railroad connections. A stratum of eastern culture and ideals was thus superimposed upon the earlier southern one. By 1848, when the present Constitution of Wisconsin was drafted, radical changes had taken place. The easterner had by this time come in such numbers that the southern spirit, although still able to assert itself, was outvoted in the councils of the state by the eastern and agricultural element.[7]

These people, largely from New England and New York, had begun

[1] Davidson, J. N., Some distinctive characteristics of the history of our lead region: Wis. Hist. Soc. Proc., 1899, p. 194.

[2] A pioneer woman's story: Evening Wisconsin, February 20, 1897. (The "Pioneer Woman" was a daughter of Governor Dodge.)

[3] The wife of a minister in Platteville who had brought with her two slaves from Virginia moved to St. Louis with them because of the popular opposition.

[4] Holford, C. N., History of Grant County, p. 137, 1900.

[5] Rates for the toll ferry at Osceola fixed by the County Board of Grant County were as follows: 18¾ cents per person, 16⅔ cents per head of cattle, 4 cents per hog, 3 cents per sheep, "each carriage 8⅓ cents a wheel." The French and Spanish coins in circulation here "were of 6¼, 8⅓, and 12½ cents value, so that these ferry rates could be paid with them better than rates of five, ten, or twenty cents." Idem, pp. 41-42, 1900.

[6] Idem, p. 47.

[7] Campbell, H. C., Wisconsin in three centuries, 1634–1905, vol. 3, p. 30, 1906.

coming in numbers after the close of the Black Hawk War had removed the menace of Indian attacks and shown the agricultural possibilities of the mine region. Other factors had favored their migration westward, such as the opening of the Erie Canal in 1826, providing better transportation facilities, the use of the overland route[1] to the lakes for lead shipments, and the high prices paid by miners for foods. Too far from home to return for the winter like their southern neighbors, they found temporary shelter in dugouts in the hillsides and for this reason were dubbed "Badgers," after the burrowing habits of that animal. The receipts of the Mineral Point Land Office offer a clue as to the volume of this immigration and its growth. It will be seen that within five years, 1840–45, the sales were multiplied six times and in a single year, 1843–44, more than trebled.[2]

This eastern immigration into Southwestern Wisconsin was one of great significance for the later history of the region. Though in the rural communities today much remains that is suggestive of the earlier southern influence, the complexion and tone of politics and society have been completely changed. The intimate connection with the south was severed and sympathy with slave holding and states' rights no longer ruled public sentiment. During the Civil War a group in Lafayette County vigorously opposed the drafts, but the section on the whole was loyal to the Union cause.

The Swiss

As has been said, the character of the population in this part of the state is less foreign than any other section of Wisconsin. The reasons are apparent. Its position was one which invited immigration, not from foreign countries but from neighboring states to the south. When foreign immigrants did begin coming to Wisconsin, access was easiest to the eastern part of the state and the isolation of this southwestern region and its rough topography offered little inducement to agricultural settlers now that the market afforded by the mining population no longer existed. At various times, however, a few significant groups of foreigners have entered and settled in these counties. The coming of the Cornish, Irish, and Welsh miners has been described. In 1845

[1] Libby, O. G., Significance of the lead and shot trade in early Wisconsin history: Wis. Hist. Colls., vol. 13, pp. 293–334.

[2]
1840	$ 9,398.73
1842	7,743.28
1843	10,692.27
1844	33,634.18
1845	55,547.00

the first important Swiss settlement was made in northwestern Green County. The Gratiots of Gratiots Grove were of French-Swiss descent and a small settlement of Swiss from Selkirk's Red River Colony (Canada) had been made about 1830[1] in Lafayette County, but these groups left no noticeable influence on the history of the region. The settlement of the Swiss at New Glarus has, on the other hand, vitally influenced the economic life of that locality.

Mountainous Switzerland at best provides but a meager living for the farmer who for food supply must supplement what he raises by purchase of breadstuffs from the neighboring countries. It was their custom in Glarus to apportion all the land in the canton among the heads of families. As the population increased, this amount necessarily decreased. Living always on the edge of his resources, hard times or poor crops threatened the farmer with ruin. It was such conditions, poor crops and a business depression, which threw[2] many out of work in the factories and back to work on the farms, that prompted the migration from the canton of Glarus to this country in 1845. Agents sent in advance purchased 1,200 acres of arable land and of woodland, which was divided among the heads of families of the 108 immigrants who finally reached the place. Since the rough topography and green pastures were suggestive of their native canton, the new home was named New Glarus. The hardships of an unsettled and unfamiliar country faced the newcomers, but thrift and industry finally brought prosperity. The men at first helped eke out an income by working in the mines, the women by working from house to house. As they became better established on their farms and more familiar with soil and climatic conditions, they began to manufacture the cheese with which they had been familiar at home. Beginning in 1854, it was at first purely a domestic industry. Sixteen years later a factory was established, the industry gradually lost its domestic character, and soon assumed an important place in the economic life of the region. Cheese from here is sent to Great Britain and even to Switzerland itself, and Green County today ranks as the foremost foreign cheese manufacturing district in the United States.

The community grew slowly at first, but in the fifties the high price of wheat consequent upon the Crimean War attracted more of their countrymen to this section. The colony expanded from New Glarus

[1] Kellogg, L. P., The story of Wisconsin, 1634–1848: Wisconsin Mag. of Hist., vol. 3, p. 35, 1919.

[2] Luchsinger, John, The Swiss colony of New Glarus: Wis. Hist. Colls., vol. 8, p. 411 ff.

as a nucleus into neighboring towns in eastern Lafayette and western Green County. Today out of a total foreign born population of 3,836 in the latter county the Swiss make up 54 per cent and the Germans 25 per cent.

The Swiss who came here were the German-Swiss, speaking the German language. As is usually the case with agriculturists, especially those who have fought their way up from poverty, they are very conservative. Not until 1915 was a high school established in New Glarus, though for several years its population had exceeded that of many villages with four year high school courses.

The Germans

Of the German immigrants who have come into Wisconsin in such large numbers, comparatively few have settled in the southwestern counties. With their agricultural proclivities they found the southeastern part of the state more inviting, not only because of its superior accessibility, but also because of its better agricultural possibilities. There is, nevertheless, an appreciable sprinkling of Germans throughout the region, especially in Grant County. In 1851 a settlement of Germans was made at Lancaster[1] and three years later a group of masons and stonecutters settled in the town of Marion, Grant County.[2] In 1905 this county, out of a total population of 39,629, had a foreign-born population of 4,490, of whom 2,151 were Germans. In Lafayette County, whose total population was 20,277, 568 of the 2,876 foreign-born were German, and in Iowa County Germans made up 698 of the 3,417 foreign-born out of a total of 22,971. In other words Grant County had a foreign population slightly over 11 per cent of its total, of which nearly 50 per cent were German. In Lafayette and Iowa counties foreigners made up 14 per cent and 15 per cent respectively, of which 20 per cent in each case were German. In recent years there has been an appreciable immigration of persons of German origin from Iowa into the western towns of Grant County. The 1920 figures, however, show a decline both in per cent of foreign-born in this county and in per cent of Germans in the foreign-born (44 per cent), and in Lafayette and Iowa counties the percentage of foreign-born fell to a mark slightly above 9 per cent (9.3, 9.5 respectively) and the proportion of Germans declined to 19 per cent of this.[3]

[1] Levi, Kate E., Geographical origin of German immigration to Wisconsin: Wis. Hist. Colls., vol. 14, p. 384.

[2] Idem.

[3] The map on page 1141, vol. 3, of the Federal Census 1920, shows the low proportion of foreign-born in this area as a whole. (See fig. 21.)

EDUCATION

Private Schools

Private schools and educational institutions as well as others have been directly and indirectly influenced or modified by geographic conditions. The southern preference for private schools found expression in the establishment of numerous academies scattered throughout the region at Benton, Cassville, Hazel Green, Patch Grove, Sinsinawa, Tafton (the present Bloomington), and Platteville. That at Sinsinawa was founded in 1848 by Father Mazzuchelli, an Italian priest; during the Civil War it was deeded to the Dominican Sisters for the beginning of the present Santa Clara College.[1] The Tafton Collegiate Institute at Bloomington, which was then known as Tafton, was opened by a South Carolinian[2], and this little inland town at one time enjoyed an enviable reputation as an educational center. The lively and intelligent community spirit shown by the people of this village today no doubt reflects some of the influence of this early school. The Normal School at Platteville is a successor to the academy of earlier days which also owed its foundation largely to the influence of a southerner.[3] The Wisconsin Mining School was established at Platteville in 1907 as a response to the needs of the mining industry.

Public Schools

For years the public schools of the lead region received scant attention. This was due to (1) the presence of an illiterate mining population and (2) the influence of the southern element, which, as we have seen, did not favor this type of school. Here "was fought the battle of the public versus the private school—the east against the south."[4]

Salaries for male teachers in public schools ranged from $10 to $15 a month and women were remunerated at the rate of $1.00 to $1.50 a week. A report sent to the state department in 1846 showed the schools of the lead region in a "wretched condition, poorly housed and poorly taught."[5]

The first school in the region was the one previously mentioned in

[1] Whitford, W. C., Early history of education in Wisconsin: Wis. Hist. Colls., vol. 5, p. 349.
[2] Stearns, J. W., The Columbian history of education in Wisconsin: State Committee on Educational Exhibit for Wisconsin, p. 582, 1893.
[3] Major J. H., Rountree, Idem p. 579.
[4] Idem, p. 578.
[5] Whitford, W. C., op. cit., p. 348.

the home of J. P. B. Gratiot but was not public. In 1829 a private school was started in Mineral Point in an abandoned sod hut. Five years later it was moved to a new school house only a little less crude. The "blackboard" in this building consisted of two wooden troughs filled with dry sand and placed across two sides of the room. Upon the surface of the sand the pupils traced with their fingers their exercises which were erased by a sweep of the hand.[1] Since these first schools were maintained by private subscription, the children of the poorer families did not have the advantage of even such meager training as these institutions afforded.

The first public school in the region was one established at Mineral Point in 1837 at the expense of the village. When two years later a tax, the first tax for public school purposes, was levied, considerable protest was made against any burden being added for the schools and even then it was necessary to supplement with private subscription the amount appropriated for this purpose.

[1] Stearns, J. W., op. cit., p. 587.

CHAPTER III

TRANSPORTATION

In the days of exploration, fur trading, and mining, Wisconsin was most conveniently reached by two great natural water routes: the St. Lawrence–Great Lakes route and the Mississippi River. The Fox–Wisconsin waterway across the center of the state connects the two routes, thus making it possible to use one route or the other as circumstances dictated.[1]

Southwestern Wisconsin lies wholly within the Mississippi drainage basin. This region is so close to the divide between the two systems, however, that its communication with the eastern United States has been changed from one route to the other without great difficulty. Eventually water transportation was abandoned for rail haul.

Fox–Wisconsin Waterway

Of these two water routes giving access to the region, the St. Lawrence–Great Lakes was of earlier importance. Down this waterway in 1673 came Joliet and Marquette, trader and priest. From Lake Michigan they followed the Fox–Wisconsin and thus opened a new route, in some respects the best of the many leading from the Great Lakes to the Mississippi, and for 150 years members of their calling followed in their wake.

Mississippi Waterway

For the quarter of a century following the close of the fur trade in 1825 the production and transportation of lead and shot played the major role in the commercial development of this part of the state. The change in the character of the chief commodity and in the place of its production served likewise to change the main trade routes. The Fox–Wisconsin, though obstructed by rapids, portage, and sand bars, was on the whole fairly satisfactory for the canoe or bateau[2]

[1] During high water the Fox and Wisconsin were joined by waters covering the mile and a half of marshy divide so that canoes could pass directly from one to the other. Thwaites, R. G., Wisconsin, p. 7, 1908.

[2] The bateaus were 25 to 30 feet long and were rowed by four to ten men.

loaded with furs, which are compact and light but of relatively high value. Lead, on the other hand, is cheap and heavy, and requires larger boats for its transport. Because of its concentration in the extreme southwestern part of the state, it at first depended mainly upon the Mississippi route.

This river has the same disadvantages for navigation as has the Wisconsin, but its larger volume makes it much better suited for freighting. Flatboats and keel boats, the latter a form of flatboat modified by the addition of a keel, were used at first. As lead was cheap, the down-river tonnage relatively larger than the return cargo, and the journey up-stream difficult, most of the boats were broken up and sold for lumber at New Orleans.

These slow and cumbersome boats were soon displaced by the river steamer. A trial lead shipment from Galena in 1822 showed its superiority and the change in craft followed rapidly. Within five years a regular line of steamers ran between Galena and St. Louis and one year later (1828) there were 99 steamboat arrivals at Galena as compared with 74 keel boats. The shallow draft of these boats gave such places as Galena, Potosi, Paris, and Muscoda the rank of river ports. The latter was at one time reached by weekly steamboat service on the Wisconsin River.

Along with the growth in tonnage on the Mississippi came increased difficulties in river transportation. The peak of lead and agricultural production was reached in late summer just when water was lowest and the boatmen were forced to portage about the rapids at the mouth of the Des Moines River and again above Rock Island. With the increase in acreage of cultivated land, there was a more rapid run-off and filling of the stream channels with sediment. (See figures 17 and 18.) These difficulties, and those caused by the ice in winter and the ever-present snags, bars, and shifting channels made the Mississippi route a decidedly unsatisfactory one. Figure 19 shows the Mississippi flood plain between Cassville and Potosi station. The major part of the plain is occupied by lagoons and a network of interlacing channels. The general appearance varies greatly, of course, with the seasons of high and low water.

Improvement of the Fox–Wisconsin Route

Various expedients were tried in an effort to solve the transportation problem. An agitation for the improvement of the Fox–Wisconsin begun in 1829 bore no results for twenty years. By 1850 the state had

built locks in the lower Fox, cut a canal at Portage, and done some dredging. The lower Wisconsin, however, presented formidable difficulties and prevented any extensive use of the through route. Major G. K. Warren, after an exhaustive investigation for the federal government, reported in 1876 that the improvement of the Wisconsin River was impracticable. The Fox is still used to a considerable extent, but the Wisconsin is practically unused except by occasional pleasure launches.

Overland Transportation

A second solution of the difficulty was attempted in hauling the lead overland to Lake Michigan. As early as 1836 an ox team with a load of lead from the Rock River was seen in Racine.[1] By 1841 an average of three or four teams arrived in Milwaukee daily.[2] They required from eight to ten days to make the journey of 150 to 200 miles.[3] In summer the oxen depended upon pasturage along the way. The freight rate for the trip varied for this reason from 50 cents per hundredweight in summer to $1.00 in winter. From Milwaukee to New York the charge per hundred pounds was 50 cents and the total charge via the Great Lakes about $30 per ton as compared with $40 via the Mississippi–Atlantic route.[4] Furthermore, the time required for the miner to get returns from his shipment was reduced by one-third. The returning teams brought back merchandise, chiefly lumber, salt, and machinery. The two main overland routes were the one via Janesville to Racine, the other via the Military Ridge to Madison and Milwaukee. Eventually a stage line using the latter route was established for mail and passengers.[5]

Though the overland movement grew steadily, the actual proportion of the total lead output going to Milwaukee was necessarily small,

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[1] Libby, O. G., Significance of the lead and shot trade in early Wisconsin history: Wis. Hist. Colls., vol. 13, p. 314, Footnote.

[2] Idem, p. 317.

[3] Evans, J. H., Some reminiscences of early Grant County: Wis. Hist. Soc. Proc., 1909, p. 237.

[4] Libby, O. G., op. cit., p. 317.

[5] "Coaches left Galena—twenty-five miles away—in the morning, arriving at Platteville about nine or ten o'clock, and reaching Madison about ten o'clock that night. The old ridge road was followed. We struck the military road at Dodgeville, and proceeded over it to Blue Mounds, and thence to Madison. . . . The firm issued regular time tables and kept pretty well to their schedule. Another line of stages went to Milwaukee by way of Janesville. When going from Platteville to Chicago, the coaches first went to Galena." Evans, J. H., op. cit., pp. 236-237. See also Libby, O. G., Significance of the lead and shot trade in early Wisconsin history: Wis. Hist. Colls., vol. 13, p. 314.

probably never over 10 per cent. The physical limitations of such a route were too great to make it a serious competitor of the Mississippi in spite of the disadvantages of the latter.

As the difficulty of hauling the growing lead output increased, still other solutions of the transportation problem were suggested. One was a canal from the Rock River to Lake Michigan, a second, a plank road joining the Mississippi and Milwaukee, a third, a railroad across the state.

Railroads

The completion of the railroad from Milwaukee to Prairie du Chien in 1857 finally solved the difficulty. It was originally planned to tap the Wisconsin steamboat line at Arena and then turn southwest so as to have the western terminus in the lead region at Potosi as shown in figure 23. Thus the road would serve both the rising grain traffiic which came to eastern markets via the Mississippi and Wisconsin and the lead of the southwest.

The change in this plan was due mainly to two considerations: (1) the great economy of building on the flat valley bottom of the Wisconsin River as compared with the extremely rough topography between Madison and Potosi, and (2) the growing prominence of agricultural produce, especially wheat, while the lead production was rapidly declining.

The peak of lead production and of the Mississippi trade was reached in 1847, the year in which the railroad was chartered. Down-river traffic practically ceased with the completion of the line to the Mississippi in 1857. The real death blow to the river traffic in lead had, however, come three years earlier with the completion of the Chicago–Galena railroad.

The beneficial effects of the Milwaukee and Mississippi road were much more pronounced for Prairie du Chien and other river towns than for cities like Madison without a water competitor. The wheat rate to Milwaukee from Madison was five to six cents higher per bushel than from Prairie du Chien, though the latter was twice the distance.[1] In fact, the rates from the towns off the river were just enough lower than the charge for wagon haul overland to eliminate the latter as a competitor. The struggle over freight rates continued until wheat growing was abandoned for the production of more concentrated products.

[1] Wisconsin State Journal, April 23, 1863, Madison, Wisconsin.

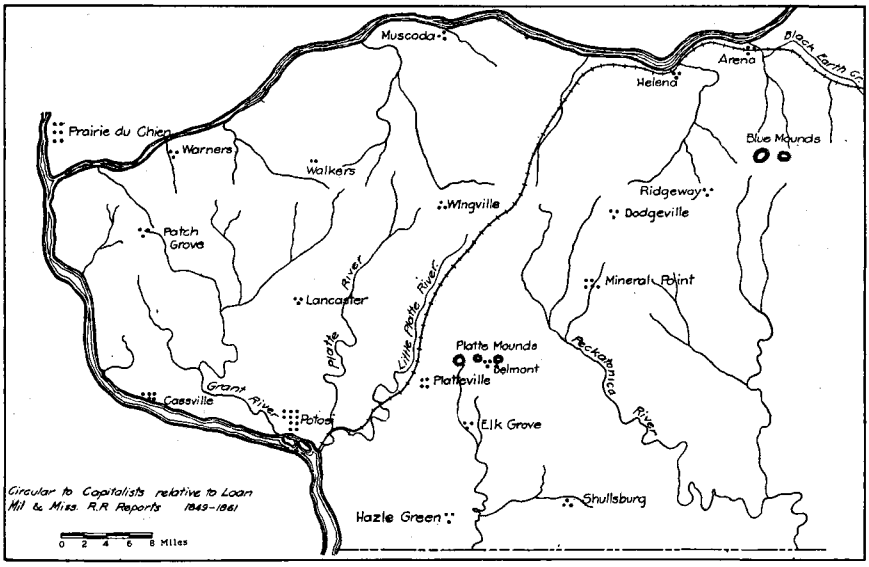

FIGURE 23. Proposed route of Milwaukee and Mississippi Railway, 1850.

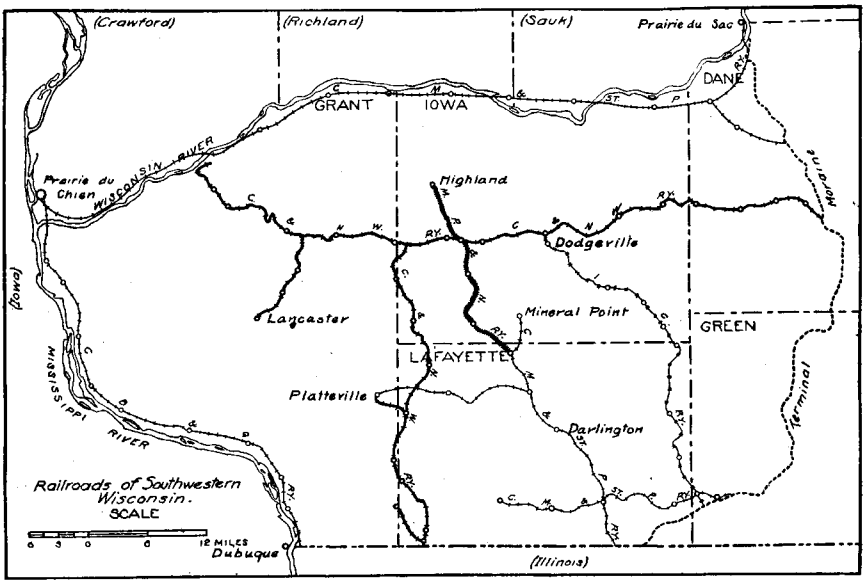

FIGURE 24. Railroad map of southwestern Wisconsin. From official railroad map of Wisconsin, 1916.

The railroad network in Southwestern Wisconsin (fig. 24) shows the Military Ridge traversed by the Chicago & Northwestern and the two valley routes, the Wisconsin and the Mississippi, occupied by the Chicago, Milwaukee & St. Paul and the Chicago, Burlington & Quincy, respectively. The Chicago & Northwestern is said to have the longest stretch of railroad in the state without a bridge over a stream. The two valley roads because of their marginal position and relative inaccessibility are of less importance to this region than the Chicago & Northwestern. The rest of the mileage consists for the most part of short branch lines running at right angles to the Military Ridge.

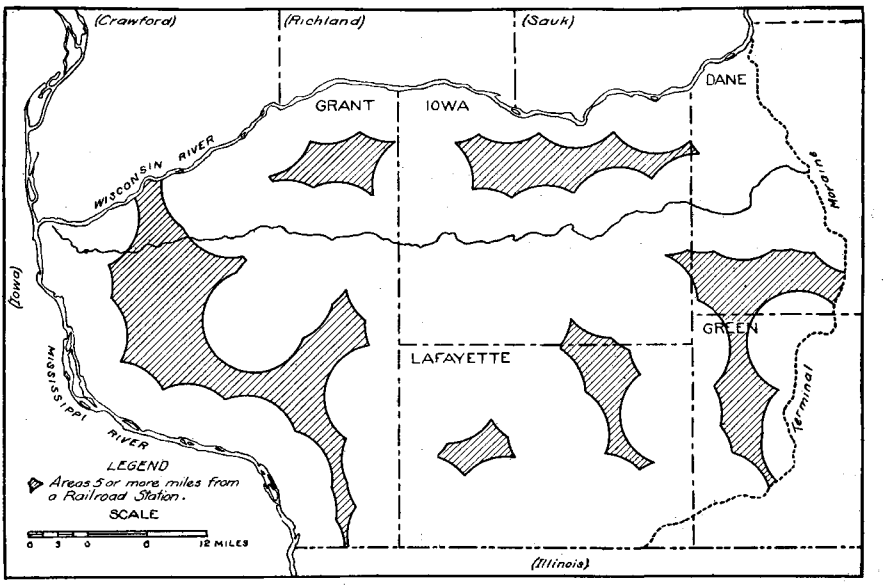

FIGURE 25. Map showing districts five miles or more removed from a railroad. From official railroad map of Wisconsin, 1916.

Although railroad building was begun comparatively early, over 500 square miles of the region still lie five miles or more from a railroad station. Bloomington, the largest inland village in the state is twelve miles from a railroad station and in pre-war times paid a passenger fare of $1.00 and 15 cents per hundredweight for freight on heavy commodities like coal from the station to the village. At this rate places on the margin of the shaded area shown in figure 25 paid an extra charge of $1.25 per ton on freight in addition to that imposed by the railroad. This added cost increases, of course, with the distance from the margin.

Because of the geographical location of Southwestern Wisconsin with relation to the great transportation centers of Chicago and the Twin Cities, one would expect it to be in the line of the great transcontinental routes. As a matter of fact, an air-line from Chicago to St. Paul passes between Arena and Mazomanie. With the exception of the Chicago, Burlington & Quincy, however, no main line from Chicago to St. Paul crosses the area. The latter line, it may be added, is used but little by this region. No city is on the line. Cassville, the largest

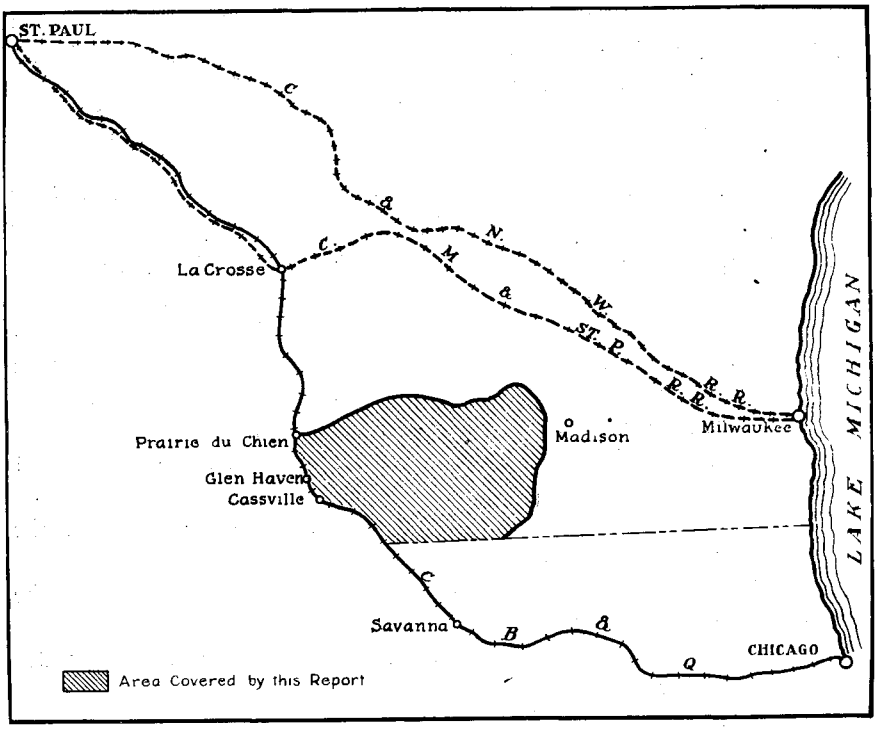

FIGURE 26. The main traffic routes to the northwest from Chicago avoid southwestern Wisconsin.

village on it, had in 1920 a population of 899. Thus topography has ruled that not only must this section of the state be handicapped in its local transportation, but that as a whole it should repel rather than invite the great trunk routes. The natural pass for such a route, the Wisconsin River valley, is transverse to the direct line between these two important commercial centers of the Middle West. As a result the railroad service in this part of the state will doubtless always be

that typical of branch lines, second rate rolling stock and limited accommodations in general. The early importance enjoyed by the Mississippi as an agency in the concentration and distribution of the produce of the Upper Mississippi Valley and the promise of a profitable traffic in the products of the mines and farms of the region traversed furnished the impetus necessary for the building of the railroad to the Mississippi. With the decline in the importance of the river as a transportation route and the location of the great transcontinental lines from Chicago to the Pacific via Minneapolis along better topographic paths, this section of the state was left an island in the stream of that traffic with the current sweeping by on both sides. How this section is avoided by these great lines is apparent from figure 26.

Highways

The rough topography has similarly placed a heavy handicap upon Southwestern Wisconsin in the construction, maintenance, and use of its highways. (See figures 27 and 28.) In general the roads do not utilize the river valleys or the ridges as much as one would expect. Two notable exceptions to this generalization are found in the flat Wisconsin Valley, and on the Military Ridge and a few of its southward branching spurs. The ridges are usually too discontinuous. The valleys as road sites present a variety of problems.

(1) The best agricultural land is often there and considerations of economy would place the road on the slope.

(2) The winding course of the valley may make the length of the road excessive.

(3) If the stream within the valley swings from side to side, the expense of bridging is excessive.

(4) Floods frequently wipe out a valley highway or at least render it impassable for a time.

How serious these objections are may be seen in figure 29. This shows graphically the utilization of the flood plains of the rivers of the region, not including that of the Wisconsin. The Mississippi shows the greatest use, but even there it is only about 50 per cent. As indicated, the average for all is only 25 per cent. Figures 30 and 31 show how local conditions may affect markedly the utilization of valleys for roads. In figure 31 a large proportion of highways occupy narrow valleys. This is a portion of the escarpment slope. The gradient from the Military Ridge to the Wisconsin flood plain is steep and the only practicable approach is via the tributary valleys. Figure 30 for the

FIGURE 27. The Narrows Road in the town of Cassville, Grant County.

most part shows a dissected upland where the selection of road sites is open to greater choice. Here the factors mentioned as favoring roads on slopes have full play. Where, as in the extreme southwestern portion of the map, the Mississippi flood plain is to be reached, tributary valleys are utilized.

In construction costs certain items due entirely to a rough topography show a much greater expenditure per mile of road than in adjacent counties where the relief is much less. To illustrate, we may compare the counties of Grant, Iowa, and Lafayette, which include almost all of the region discussed, with Rock, Columbia, and Jefferson, the nearest counties to the east which have been wholly glaciated, in selected items

FIGURE 28. View of Sandy Hook Road. Figures 27 and 28 are from the Third Biennial Report, Wisconsin Highway Commission.

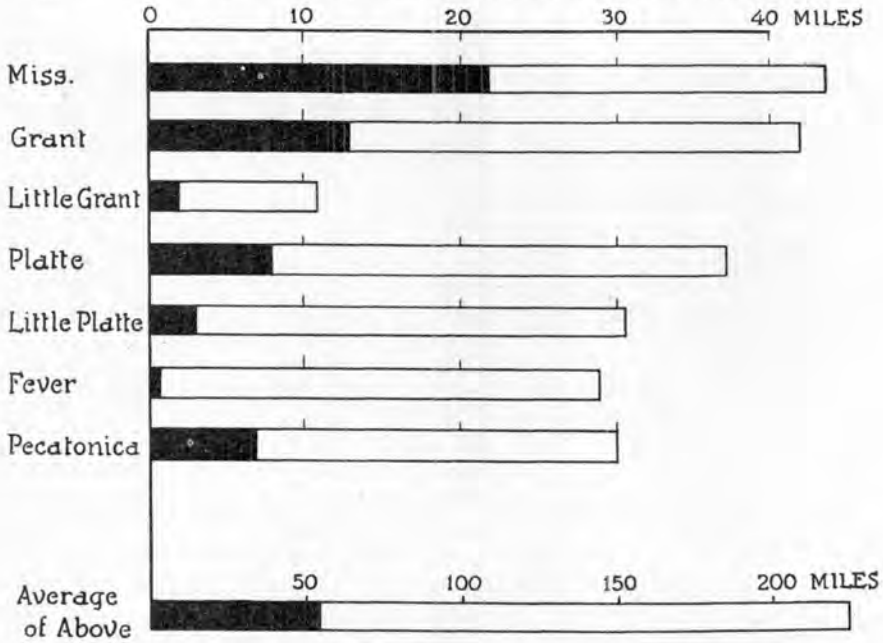

FIGURE 29. Highway utilization of valleys. The whole bar represents the total length of flood plain of rivers, the shaded portion the part of the flood plain occupied by highways. Even the larger valleys are little used for highways.

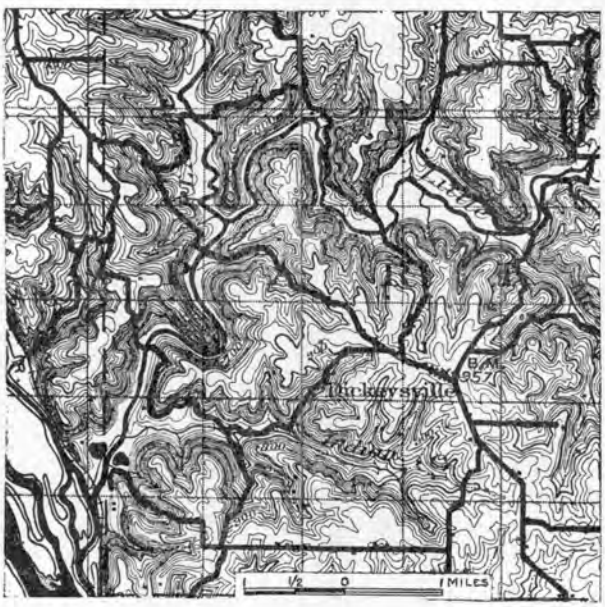

FIGURE 30. Topographic map from southern Grant County. Highways make but little use of the large stream valleys.

which bear intimate relations to topography, such as the cost of (1) survey, (2) grading, (3) bridges and culverts, and (4) guard rail. It is found that on state aid highways built from 1914 to 1917 there is a difference in construction cost in the items named averaging $1,531.73 per mile of road. This is added cost due not to materials being more expensive, but to greater mileage of guard rail, more bridges, more grading, and difficulty in surveying. For the total mile-

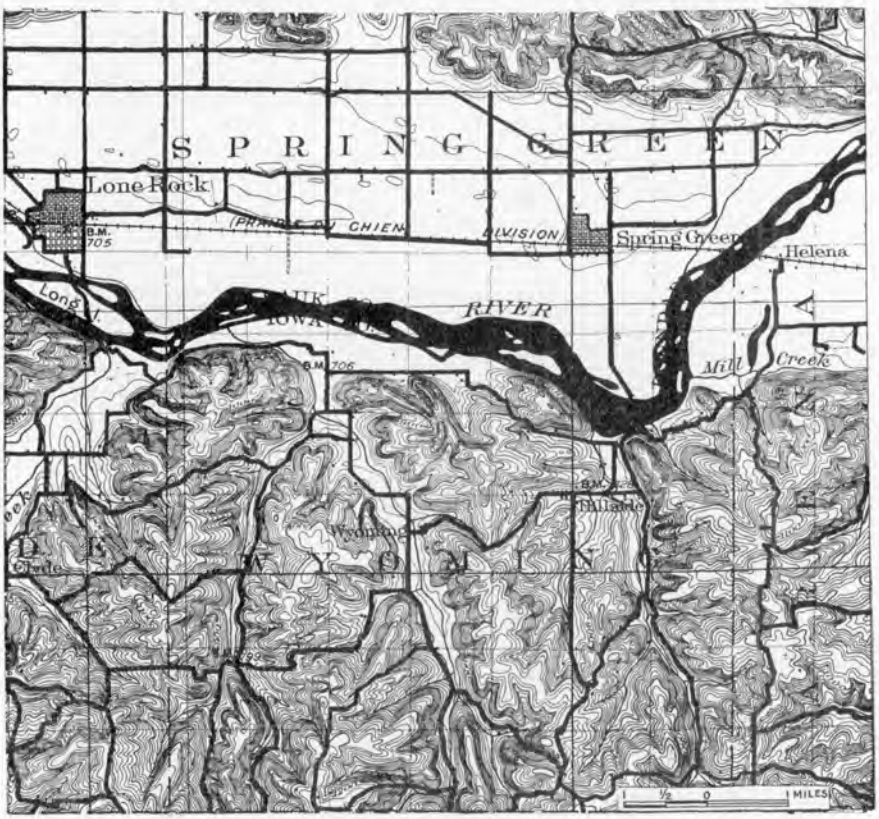

FIGURE 31. Topographic map of the Wisconsin River valley and a portion of the escarpment near Lone Rock and Spring Green. The escarpment highways leading to the Wisconsin Valley must use the tributary valleys. Contrast the pattern of these highways with the rectangular pattern in the Wisconsin Valley.

age built during the four years in the rougher counties this would total almost $25,000.[1]

[1] Computation based upon data from the Third and Fourth Biennial Reports of the Wisconsin Highway Commission, December, 1916, and December, 1918, Madison, Wisconsin.

The scarcity of gravel in this region has resulted in a large proportion of the roads remaining unsurfaced. Of the 202.6 miles of state aid road constructed from 1912 to 1917 about two-thirds (65 per cent) were not hard surfaced. Crushed stone macadam formed almost three-fourths of the surfaced mileage. The glaciated counties named above built in the same period over twice the mileage and hard surfaced over nine-tenths of the total. Gravel was used for almost two-thirds of the surfacing. The above is shown graphically in figure 32.

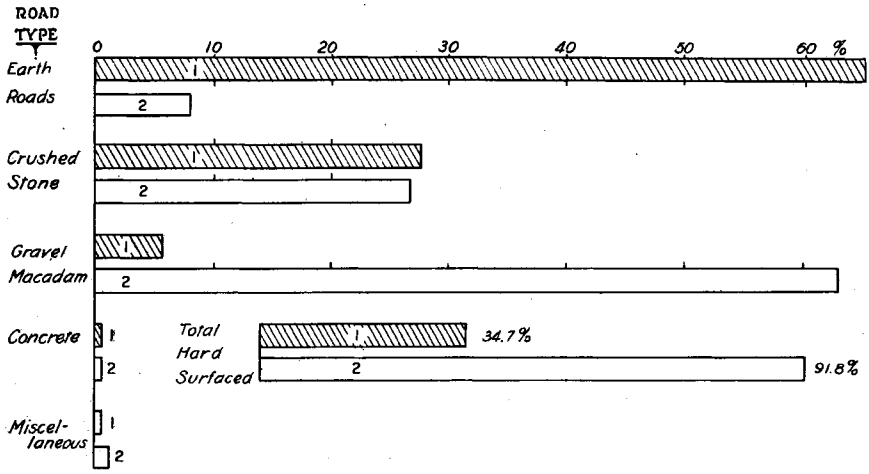

FIGURE 32. Road types constructed under the state aid law, 1912-1917 inclusive. Shaded bars represent roads constructed in Grant, Iowa, and Lafayette counties (driftless), unshaded bars represent Columbia, Rock and Jefferson counties (glaciated). Note the large proportion of the first group having earth roads (but 34.7 per cent hard surfaced) and the large proportion (91.8 per cent) of surfaced roads in the second group.

Important as is this excessive initial cost, it is, of course, in the time and energy required to transport goods over such inferior roads and in the high cost of maintenance of the highways that the chief disadvantages lie.

Further contrasts between glaciated and unglaciated districts may be seen in the type of road patterns. The topography of Southwestern Wisconsin makes a rectangular road pattern over much of its surface impossible. Where flat areas are found, as indicated in figures 10 and 31, the rectangular plan is used. As a rule, however, the crooked roads of this region give a more direct route than the rectangular pattern of a level region.

CHAPTER IV

MINING

Of the three periods in the history of the southwestern part of the state, the last two are by far the most important. In the first of these two periods mining was the main industry measured both by value of output and by the number of people to whom it furnished employment. By the close of the first half of the nineteenth century the mineral industry, which had been declining rapidly, had yielded first place to agriculture. The dominance of the latter has become more secure with each succeeding decade.

These two industries have been the only ones of consequence within the region and each has been affected quite differently by the various geographical conditions surrounding it. Thus the rough topography, which is a most serious handicap to the farmer, was to the miner an actual advantage because it exposed the ores.

Origin of the Ores

The origin of the lead and zinc ores which are mined in this region dates back to the time when the rocks in which they are embedded were formed. In geological ages long past this region, like much of the rest of Wisconsin, was under the sea and far to the north there was dry land. As the rocks on the land above sea level were weathered, fragments from them were carried and spread out over the sea floor. Along with the sand, lime, and clay thus transported were particles of other minerals, particularly of zinc and lead. These came to be incorporated into the thick sediments which later became the sandstones, limestones, and shales. When through crustal movements the sea bottom was elevated and became dry land, these minerals remained as fine particles disseminated throughout the rock mass. Ground water circulating through the rocks picked up the zinc and lead and redeposited them in cracks and crevices principally in the Galena limestone formation. During the long period in which this concentration was in progress, the rock layers overlying the Galena were stripped off by erosion and carried away, and the Galena limestone, enriched by these valuable

minerals, was left at the surface of much of the region. Before erosion had removed its upper layers the Galena limestone in this part of the state averaged about 250 feet in thickness. As the Galena is the ore-bearing formation, it follows that most of the mines are less than 200 feet deep.

Commercial Ores

The ores of economic importance occurring here are the lead sulphide or galena, the only lead ore of consequence, and zinc sulphide, known locally as "zinc blende," "blende," or "jack," which is the principal zinc ore. Zinc carbonate, sometimes called "drybone," though formerly important is now mined only on a very small scale. Though both zinc and lead are found throughout the Galena limestone and to some extent in other adjacent formations, the bulk of the lead produced has been from workings above the water table, the most of the zinc from below. As zinc carbonate is commonly found above as well as below the water table, in the first days of zinc mining before the problem of water in the mines had been solved, it was the more important of the two zinc ores of this section. The sulphide has, however, long since superseded it as the main source of zinc here. In 1918 it furnished 98 per cent of the zinc production of Wisconsin. In general the crude zinc ores of this state are of low grade. In 1918 the recovery was only 2.1 per cent of zinc metal. From 40 to 50 per cent of the zinc is lost in the various milling and smelting processes. The actual metal content of the crude ore according to six tests made in 1914 was 4.7 per cent.

Lead Mining

Although some lead mining and smelting after a crude fashion were done by the Indians in the first two decades of the nineteenth century, up to 1822 mining was purely incidental to the fur trade. The few white miners, including Dubuque, were primarily traders. They accepted lead to satisfy the Indians' debt or to provide ammunition for the hunt. Mining operations of both French and English previous to this date were for the most part outside of what is now Wisconsin. Exploration of the deposits by Americans was delayed by the hostility of the Indians, who, influenced by French and British traders, looked upon the "Yankees" as especially undesirable intruders. As early as 1807 the Federal Government had arranged to take over the

mineral region and lease the lands to settlers.[1] Under this arrangement, however, the first lease was not taken out until 1822 and two years later the first mines within the limits of Wisconsin were opened at New Diggings, Lafayette County. In the same year this was followed by the first mining settlement in Grant County, at Hazel Green. Within the next three years mines were opened in all parts of the lead region. Recurring Indian troubles retarded occupation until after the subduing of the Winnebagoes in 1827, when a rush of miners laid the foundations of Dodgeville, Platteville, and Beetown. The main part of the agricultural element did not come in until after 1832. The population of the lead region grew with almost unheard of rapidity, from 74 in 1823 to 10,000 in 1828, the greatest movement occurring in the last year.

Lead mining was in these early days an exceedingly simple operation carried on largely by individuals, often in conjunction with farming. During the slack season in agriculture the farmer could employ his time in raising "mineral", a ready "money crop", which would supplement his income from the farm. By 1843 most of the mining in the district was in the hands of chartered companies, though the lone operator working his own pit may be found in some sections even today. As is to be expected, these first mining operations were carried on in the beds that were above the water table to eliminate the necessity of pumping, which required more of an investment and for which efficient machinery was not then available. In some cases, however, where the extent of the ore body seemed to warrant, pumps operated by horse power were used.

The lead or "galena" was close to the surface and actually outcropped in many places upon the hillsides and ravine slopes. Loose pieces, or "float" as they were called, were often found strewn about on the surface of the ground, and served to direct the prospector to the hidden lode. Usually test pits were dug to examine the deposit and in some localities the whole surface came to be "pock-marked" with these excavations. From these shallow pits the ore was raised by means of a hand windlass. The crude Indian furnace, by which only a small part of the metal was recovered, speedily gave way to more

[1] Previous to 1846 land known to contain mineral was not subject to entry and purchase as were the agricultural sections. It could be leased from the government, the miner paying a part of his "diggings" as rent. Up to 1830 this was ten per cent; from then to 1846 six per cent. After 1846 the leasing system was abandoned, and the mineral lands were thrown open to sale on the same terms as other tracts. Kellogg, L. P., The story of Wisconsin, 1634–1848: Wis. Hist. Colls., vol. 3, p. 36, 1919.

effective types. The reverberatory furnace introduced from England was constructed of stone with an iron oven built into the side, into which the ore was put. The Scotch hearth furnace, a further improvement, was used exclusively after 1866. This type of furnace recovered about two-thirds of the metal from the ore. The oven was placed beneath an immense chimney, thirty or thirty-five feet high, and a bellows operated by water power furnished the draft. The Scotch hearth furnace was more economical of both fuel and time, for it required from six to twelve hours for the completion of a single charge. Huglett's furnace, which was one of this type, smelted 4,000,000 pounds of lead in one year. With increased settlement and improvements in smelting processes furnaces sprang up all through the mining region and Wisconsin in 1840 had 49. (See fig. 33.) When possible they were located on the streams to facilitate the shipping of the "pigs" and, where there was not a sufficient wood supply near at hand, to make it easier to secure the logs required for fuel. To these furnaces or smelters the miner hauled his ore and from them went the "pigs" to one of the river ports whence they were shipped to St. Louis or New Orleans. In this traffic Galena on the Fever River was for a long time the most important distributing and concentrating center for the lead region.

A shot tower built into the bluffs of the Wisconsin at Helena in 1833, opposite the present site of Spring Green, operated with some interruptions until 1861.[1] Eventually three lead pipe and sheet metal factories at St. Louis and Buffalo served to absorb a part of the lead output.

The peak of the lead production of the Upper Mississippi Valley was reached in 1845 with an output of about 24,300 tons of lead metal. The rapid decline—50 per cent in five years—which came after 1847 was due to several causes:

(1) The richer and more accessible ores had been mined and those remaining could be worked only by elaborate machinery, which meant large scale operations requiring expenditures beyond the means of the average individual miner.

(2) The California gold rush drew off many of the miners—in some places over one-half the population.

Among other factors of lesser importance were the difficulty of separating the then worthless zinc ore which was found mixed with the

[1] See Wis. Hist. Colls., vol. 13, pp. 335–374, also Campbell, H. C., Wisconsin in three centuries, 1634–1905, vol. 2, p. 272, 1906.

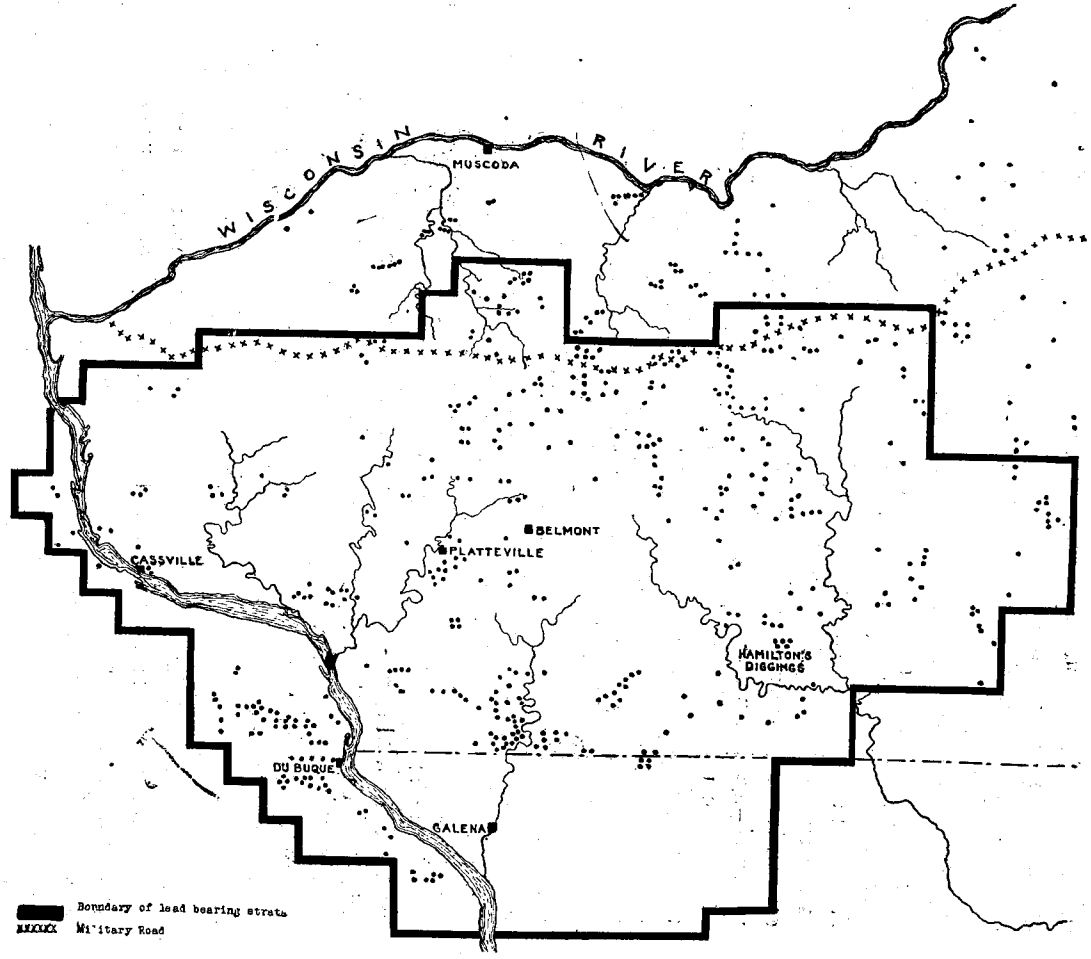

FIGURE 33. Map of Lead Region (after Owen). Courtesy of the Wisconsin Historical Society.

lead in larger quantities as the mines deepened, a tariff reduction on lead imports which temporarily lowered the price of ore, and the drawing off of labor for various public improvements such as railroads.

The story of the rise and decline of lead production is indicated graphically by the production curve in figure 34. The spectacular rise and almost equally sharp decline from the peak years of 1845–47 are shown to have been followed by a small output which continues to fluctuate year by year.

With the exhaustion of the richer lead mines and the increased demand for zinc, the lead came eventually to be mined only where it occurred above or with the zinc ores—that is, as a by-product of the zinc. An examination of figures 34 and 36 shows a marked resemblance in the curves of production since 1905. A large output of zinc is accompanied by a corresponding increase in the production of its by-product—lead. On this basis, the lead industry has and will probably continue to put out each year a small quantity of metal—four to five thousand tons—but its place among the important industries of the section has been lost. Up to 1905 there had been in the entire Upper Mississippi Valley lead region a total production of about 611,975 short tons of lead valued approximately at $50,000,000, the bulk of which came from Wisconsin. In 1918 there were produced 4,533 short tons having a value of $643,686 at the period of high lead prices. This was 0.7 of one per cent of the production of the United States for that year. Over one-half of the Wisconsin production came from the Benton–New Diggings district. Figure 35 shows the relative production of different parts of the lead district. The long axis of the district almost coincides with the eastern Grant County line. Compare this with figure 37. By 1920 the output had dropped to 2,547 tons, and Wisconsin held eleventh place among the lead producing states.

Zinc Mining

As previously intimated, the zinc ores, where they were encountered in the mining of lead, were at first looked upon not only as useless, but as an actual impediment to mining operations. This attitude resulting in the much later development of the zinc ores may be attributed to a variety of circumstances.

(1) Zinc was not so useful a metal at that time.

(2) It lay deeper and was therefore less accessible.

(3) Being deeper, usually below the water table, its mining necessitated expensive pumping.

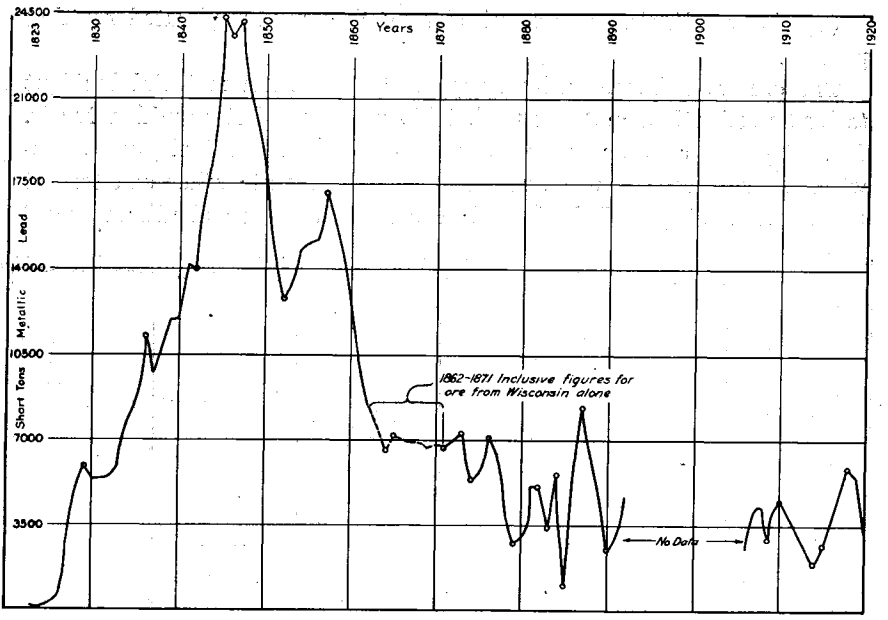

FIGURE 34. Curve of lead production of the Upper Mississippi Valley, 1823-1920. Unpublished thesis, Mrs. E. J. B. Schubring, University of Wisconsin, 1920.

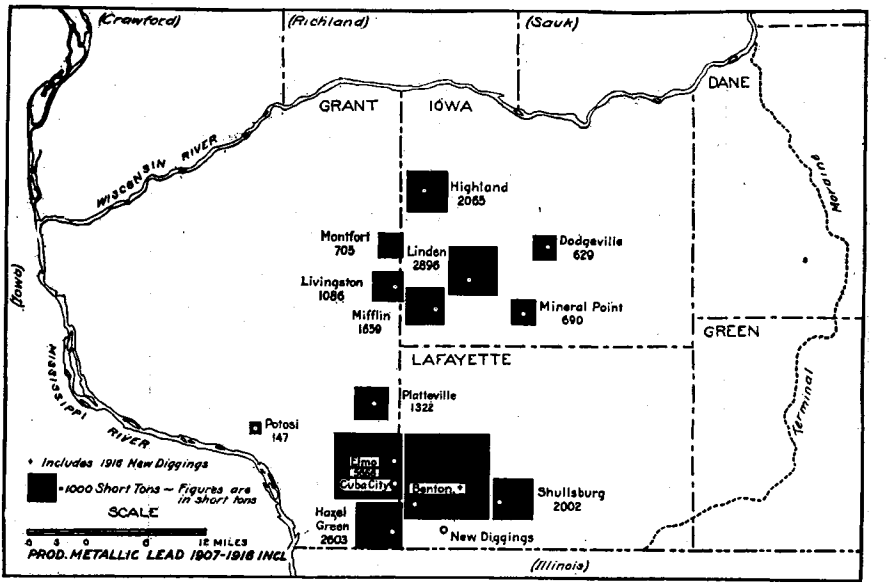

FIGURE 35. Lead production in southwestern Wisconsin, 1907-1916. Unpublished thesis, Mrs. E. J. B. Schubring, University of Wisconsin, 1920.

(4) Above all, zinc ores required a much more complicated refining process.

The ore was, therefore, long regarded as a waste material incident to lead production, and not until 1860 was a market provided for it. In that year a smelter began operations at LaSalle, Illinois, and somewhat later a furnace was opened at Mineral Point; other smelters at Peru and Waukegan, Illinois, and even so far distant as Indiana served

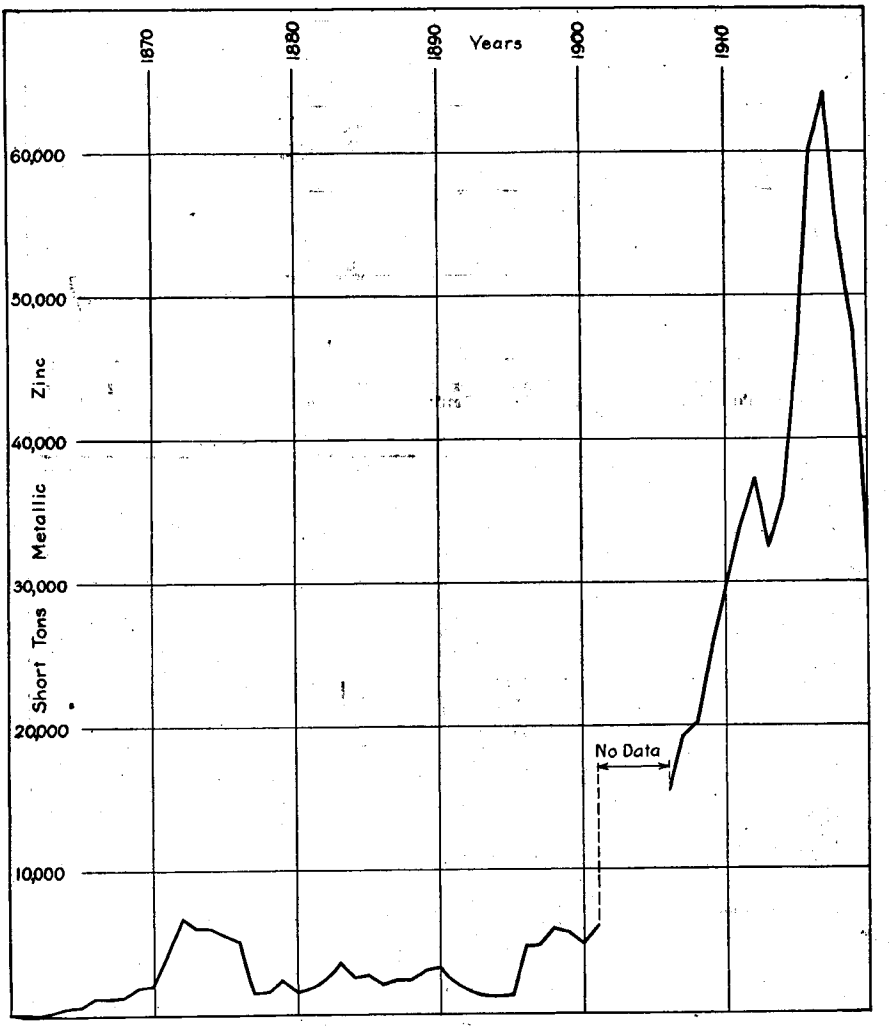

FIGURE 36. Curve of zinc production, 1860-1920. Data, 1860-1901 from unpublished thesis, O. C. Gillett, University of Wisconsin, 1911; 1907-1920 from Mineral Resources of the United States.

to stimulate further production. In 1860 there were produced in Wisconsin 160 tons of zinc metal, but prices were low (from $3 to $8 per ton for carbonate ores and $4 to $12 for blende). The carbonate ores being the nearest to the surface were naturally the first ones mined. When they had been worked down to the water table, the industry became for a time relatively inactive until it became profitable to mine ores where pumping was necessary. This was possible by 1900 when higher prices were caused by the increased demand for zinc, and Wisconsin speedily became an important producer of that metal.

The production curve for zinc, figure 36, shows the small output up

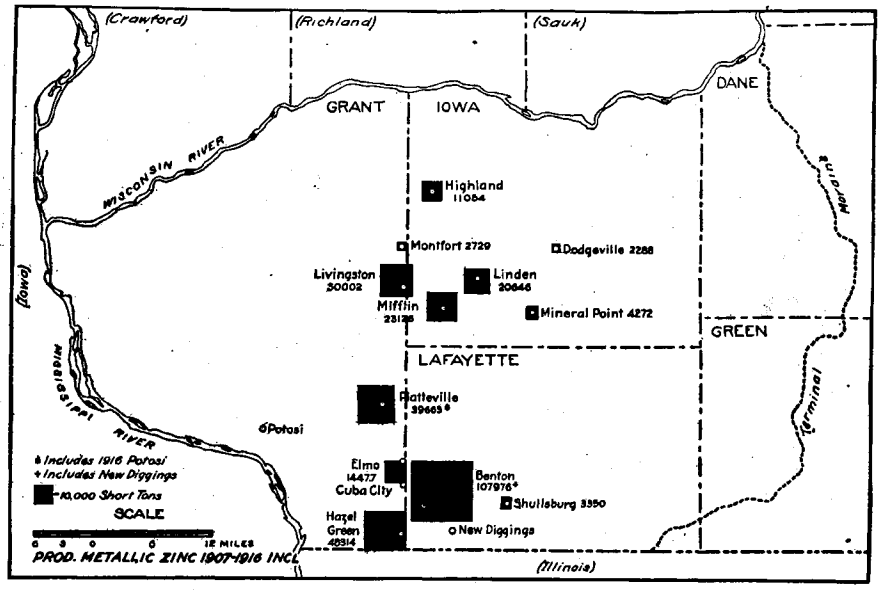

FIGURE 37. Zinc production in southwestern Wisconsin, 1907-1916. Unpublished thesis, Mrs. E. J. B. Schubring, University of Wisconsin, 1920.

to 1900 followed by a sharp rise which resembles that of lead sixty years earlier.

As would be expected, the distribution of productive areas, shown in figure 37, is essentially like that of lead except in quantity of ore output.

With the exploitation of these deeper zinc ores, mining operations were placed upon a different basis. The more expensive equipment required an investment which the average small operator or company was unable to meet; operations were henceforth prosecuted almost ex-

clusively as large capitalistic enterprises using modern power machinery for mining and milling.[1] The low grade of Wisconsin zinc ores —the crude ore in 1918 averaging a yield of 2.1 per cent zinc metal— necessitates elaborate concentrating processes to bring the percentage of metal up to commercial standards. Refining, therefore, has become the most important branch of later day zinc production. Thus the Mineral Point Zinc Company's works alone represent an outlay of approximately $6,000,000.[2] (See fig. 38.) The difference in scale of operations is shown by the difference in output of the two metals, the

FIGURE 38. Plant of the Mineral Point Zinc Company.

peak year of zinc production shows about 2½ times the tonnage of the lead during its boom days.

Most of the zinc mines are further developments of old lead mine shafts; the location of new ore bodies is determined by drilling. The deposits are not in extensive beds, but occur in patches, separated by barren or semi-barren areas. The mining privileges are usually secured by leases, the area leased varies from five to forty acres and the owner of the land receives a royalty of 10 to 15 per cent.

The zinc industry like the lead has been exceedingly erratic—"boom-

[1] Of the 160,000 tons of sphalerite concentrates treated at roasting and operating plants in the Upper Mississippi region in 1918, 80 per cent were handled at three plants.

[2] Lewis, J. H., Wisconsin State Journal, December 29, 1919, Madison, Wisconsin.

ing'' one year and dull the next. It possesses this characteristic to a higher degree than do most types of mining. During July, 1919, for example, 60 per cent zinc concentrate brought above $60 per ton, and in the autumn of the following year it sold for less than half that price. At the most prosperous period of this industry—during the world war and to the middle of 1920—it is estimated that there were fifty to sixty active mines employing a total of about 5,000 men, and that the capital invested in power, mining and milling, and ore separating plants was not less than $10,000,000.

Up to 1905 the total output of zinc ore in the whole Upper Mississippi region was estimated at 450,000 tons valued at approximately $10,000,000. The figures for 1918 suggest the stimulus given the industry by the war; in that year Wisconsin alone produced 50,014 short tons of metal valued at $9,102,548. This was slightly over 10 per cent of the total production of the United States, and Wisconsin ranked third among the zinc producing states of the United States. As was true in the case of lead output, the Benton–New Diggings district accounted for half the total. By 1919 the production had decreased almost 30 per cent and in the next year experienced a further decline of 24 per cent. At present (spring of 1921) the industry is suffering from the most extreme depression it has ever known. Low prices of zinc and the competition of the richer fields of Oklahoma and Butte have closed practically all of the mines.

CHAPTER V

AGRICULTURE

Unlike most mining regions the lead and zinc district of Southwestern Wisconsin is also well suited for agricultural production. The latter was not, however, the chief attraction during the early period of settlement. Just as mining before 1825 was incidental to the fur trade, so agriculture previous to 1850 was of importance mainly as it helped to support the mining population.

Development

The development of the agricultural resources during the early mining era was very slow for several reasons.

(1) Mining was more profitable. Naturally those interested in the lead made up a majority of the early immigrants and even to those who failed to strike it rich the lure of possible quick wealth was stronger than the slower, though usually more certain, agriculture.

(2) The Indian menace was present to a greater or less degree till the close of the Black Hawk War in 1832. Grouped rather closely around the mines, the settlers were in a much better position to protect themselves than if scattered about on isolated farms. Farming too encroached more extensively on Indian hunting domains and therefore aroused more hostility on the part of the red men.

(3) The initial investment for farming was much more than that needed for lead mining. A miner could carry practically all of the tools necessary for his work. Mining leases cost only a share of the profits whereas an eighty acre farm with only the equipment absolutely necessary required over $200.00 of initial purchase money.

(4) The lack of cheap transportation limited the market for agricultural products to the nearby mining population. This isolation became the most serious handicap in the forties and early fifties.

(5) Government restrictions on the ownership and use of "mineral lands" for agricultural purposes tended to discourage farming in that section. These restrictions were not removed until 1846.

(6) Lack of knowledge of the agricultural possibilities of the region

tended to discourage immigration. The general opinion in the east was that Wisconsin was largely wilderness and swamps. The Black Hawk War revealed its potential wealth and the subsequent advertising by newspapers and travelers brought a flood of settlers.

These obstacles, however, were removed one by one. Eastern United States was much more densely settled and was receiving a constantly increasing influx of European immigrants. The Mississippi route from the South and that of the Great Lakes from the East were convenient pathways for immigrants. The use of the Great Lakes route was greatly increased by the opening of the Erie Canal (1826) and the establishment of steamboat navigation from Buffalo to Milwaukee in the next decade. The overland lead teams blazed the trail for the last portion of the journey. After 1854 settlers could go from Chicago to Galena by rail and by 1857 they could reach Prairie du Chien from Milwaukee by the same means. For many years, up to the forties, the miners furnished a market for agricultural produce at extremely high prices. In 1829 flour was $15 to $18 per barrel (equivalent to 4,000-5,000 pounds of lead) and pork was $30 per barrel. There was

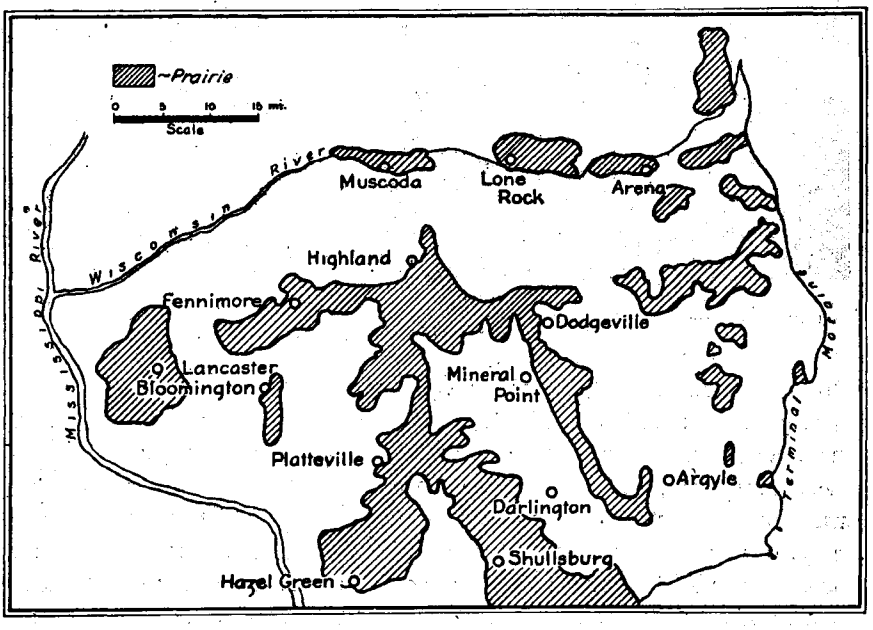

FIGURE 39. Distribution of prairies in southwestern Wisconsin. Compare with the photograph of the relief model shown in the Frontispiece and note that the prairies occupy the broad divides. The exception to this is the group in the Wisconsin Valley on the terraces. (After Martin.)

also the possibility of combining farming and mining, pursuing the latter during the fall and winter season.

The farmer immigrants who came pouring into Southwestern Wisconsin after the Black Hawk War found a considerable variety in the lands offered them by the government. Factors of soil, topography, water supply, timber, and accessibility to roads or to neighbors were considered in the selection of their future homes.

At the time of white settlement a large part of the upland, as indicated on the map, figure 39, was not wooded but covered with a coarse prairie grass. The forest, consisting mainly of oak, "fringed the streams and occupied the valleys." The lack of tree growth on the

FIGURE 40. Steep slopes and narrow hill tops are left wooded while broad valley bottoms are tilled.

higher lands may have been due to repeated fires,[1] for trees planted after white settlement, which tended to check the fires, grew readily. In places primeval oaks dotted the prairies. Such areas with trees scattered over them here and there were called "oak openings." Presumably the boundaries of prairies, woodland, and oak openings shifted according to the frequency of fires. In 1839 it is estimated that on the back slope 44.5 per cent of the area was prairie; on the escarpment with relatively little upland only 7 per cent was prairie. Other things

[1] Many other theories have been suggested to account for the prairies. Their distribution may be associated with the condition of the soil drainage.

being equal, the early immigrants usually passed by the prairies with their thick, tough sod and sought the "openings." The disadvantages of the former were apparent. The open prairie offered no protection from the bitter winds of winter or the destructive prairie fires of summer. In addition wood was lacking and water was scarce and hard to obtain. (Figs. 40 and 41.)

The minimum expenses which the prospective settler had to meet may be itemized as follows:[1]

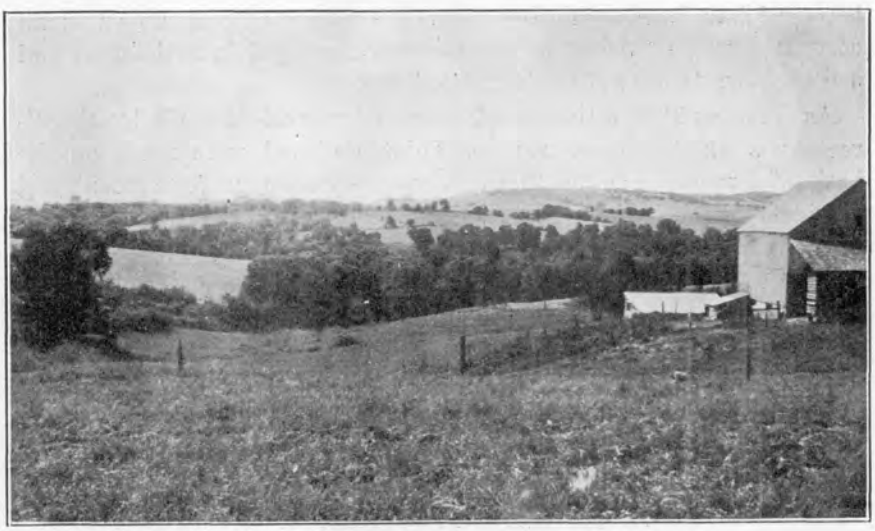

FIGURE 41. Flat or gently rolling uplands are tilled. The ravine-like valleys are left wooded.

For 80 acres of land	$100
For a log house	25
For a yoke of oxen	45
For a cow	16
For a pig and fowls	2
For a cart, chains, hoe, harrow, plow and axe	40
Total	$228

With this equipment purchased at Green Bay or Milwaukee the immigrant drove overland to the region of his choice. After filing on the homestead he selected, he built a cabin of logs or sod and proceeded to put in his crop. If he hired the breaking done, it cost him

[1] McLeod, Donald, History of Wiskonsan, p. 56, 1846.

$2 to $2.50 per acre. Three to six yoke of oxen could turn three to four acres per day, if it was prairie land. If it was "opening," three oxen could plow two to two and one-half acres per day. The oak openings were worth $3 to $5 per acre more than heavily timbered land because they were richer and required less work to clear.

After 1832 agricultural activity increased rather rapidly and by 1850 it had superseded mining as the chief occupation. According to the census of 1840 there were only 220 miners in Grant, Lafayette, and Iowa counties. By 1905 the ratio of farmers to miners had become 12 to 1. Considering the number of people employed in all occupations a little less than one-half were engaged in agriculture and a little more than one-thirtieth in mining.

As early as 1853 estimates of prospective receipts made by the directors of the proposed Mineral Point Railroad were made on the basis of two and one-fourth times as much tonnage for agricultural products as for lead and zinc, even though this road was to be built through the heart of the mining district.

In 1910 the cereal production of Lafayette County alone had a value equal to all the lead and zinc produced in the state. In 1919 the value of all crops within the area ($36,538,623) was almost six times that of the zinc and lead mined ($6,398,374). Thus agriculture has become the dominant industry in Southwestern Wisconsin and it is quite probable that over 90 per cent of the population of this section of the state is directly or indirectly dependent upon it.

Influence of Topography

What has been the record of agricultural development on the escarpment as compared with that on the back slope? The story told by the census figures[1] is based upon the town and some of these towns extend across the Ridge so that part of the town lies within each of the two main physiographic regions. A group of towns representative of the escarpment and Wisconsin flood plain may, however, be selected. In the group thus chosen some are on the Wisconsin flood plain, some on the steep bluffs, and some are near the eastern markets and some farther away, but all are entirely within the escarpment and Wisconsin flood plain. The average of agricultural conditions in this group may be taken as representing fairly accurately the condition throughout the

[1] 1860–1880 Original manuscript, U. S. Census.
1885–1905 Wisconsin State Census.
1920 J. A. Becker, Statistician, Division of Agricultural Statistics, State Capitol, Madison, Wisconsin.

escarpment and Wisconsin flood plain. The same may be done with the back slope. Such selected groups are shown in figure 42 and the comparisons which follow are based upon the lists of towns given below. The areas of the two groups are practically equal.

List of towns selected for the two groups:

ESCARPMENT

Dane County
  Vermont
Iowa County
  Arena
  Wyoming
  Clyde
  Pulaski
Grant County
  Watterstown
  Boscobel
  Castle Rock
  Hickory Grove
  Marion
  Millville

Total area, 449 square miles and 520 acres.

BACK SLOPE

Green County
  Adams
  York
Lafayette County
  Benton
  Gratiot
  New Diggings
Grant County
  Clifton
  Lima
  Platteville
  Smelser
  Hazel Green
  Bloomington
Iowa County
  Mifflin

Total area, 450 square miles and 400 acres.

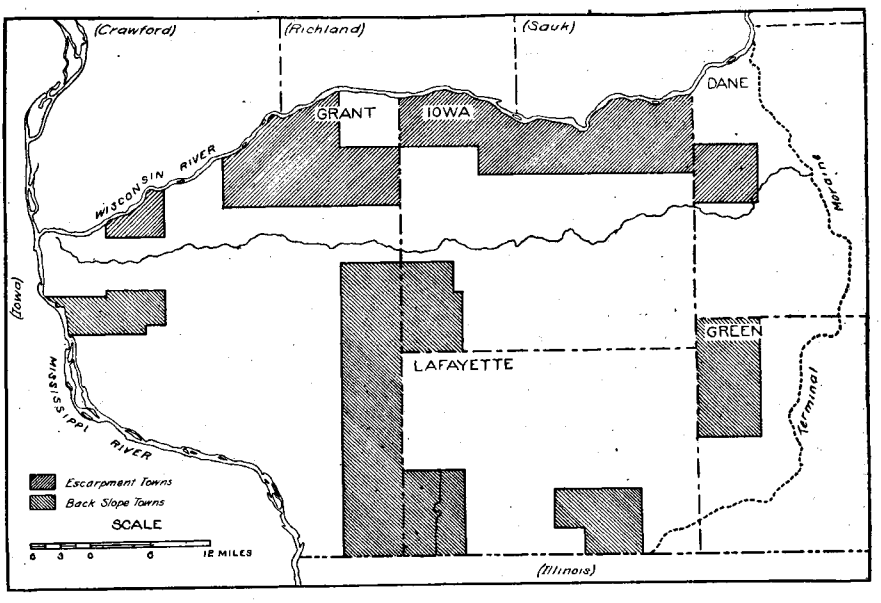

FIGURE 42. Townships chosen as representative of back slope and escarpment conditions.

The agricultural development of the back slope has been much more rapid than that of the escarpment. This has been due to the fact that the former possessed: (1) the attraction of the mineral deposits resulting in an earlier settlement of the region, (2) the advantage of the Mississippi as a commercial route in the early days, and (3) a topography more favorable to farming.

As a result the land on the back slope was taken up very rapidly during the pioneer stage and by 1870 was practically all in farms. On the escarpment, on the other hand, this stage was not reached until

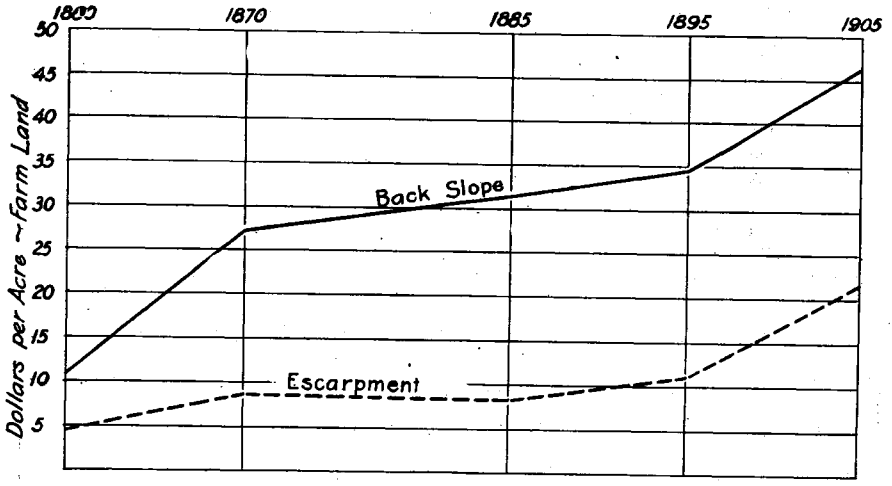

FIGURE 43. Value of farm lands per acre, 1860-1905. For areas compared see figure 42

twenty-five years later. The same is true for the proportion of improved and unimproved land, the latter declining on the back slope since 1860, on the escarpment since 1895. Figure 43 shows the trend in land values on escarpment and back slope from 1860 to 1905. It brings out the marked contrast in acreage value, that of the back slope acre is two to three times the average on the north side of the Ridge. The effect of the more rapid settlement of the region south of the Ridge from 1860 to 1870 is shown in the marked increase in land values there during that period. For the thirty-five years following, however, the trend of the two is about the same. In 1905 the ratio of the values was about 2 to 1.

The tendencies in the size of farms on the two sides of the Ridge in the last fifteen years are shown in the following table:

	1905	1920	Per cent of decrease
Average size of farms on escarpment in acres	197.4 A.	171.6 A.	13.1
Average size of farms on back slope in acres	159.9 A.	150.0 A.	6.2
Excess in size of escarpment farm over farm on back slope	23.5%	14.4%	9.1

Specialization along dairy lines and a general intensification of agriculture probably account in part for the decrease in the size of farms, for the dairy industry tends to crowd out the cereal raising. The rate of reduction, it will be noticed, is about twice as great on the escarpment as on the back slope. The greater opportunities for the use of machinery, the smaller amount of woodland, and the more advanced stage of development resulting from earlier settlement apparently are factors in retarding the decrease in the size of farms on the south slope. According to the figures the difference in the size of farms is growing less.

Agricultural Products

Wheat

The term "one crop period" which has been applied to the wheat era in some parts of Wisconsin is not applicable to the section of the state southwest of Dane County. Measured by total production, corn, not wheat, has always been the most important crop in this region. The census figures of 1850 show about 50 per cent greater corn production than wheat and the divergence in the production curves for the two increases rapidly with each decade. See figures 44 and 60.

The causes for the supremacy of wheat in Dane and other counties to the east were at an early date less potent in the southwestern counties. With the coming of machine-raised wheat in the sixties the advantages of the level glaciated country for that cereal were emphasized. The driftless section found it more profitable to raise corn and condense it for shipment, first, into the form of meat, and in later years also into dairy products. The portion of western Dane County included in the region studied is the only part of the area where at any time wheat outranked corn. In general the distribution maps show the wheat and the corn areas to be complementary to each other and in diagonally opposite parts of the area.

The production curves (fig. 44) for the escarpment and back slope show: (1) that an equal area on the latter produced in 1860 twice the number of bushels of wheat produced on the former; (2) that both

reached the peak of production in the seventies; and (3) that both by 1905 had dwindled to insignificance as far as wheat raising was concerned. It is interesting to note the more gradual decline on the escarpment due in part, perhaps, to the more backward condition of the rougher country[1] (figs. 45, 46, 47, 48, and 49). By 1905 neither region was a wheat producer of importance. Were the production figures for towns available since 1905, they would doubtless show a rather abrupt revival of wheat raising especially since 1914 under the impetus of high war prices. The acreage map of 1920 (fig. 49) does, in fact, show that a large relative increase has taken place. In total yield, Grant, Iowa, and Lafayette counties from 1917 to 1918 increased their production 138 per cent, producing in the latter year over half a million bushels of wheat. Undoubtedly this is only a temporary increase which will disappear with a return to normal conditions.

[1] "Production of wheat on the escarpment retired to the 'ridges' during the seventies and this land being new and good for wheat lengthened the wheat era and prevented the rapid decline noted on the back slope." Joseph Schafer, Wisconsin Historical Society, personal communication.

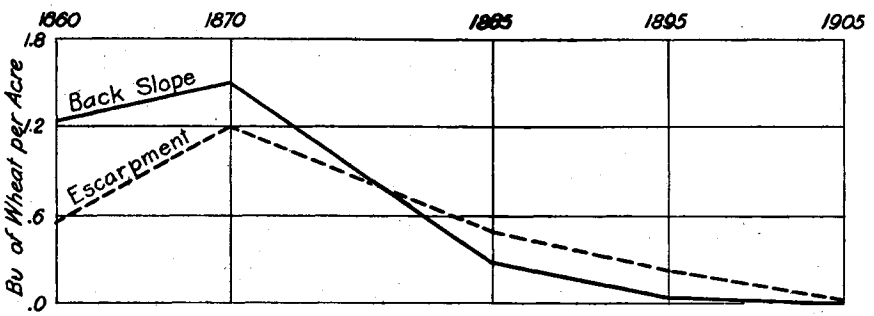

FIGURE 44. Wheat production per acre. For areas compared see figure 42.

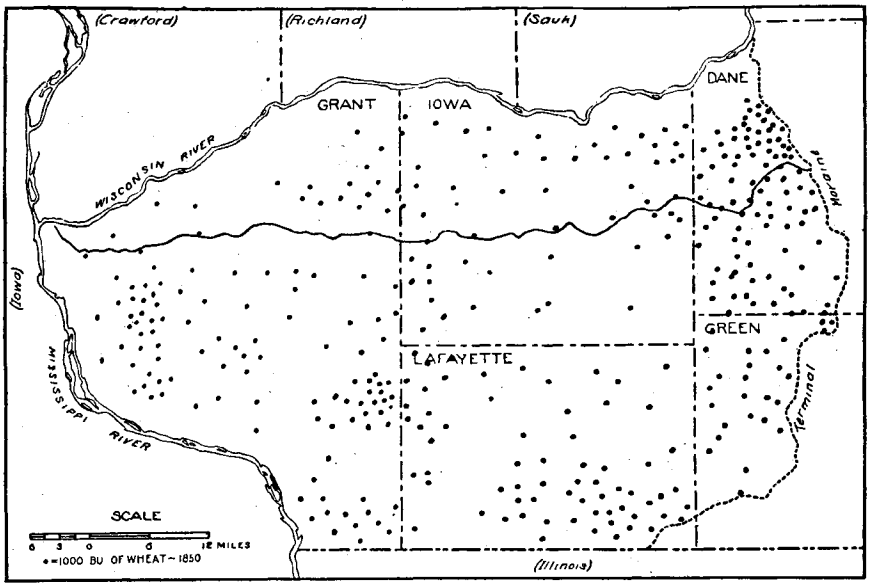

FIGURE 45. Wheat distribution, 1850.

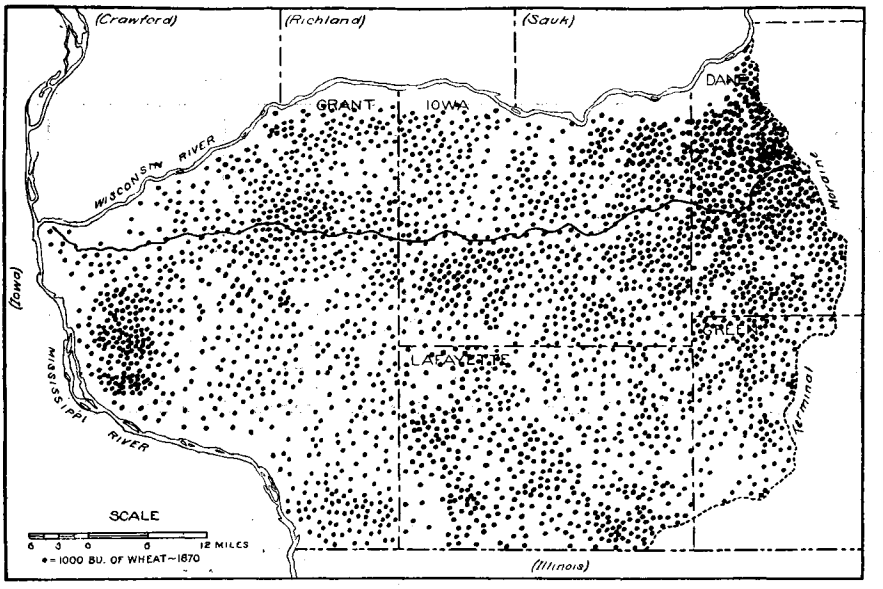

FIGURE 46. Wheat distribution, 1870. After the seventies wheat production declined rapidly. Compare with figures 47 and 48.

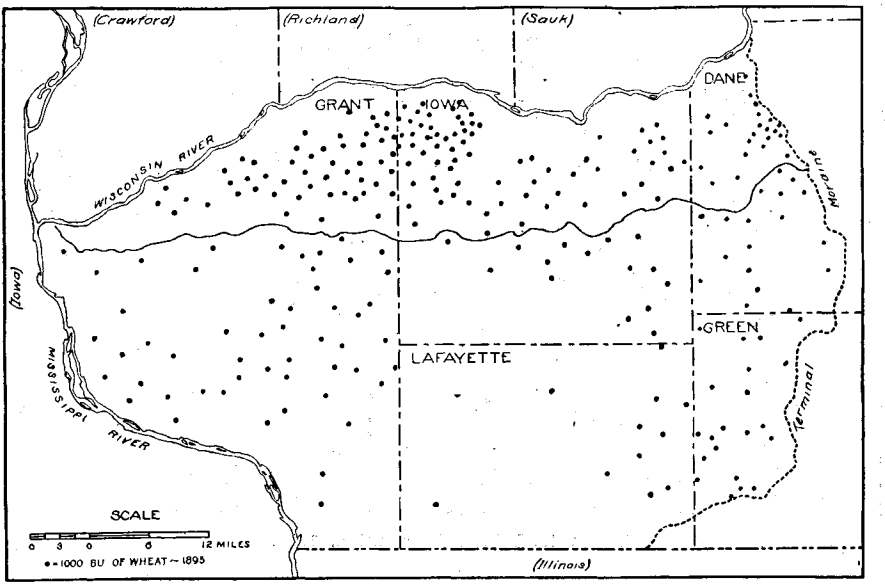

FIGURE 47. Wheat distribution, 1895. The escarpment farmer produced wheat longer than his neighbor across the ridge.

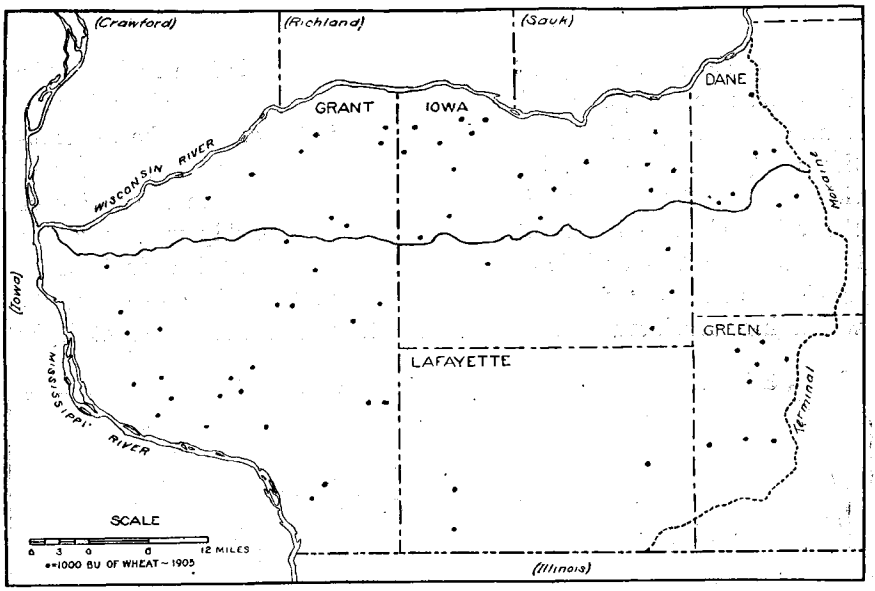

FIGURE 48. Wheat distribution, 1905.

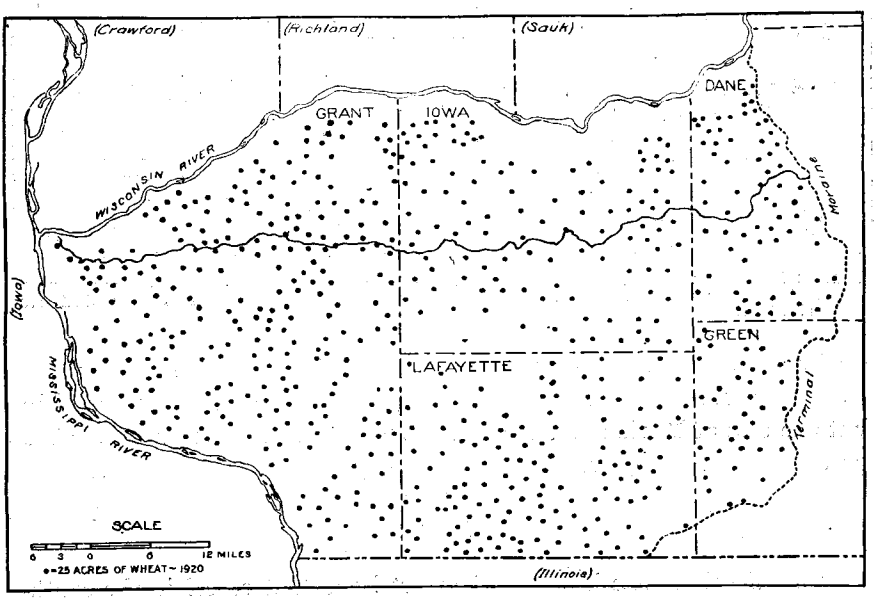

FIGURE 49. Wheat acreage, 1920.

Rye

One of the best indices of the character of the soils in a region is the distribution of crops especially suited to them. Rye, since it will flourish on sandy infertile soil, is such an index crop. The distribution of rye acreage (fig. 50) shows it confined almost exclusively to the escarpment towns which have considerable areas in the valley of the Wisconsin and its tributaries. Only one township wholly within Southwestern Wisconsin but outside the escarpment had in 1920 as much as a hundred acres of rye. This was Jordan in Green County which has considerable areas of sandstone and the resultant light

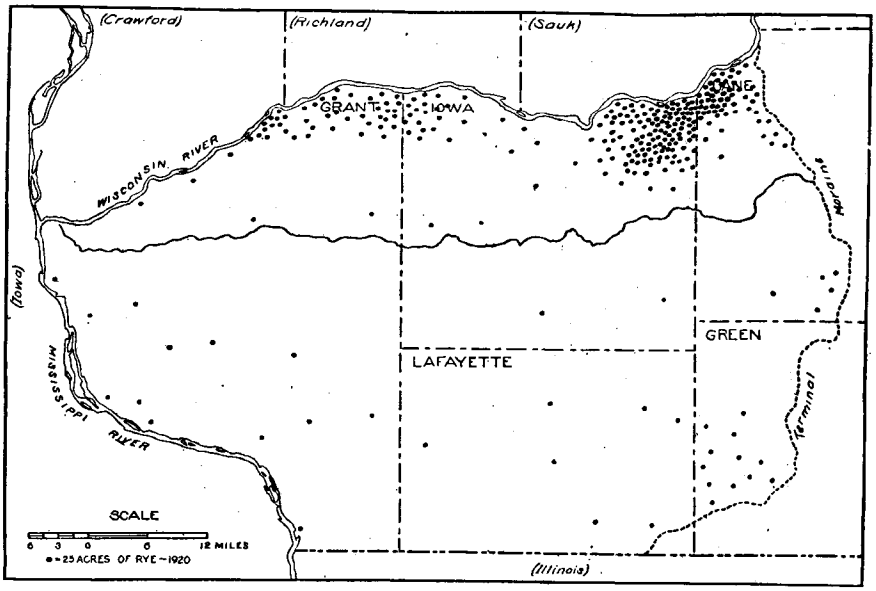

FIGURE 50. Rye acreage, 1920. Rye is indicative of poor soil and rough topography. Note the concentration on the sandy soil of the Wisconsin Valley and its tributaries.

sandy soils. In the territory north of the ridge the rye distribution outlines clearly the form of the Wisconsin Valley and every township but one east of Marion and bordering the Wisconsin River has over 100 acres of rye, varying from 102 acres in Clyde to 3,055 in Arena.

Corn

From the first corn has been the most important cereal in the southwestern counties. As a pioneer crop it possessed certain advantages

over other cereals; the settler did not need to wait until the land was cleared or the prairie sod subdued before he could raise a corn crop; it yielded a relatively high food value per acre for both man and beast; it did well on both the loam and the loess soils of the prairie and woodland; it has an extended harvest season, an important item where labor is scarce. Climatically, however, the region is on the northern border of the great corn belt and as shown below, the difference of a few days in the length of the growing season between southwestern Grant and central Iowa counties is sufficient in some years to prevent the maturing of the crop.

The causes for the supremacy of corn in Southwestern Wisconsin may be summed up as follows: (1) the mining of lead furnished the first "money crop" and took the place occupied by wheat in other regions; (2) many of the earliest settlers had come from the southern corn region rather than the eastern wheat region; (3) although for keeping qualities and for ease of transportation wheat is superior to corn, the mining region, prior to the building of railroads, was too far from outside markets to admit of much profitable exportation of either; (4) the advantages of corn as a frontier crop were too great to permit wheat to displace it where the former is at home; and (5) the rough topography of the region of Southwestern Wisconsin as compared with Dane and other counties to the east favored corn growing in the former section. Corn, it is true, being a cultivated crop is not suited to successive planting on steep slopes because of the liability of washing; but on the other hand it is a crop which requires for planting and harvesting less heavy machinery than wheat.

The gradual expansion of the corn area is shown graphically in the distribution maps, figures 51 to 56. In 1850 before the region was very well settled the corn areas naturally clung to the regions about the mines where the settlers were, and to those along the routes leading from the mines to the markets (fig. 51). The absence of corn raising in many other places is an indication of undevelopment rather than of non-adaptability to the production of that cereal. With the lapse of another decade corn had spread pretty well over the entire area, and particularly favorable conditions began to manifest themselves in the concentration evident in certain spots, such as southwestern Grant County. A comparison of figures 52 and 53 shows that by 1870 and to a still greater degree in 1885, this concentration had become so pronounced as to clearly define the sections where corn predominates. The heaviest production is in the region south of the Military Ridge and

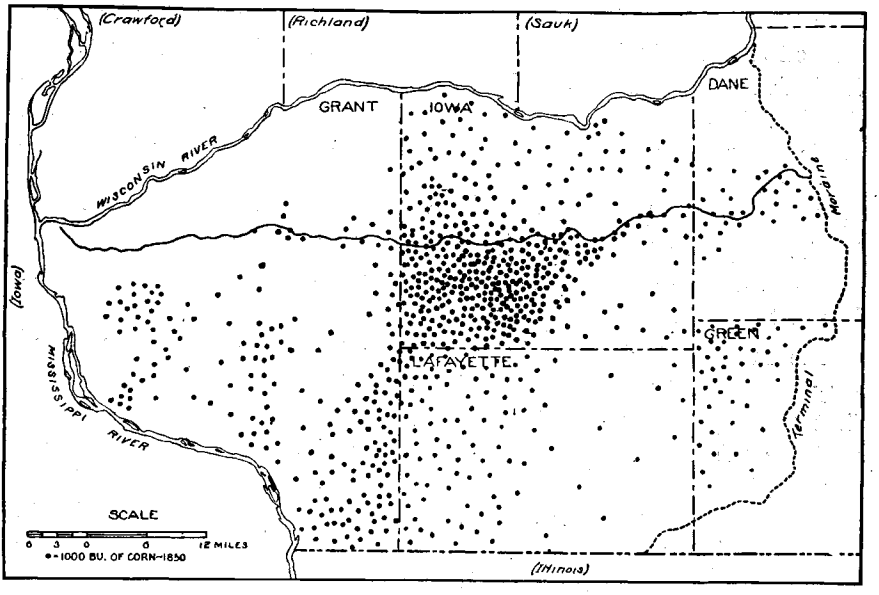

FIGURE 51. Corn distribution, 1850. Note concentration near mining settlements and routes of travel.

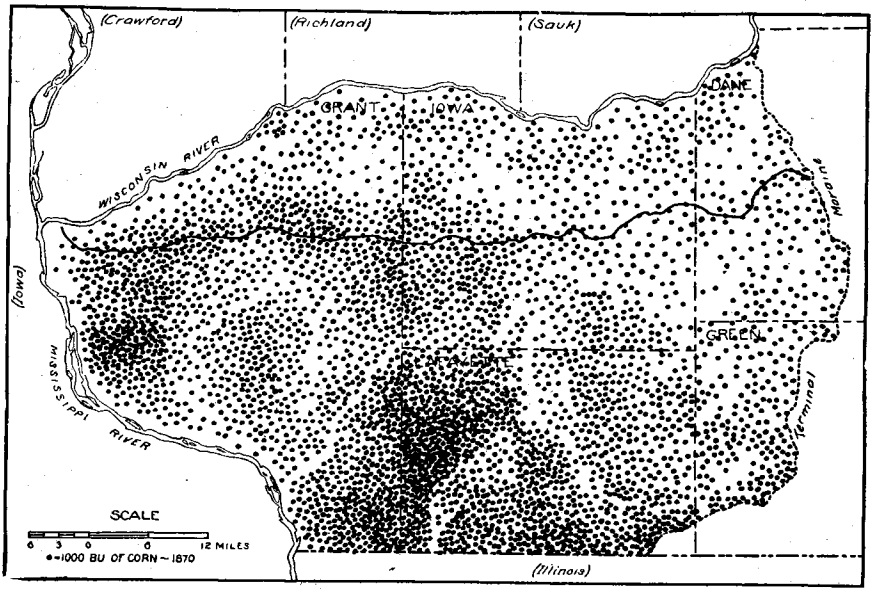

FIGURE 52. Corn distribution, 1870. Note concentration in south and west as compared with 1850.

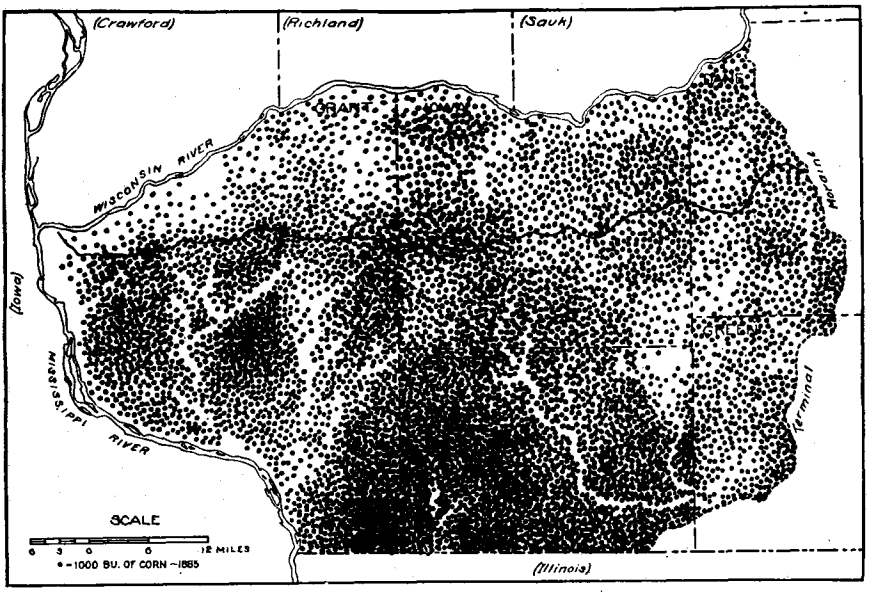

FIGURE 53. Corn distribution, 1885.

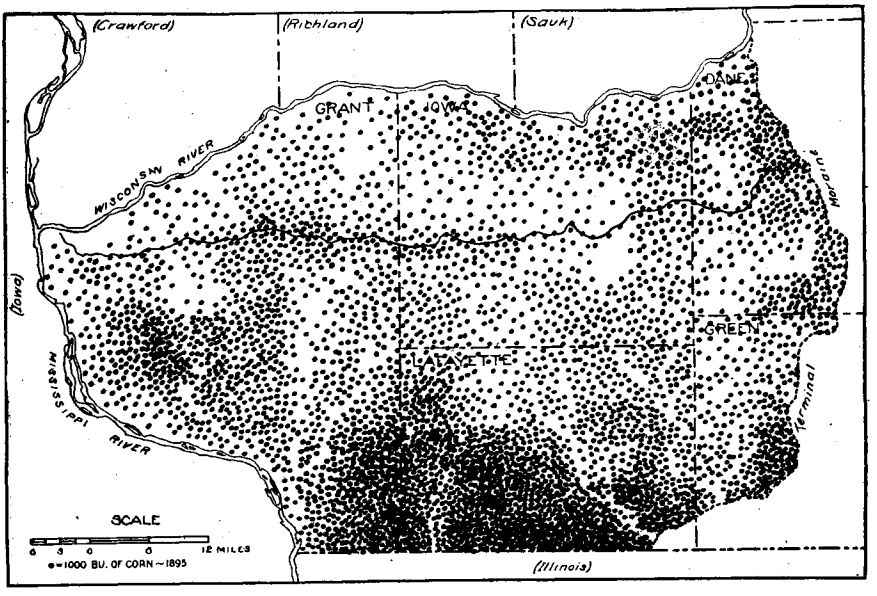

FIGURE 54. Corn distribution, 1895. The effect of the great drought of this year may be seen by comparing this map with the one for 1885.

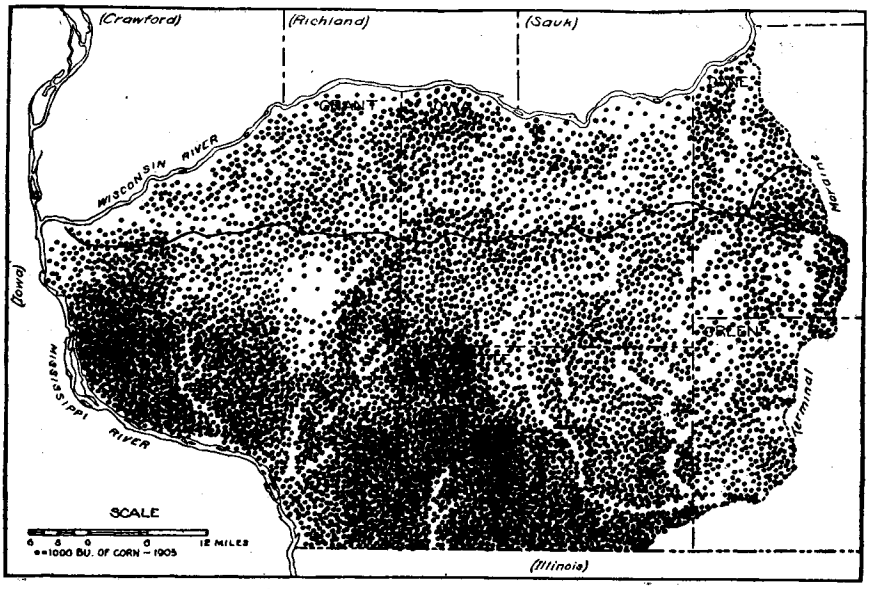

FIGURE 55. Corn distribution, 1905. Compare production on Cassville and Blake's prairies in southwestern Grant County with that in the much dissected towns of Little Grant and Liberty in the central part.

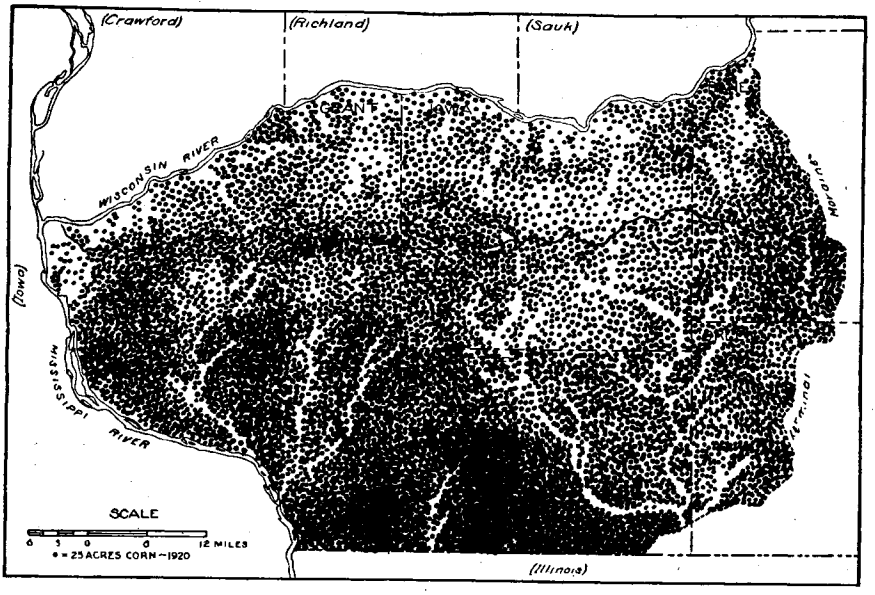

FIGURE 56. Corn acreage, 1920. Note the dominance of the back slope. Even there the steeper areas must be used chiefly for pasture and woodland.

west of a line from Dodgeville to South Wayne. The only "thin spots" in this area are found where topography is unusually rough as in Beetown, Liberty, Little Grant, and what is now North Lancaster. The year 1895 (fig. 54) shows a shrinkage in the corn production due to the severe drought of that year. The per cent of decrease was about the same over the whole area, for the dry weather of that year was general throughout the West and Middle West. The map for 1905 shows a return to normal conditions not only from the drought, but also from the serious financial depression of the ten years before. (See fig. 55.) The continued dominance of the back slope is striking, although corn also constitutes the most important cereal of the escarpment. The corn acreage map of 1920 (fig. 56) differs materially from the others in the northwestern part of Green County and southwestern Dane. The explanation doubtless lies in the silage corn which appears on an acreage but not on a grain production map.

As corn is a cultivated crop, the ridge and back slope towns with their higher percentage of level or gently rolling land hold a marked advantage over the escarpment. A second important influence of topography on corn distribution lies in its effect upon climate. In this respect all parts of the back slope are not equally favored; in fact the Wisconsin Valley has a better corn climate than has the greater part of the back slope. The marked control of climatic factors upon the corn area is indicated by figures 57, 58, and 59,[1] which show (1) the comparative mean summer temperature, (2) the comparative effective heat, and (3) the length of the growing season. Because of the influence of the low Mississippi Valley, western and southern Grant County have a mean summer temperature of over 70°. An "island" of lower temperature in southern Iowa, northern Lafayette, and adjacent portions of Dane and Green counties, because of the higher altitude in this section, has an annual mean summer temperature of less than 69°. The mean summer temperature of Mt. Horeb is 2.8° lower than that of Prairie du Chien. The mean effective heat (temperature)[2] shows this same "island" with 17.5° to 20° whereas the rest of the area has over 20° for the six growing months. For the same reason the length of the growing season as shown in figure 59 is much more favorable

[1] Whitson, A. R., and Baker, O. E., The climate of Wisconsin and its relation to agriculture: Agricultural Experiment Station, University of Wisconsin, Bull. 223, pp. 18, 21, 27, 1912.

[2] Defined as the mean temperature in growing season in excess of 42°. This figure represents more nearly than 32° the condition necessary for seed germination and plant growth. Idem, p. 20.

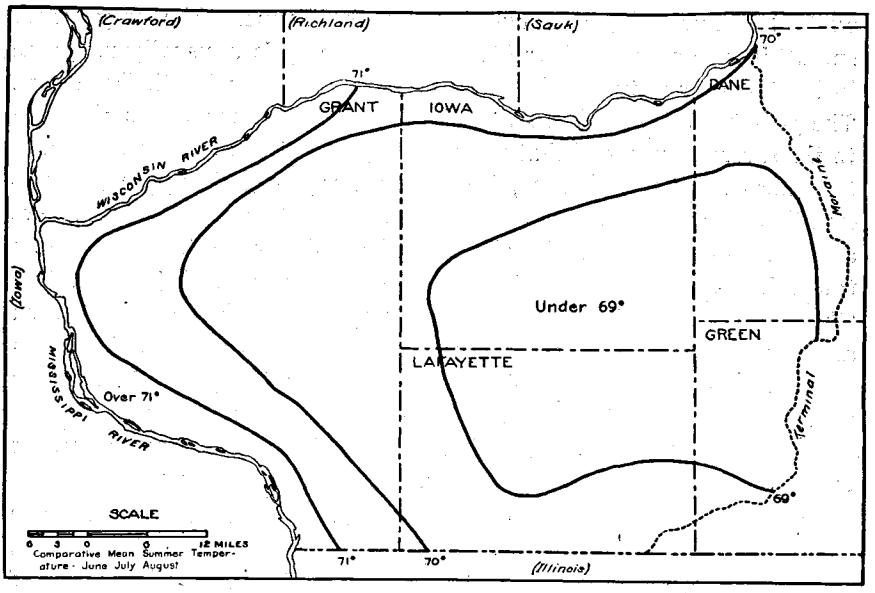

FIGURE 57. Comparative mean summer temperature, June, July, and August. (After Whitson and Baker.)

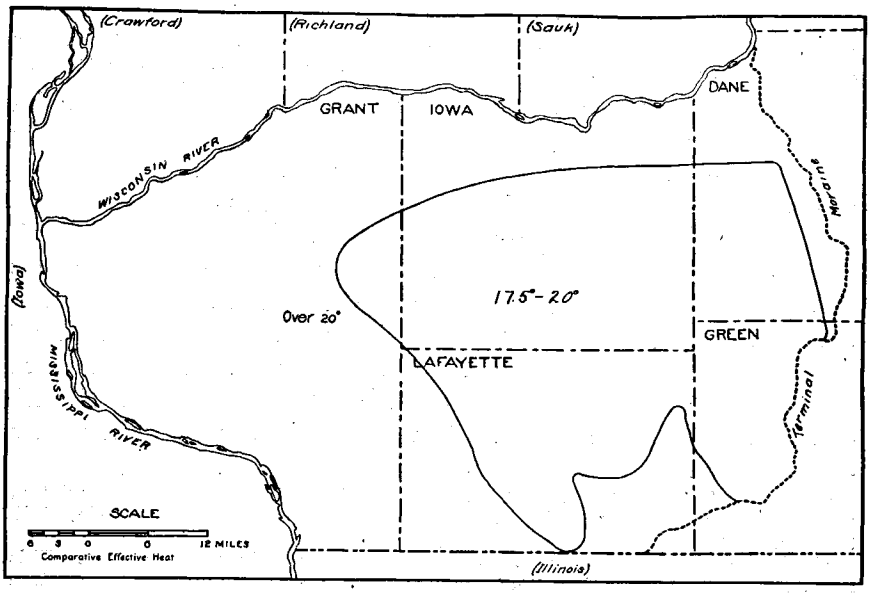

FIGURE 58. Comparative effective heat. (After Whitson and Baker.)

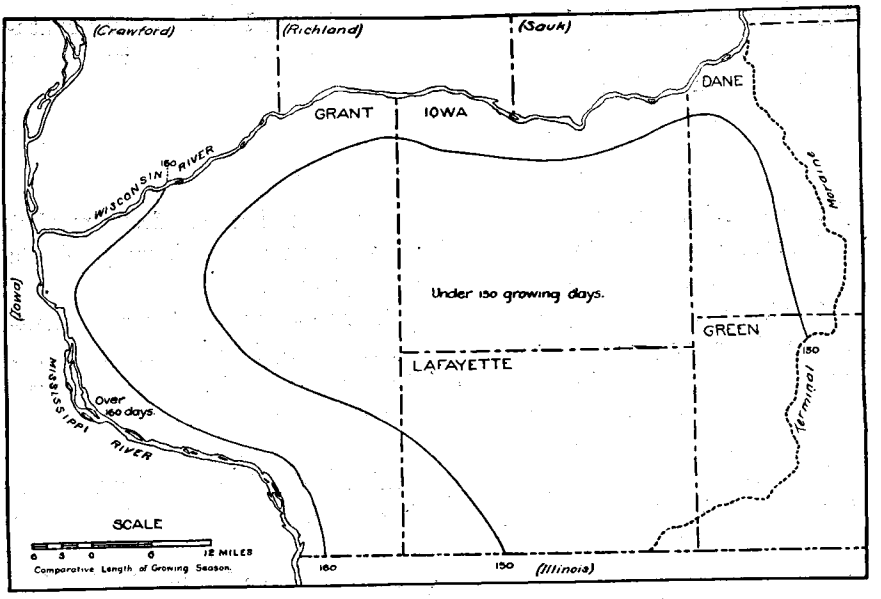

FIGURE 59. Comparative length of growing season. (After Whitson and Baker.)

for corn raising in the western section and even in the Wisconsin Valley. In the latter case, however, the sandy soil more than offsets the advantage of the longer growing season. From these facts one may draw the conclusion that the topography and the heavier soils of the back slope are the important factors in its superior corn production, rather than a more favorable climate. The production curve for

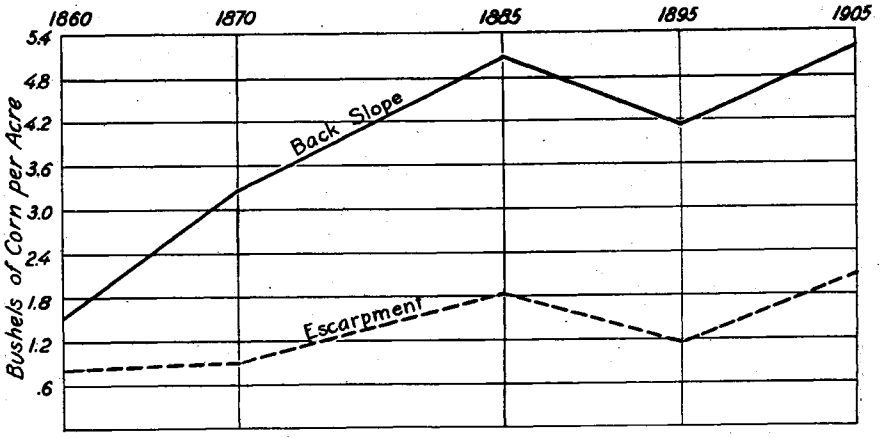

FIGURE 60. Corn production per acre, 1860-1905. For areas compared see figure 42.

the escarpment and back slope shows that the production on the southern slope of the cuesta averaged almost two and one-half times that on the escarpment. See figure 60.

Swine

The distribution of swine is related to the distance from market and more especially to the distribution of corn and dairy products and through the latter to climate and topography.

In the southwestern part of the state swine represent a concentration of milk by-products and grain-corn. Corn, in the form of pork, occupies about one-fifth of the original bulk and is, therefore, well adapted to sections far from market. Thus, hog raising here is much more important than nearer the Milwaukee and Chicago markets.

Because of the suitability of buttermilk and skimmed milk as food for pigs, the butter industry yielding these by-products is usually found in the same sections as the swine. A comparison of the maps and production curves shows a marked resemblance in the distribution of swine (fig. 61), grain-corn, and butter. Non-geographical influences such as stock breeding associations by stimulating interest in some localities may develop the industry there irrespective of local geo-

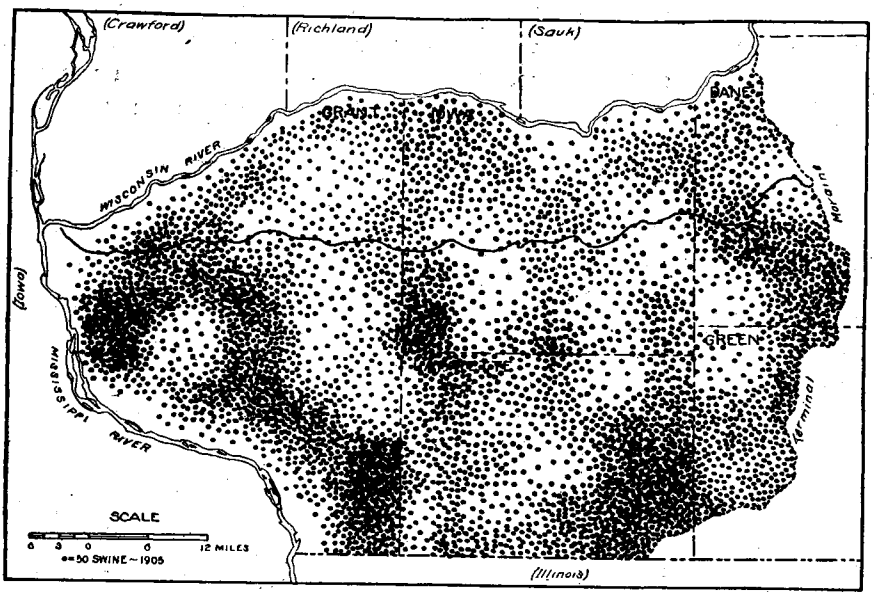

FIGURE 61. Distribution of swine, 1905.

graphic conditions. This is probably the explanation for the "spotty" appearance of the distribution map.

With the marked dependence upon corn, swine production, as might be expected, shows a much greater development on the back slope, the number per square mile being two to three times that on the escarpment. This is shown graphically in figure 62.

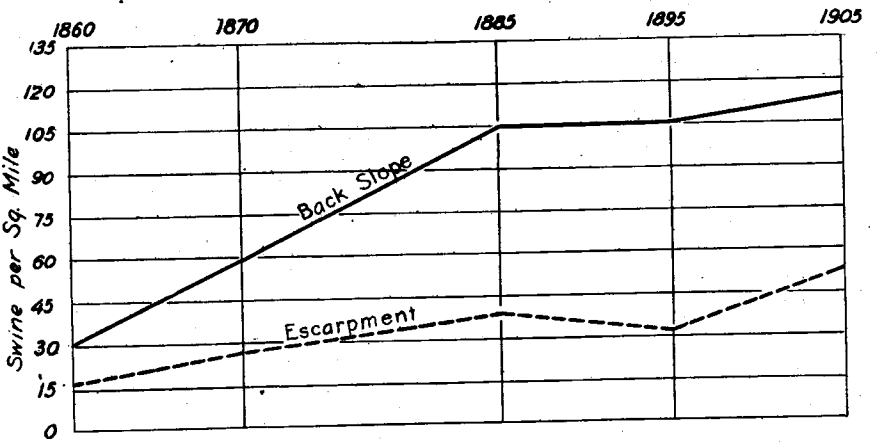

FIGURE 62. Swine production per square mile, 1860-1905. For areas compared see figure 42.

THE DAIRY INDUSTRY

Southwestern Wisconsin includes the greater part of one of the two most important dairy regions of the state. In value the dairy products here far exceed that of the most important cereal—corn. In 1905 the excess was more than half a million dollars and production curves show the difference constantly growing greater due in large part to the rapid increase in cheese production.

The factors which have been responsible for the development of the dairy industry here are partly geographic, soil, climate, topography, density of population, and accessibility to markets; partly social, as in the case of the settlements of the Swiss with their skill and experience in dairy work in Switzerland; and partly educational, a result of the intelligent leadership and encouragement of the Wisconsin College of Agriculture and a few prominent agriculturists such as former Governor Hoard.

As previously pointed out, a warm and relatively dry climate, loam soils, and level or low, rolling topography are more or less interlocked

with the corn, swine, and butter industries. In the areas complementary to the above where it is slightly cooler and more moist and the soil is a heavier clay better suited to pasturage and summer dairying, cheese outranks both pork and butter as the leading product.

The cheese district, conditioned by these factors, is in turn subdivided into foreign and American cheese producing sections, and the former further divided into Swiss, Limburger, and brick cheese-making districts. This localization is due to the fact that foreign cheese manufacture is most sensitive to differences in environmental conditions such as temperature, water, and pasture.

An essential concomitant of growth in the dairy industry is an increase in the use of silos and silage corn. The map (fig. 63) showing the distribution of silos is most significant in indicating the relative importance of the eastern part of the area in dairying and of the western in pork and beef production. It is noticeable that the southern part of Grant and Lafayette counties, which have such a high output of grain corn, have comparatively few silos.

The graph showing the per cent of corn acreage used for silage is based on county data since that by towns is not available. It does not, therefore, indicate any contrast that might exist on escarpment and back slope, but does show the increase in dairying toward the east and the general increase in the percentage used for silage in all the counties with the exception of Lafayette, an increase significant of the change to dairying general throughout the area. On the average more than a third of the total corn acreage in 1918 was silage corn. (See fig. 64.)

Previous to 1880 milch cows were scattered rather uniformly over all of Southwestern Wisconsin. Dairying was largely in the domestic stage; the local markets absorbed all of the product. The cheese industry at that time gave no promise of the remarkable growth which it has since made. By 1895 and to a still greater degree ten years later the greater relative importance of the southeastern section had become very noticeable. (See fig. 65.)

The marked "spottiness" of the pure bred stock distribution as shown in figure 66 indicates, as in the case of swine, the influence not only of topographic differences, but of pure bred stock associations. It will be noted that the back slope shows a marked preponderance in pure bred cattle—including both beef and dairy types—an indication of greater progressiveness and prosperity. During the period from 1870 to 1885 that section made a marked gain over the escarpment

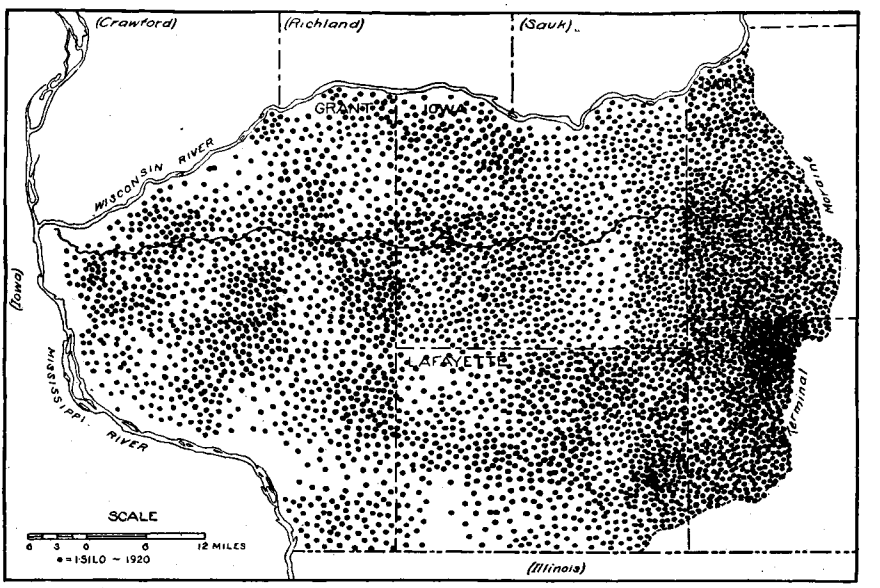

FIGURE 63. Silos, 1920. A comparison of this map with that of corn shows the dominance of dairying in the eastern section and of beef production in the western.

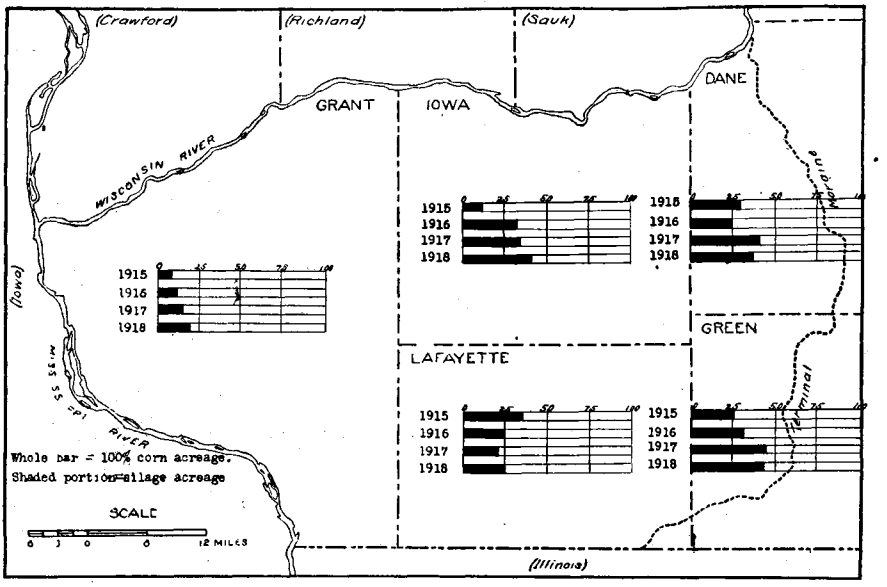

FIGURE 64. Silage corn acreage, 1915-1918 inclusive.

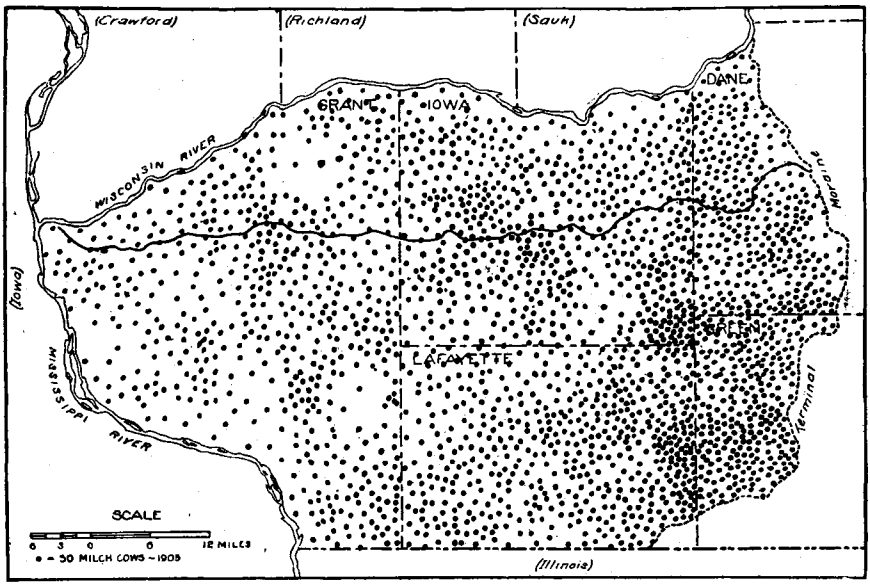

FIGURE 65. Distribution of milch cows, 1905.

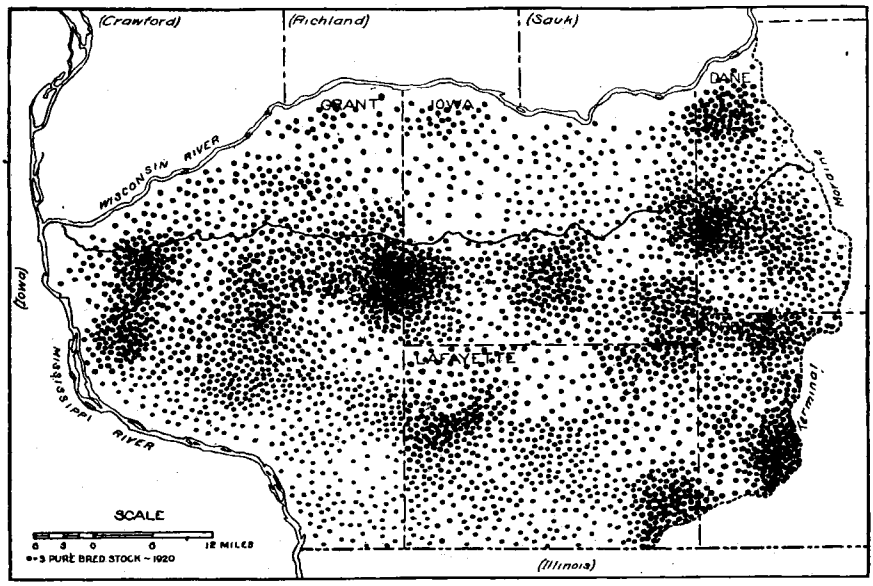

FIGURE 66. Distribution of pure-bred stock, 1920.

in both milch and beef cattle (fig. 67). The ratio of 2:1 at the beginning changed to 3:1 by the end of this period. That the gain was largely in beef cattle, however, is shown by a comparison with figure 68 which shows a rather uniform gain in milch cattle in both sections.

Distance from the Milwaukee and Chicago markets practically removes Southwestern Wisconsin from the list of prominent fresh milk shippers. A condensary at New Glarus is the only one within the area.[1] The chief dairy products are butter and cheese. (See fig. 69.)

As shown by the distribution maps, figures 70, 71, and 72, butter production, concentrated previous to 1850 in the eastern part of the region, has gradually been pushed westward by the competition of cheese (figs. 74 and 75), until it is now chiefly produced in the west, in Grant and adjacent portions of Iowa and Lafayette counties. The reason for this westward movement is found in its inability to compete with cheese where conditions have made the latter profitable. Through its association with corn raising the back slope produced in 1905 about fifty per cent more butter per acre than the escarpment. (See fig. 73.) Butter, therefore, completes the industrial chain of corn, swine, and butter,[2] which dominates the less dissected portion of the cuesta.

In cheese, however, the production of the back slope per acre in 1905 was not much greater than that of the escarpment. (See fig. 76.) Cheese making as an industry began with the change from domestic to the factory system, initiated with the building in 1870 of the first cheese factory in the area (in Green County). The skill and experience of the Swiss immigrants of 1845 in making foreign cheese furnished the impetus which has put this region in the lead in foreign cheese manufacture. On the other hand, the gradual shifting and adjustment of the cheese industry within the area reflect the strong influence of the differences in environment.

The making of Swiss cheese is confined almost wholly to the limestone areas. Beginning on the Dodgeville silt loam, a thin soil extending eastward and southward from Dodgeville, it has spread rapidly to the better suited slopes of Knox silt loam which has a heavier body and a greater capacity for retaining moisture. The valley alluvium is, in general, too damp and its pasture grasses are inferior to the blue grass of the Knox slopes. These valley soils and the sandy valleys of the Sugar River lend themselves to the production of Limburger. Brick cheese, too, is made rather extensively in these valleys but is

[1] A condensary at Richland Center and a second at Middleton draw small amounts of milk from this region.

[2] Whitson, A. R., and Baker, O. E., op. cit., p. 52.

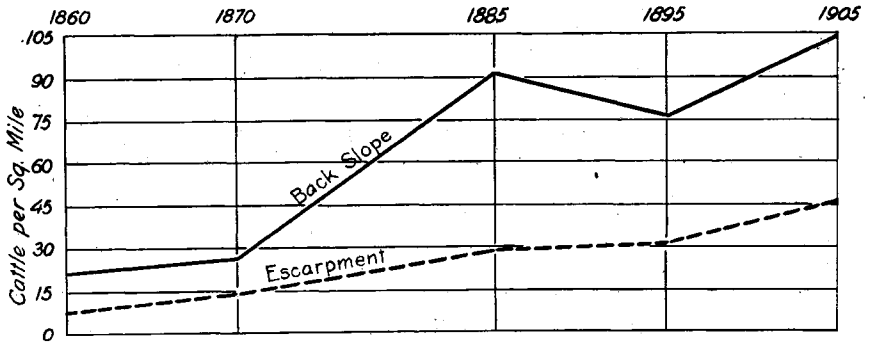

FIGURE 67. Number of cattle per square mile, 1860-1905. For areas compared see figure 42.

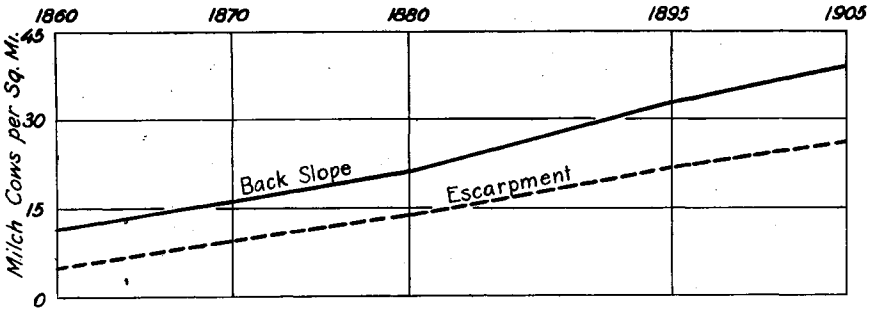

FIGURE 68. Number of milch cows per square mile. 1860-1905. For areas compared see figure 42.

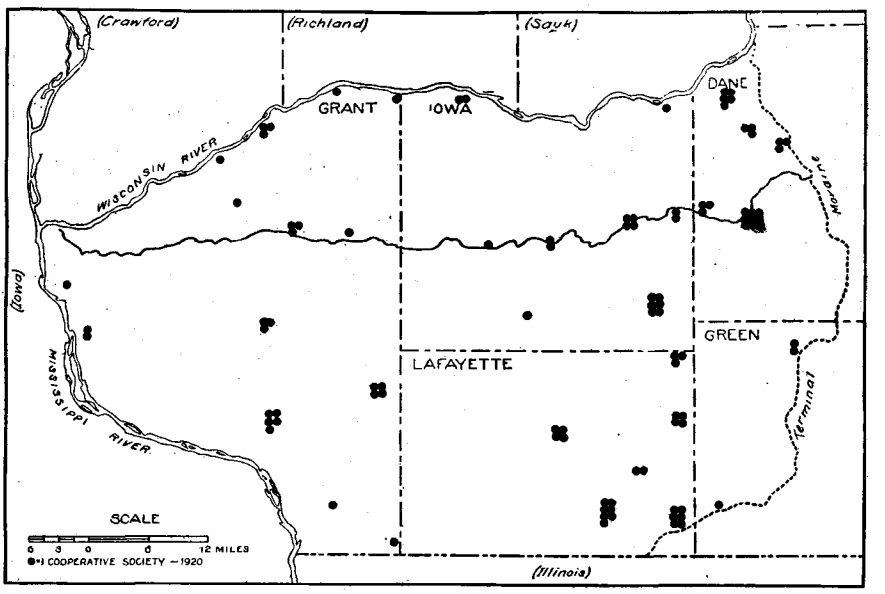

FIGURE 69. Cooperative societies in 1920, 78 on the back slope, 21 on the escarpment, all of the latter in the valley of the Wisconsin or its tributaries.

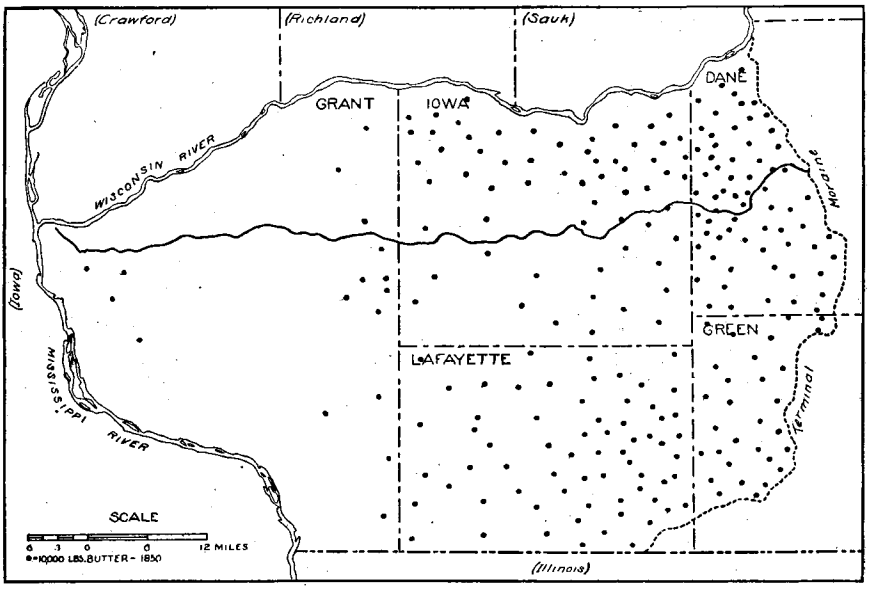

FIGURE 70. Butter distribution, 1850.

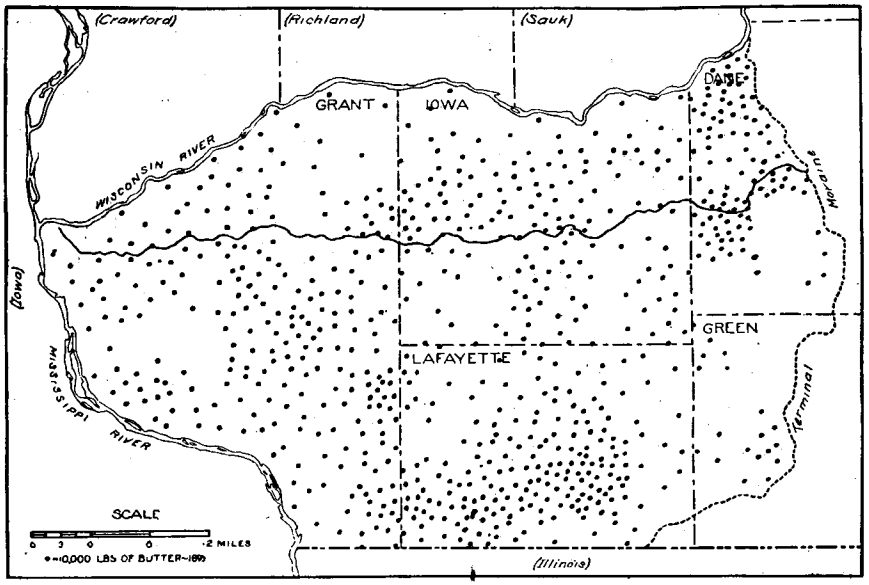

FIGURE 71. Butter distribution, 1895.

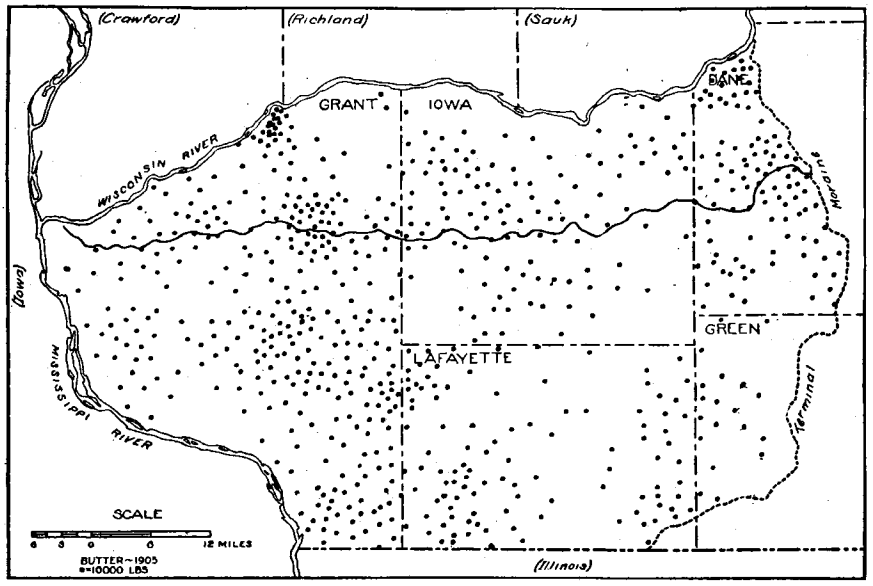

FIGURE 72. Butter distribution, 1905.

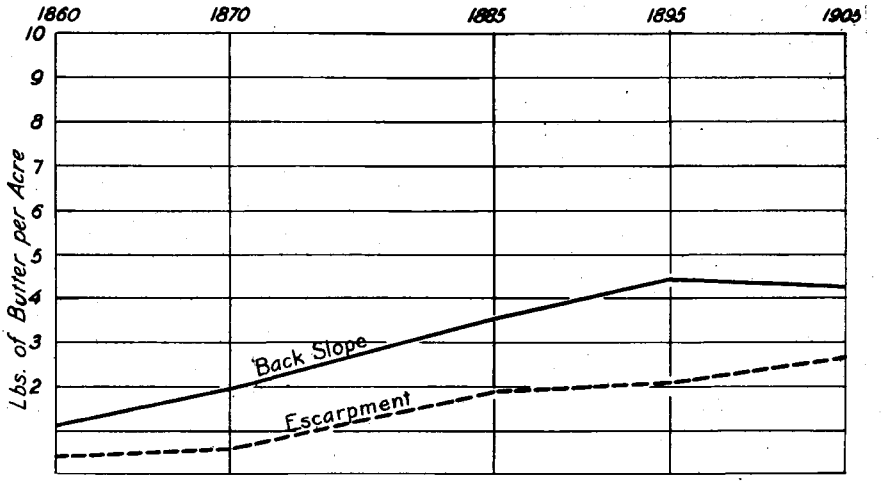

FIGURE 73. Butter production per acre, 1860-1905. For areas compared see figure 42.

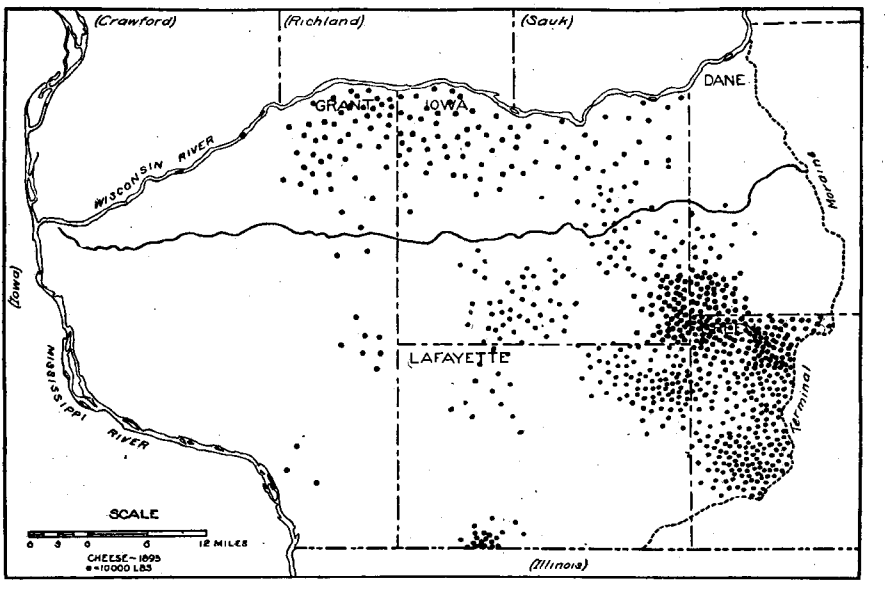

FIGURE 74. Cheese distribution, 1895.

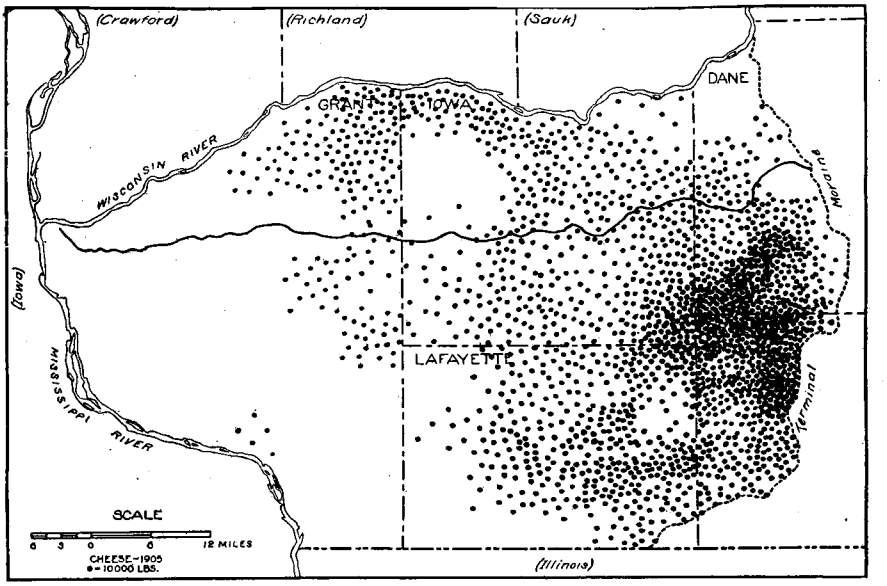

FIGURE 75. Cheese distribution, 1905.

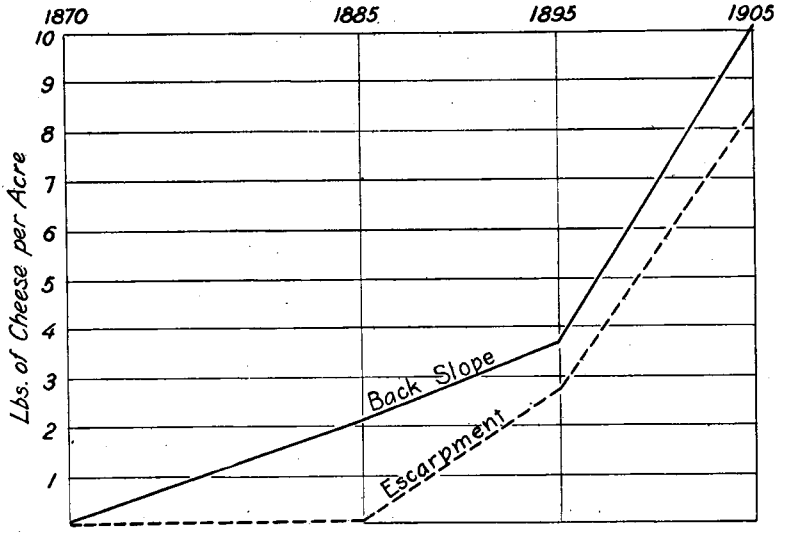

FIGURE 76. Number of pounds of cheese produced per acre, 1870-1905. For areas compared see figure 42.

also made at the two "ends" of the season in the Swiss cheese factories. The Swiss cheese belt extends through the eastern half of Iowa County to the Wisconsin Valley. On this margin the American cheese district adjoins it and crosses into Richland County. (See fig. 77.)

The exacting requirements in foreign cheese manufacture as to temperature, as well as to the character of the water and pasture, make the probabilities of its much wider extension in the future very slight; whereas the fulfillment of these requirements within this area and the extensive acreage unsuited for anything but pasture promise an important future here. In general the present limitations seem to be: (1) the line of 150 growing days; (2) the isotherm of 65° mean temperature; (3) the heavier rainfall—about four inches greater on the "island" than in the Wisconsin and Mississippi valleys; (4) the soil, differing for the varieties of cheese, but suitable for pasture; and (5) the adaptability of much of the region to little else than grazing because the rough topography unfits much of it for cultivation, and because the lower temperatures characteristic of the higher altitudes in the region favor pasturage rather than grain culture.

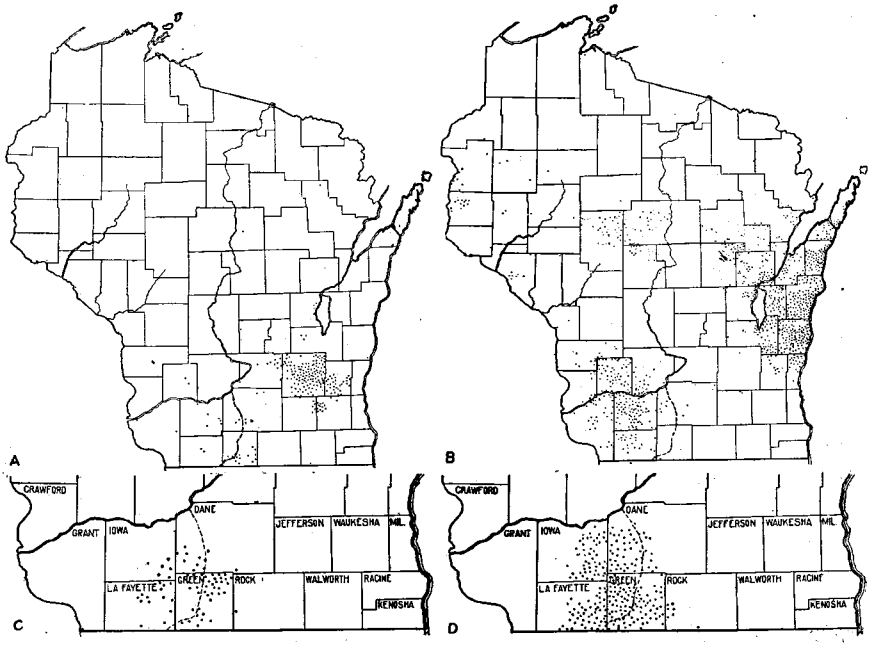

FIGURE 77. Cheese factories classified according to the type of cheese they manufacture during the greater part of the year. A. Brick cheese; B. American cheese; C. Limburger cheese; D. Swiss cheese. (University of Wisconsin. Bull. 251.)

CHAPTER VI

DISTRIBUTION OF POPULATION

Influence of Mineral Resources

The influence of the mineral resources of Southwestern Wisconsin upon the settlement of that region can hardly be overestimated. Their location not only hastened the period of settlement but to a very large extent determined the character of the population and its distribution. The lead region was a settled community in 1832 when the most of the rest of the state was a wilderness. Figure 78 represents the distribution of population at the census of 1836. It shows the mining region to be the most important of the three sections of the state having a population density of over two to the square mile. The Milwaukee and Green Bay districts are the other two. Mineral Point was for some time the most important town in Wisconsin. As little rivalry for the honor existed outside of the mining section, Belmont in Lafayette County was made the first capital of the territory (fig. 22).

Influence of Agriculture

The coming of the agriculturists filled in the "gaps" between the various settlements of miners so that the distribution of population within the escarpment and within the back slope soon became and is today exceptionally uniform. Between the two sections there is, however, a striking difference in density of population, the back slope having twice that of the north slope and also having the only cities in the whole region with a population in excess of 2,000. Figure 79 shows the distribution of population in 1920. It illustrates the following general facts: (1) a fairly uniform distribution of rural and urban population throughout the whole region; (2) the absence of any large cities; (3) a population density south of the Military Ridge approximately twice that on the north; and (4) a variation in detailed distribution which shows the influence of (a) mineral resources as in the Benton–Cuba City–Hazel Green section (fig. 35), (b) topography, for example the sparsity of settlement in central Lafayette and adjacent

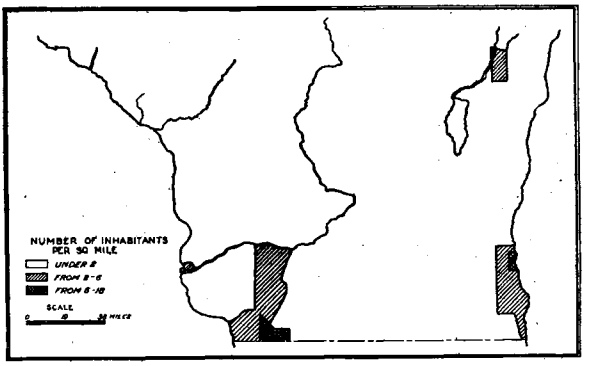

FIGURE 78. Density of population in Wisconsin, 1836. (Wisconsin Historical Collections, vol. 13, p. 251.)

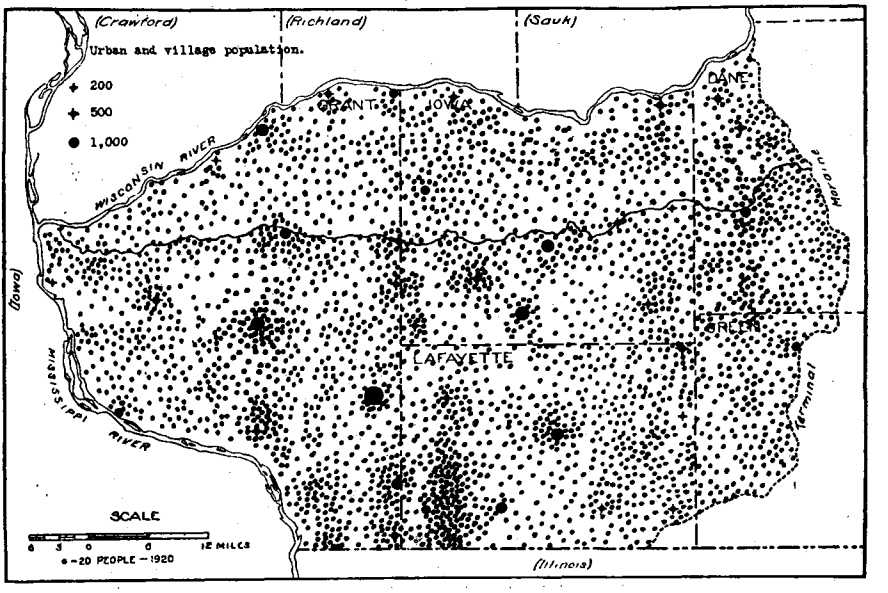

FIGURE 79. Distribution of population, 1920. (U. S. Census.)

Iowa County, and (c) railroads, as shown by comparison with fig. 24.

The rural character of the population is emphasized by the fact that there is not within the entire area a single city with even the modest population of 5,000, and indeed only two[1] with a population more than half that number. According to the census of 1920 the urban population[2] was only 7 per cent of the total, whereas in the state as a whole the proportion amounted to almost seven times as much (47.4 per cent). In the same year in this section there were eleven cities and villages each containing 1,000 or more people and possessing 22 per cent of the entire population.

Origin of Villages

Large cities grow at the crossing of great trade routes or where cargoes must change from land to water or at points having cheap power or raw materials. As a rule they possess intimate relations with a wide hinterland. The absence of such favorable conditions here has resulted in two small cities and many small villages. These villages are distributed rather evenly over the whole region and are located at convenient points on railway lines from which local farm produce may be shipped and miscellaneous merchandise distributed. They are distinctly *trade* centers, not *manufacturing* points, and each has a tributary region with a radius of four or five miles. In most cases the population has increased so slowly as to be practically static and in a few cases it has actually decreased.

River Ports

Many of these villages owed their beginnings to local advantages not of particular importance at the present time. Some owed their start to their location on the Wisconsin or Mississippi rivers, thus serving as ports in the early mining days. It was to Potosi, Paris, Helena, and Muscoda that the ox teams hauled the lead for shipment to St. Louis and New Orleans. Most of these river ports had smelters. Helena had the added distinction of possessing the first shot tower erected in the state and for the greater part of thirty years did a thriving trade in shot and lead. With the abandonment of the river as a carrier and the coming of the railroad the river towns lost their peculiar advantage and declined in importance or, if the railroad failed to reach them,

[1] Mineral Point (2,562) and Platteville (4,353).
[2] People living in cities having a population of 2500 or more.

actually disappeared. Old Helena and Paris suffered the latter fate. Potosi at one time rivaled Galena and Dubuque in both wholesale and retail trade. Supplies coming up the river were redistributed from here to troops at Fort Snelling, to lumbermen on the Kickapoo and Wisconsin, and to the hundreds of teamsters from Illinois who came to break the prairies in the spring, as well as to the general mining population of that vicinity. Potosi reached its maximum growth in 1843. The filling of the Grant slough, the decline in mine output which began four years later, and the exodus of the miners to California in 1848-49 contributed to its decline. An attempt to run a canal from the Grant River to the Mississippi failed and the river trade gradually shifted to Cassville located directly on the Mississippi. As agricultural interests took precedence over the mining, the source of exportable materials shifted to the rich level prairies to the north and east, like Blake's Prairie, which were tributary to other points, and Potosi dwindled from 1300 in 1845 to a little village of 501 in 1920. A large part of Potosi's history is repeated in that of Cassville. Situated farther from the mines, it did not enjoy the same period of prosperity in the forties, but had its heyday when the silting up of the Grant slough diverted much of Potosi's trade to the north. After the opening of the prairies in 1850 when corn and wheat rather than lead became the principal articles of export from this region, Cassville grew rapidly and trebled its population in a single year (1856). Though the railroad saved it from the fate of Paris, Cassville lost whatever leadership it possessed from its location on the river.

Mining Centers

A second group of villages and cities developed in the vicinity of rich lead and zinc deposits. Mineral Point is the best example, and Platteville, Gratiot, Benton, Hazel Green, and Highland owed their growth, at least in early days, to the mineral riches about them. The growth of these places was intimately related to the fortunes of the mining industry. A few of the old mining towns which possessed rich zinc deposits, as Benton, Livingston, Linden, and to a lesser extent Mineral Point, still retain their mining character. At present Mineral Point possesses the great plant for the reduction of zinc ore and the manufacture of sulphuric acid. (See fig. 38.) The majority of the early mining communities, however, have developed into agricultural trade centers and depend upon that industry more than upon mining for their support. In this latter class are Dodgeville, Montfort, Potosi, and Plattteville.

Trade Centers

A third and last group has arisen in response to the need for shipping and distributing points for rural sections. They are, with the single exception of Bloomington, located upon railroads. In a few cases the attractions of the county government seat, as in Lancaster, Dodgeville, and Darlington, or educational advantages, as at Platteville with its normal school and school of mines, have served to supplement the population of local tradesmen and retired farmers.

As has been seen, the mining stimulated the early development of the mineral sections. Since 1870, however, the advantage of growth has been markedly in favor of the agricultural township. The latter has grown slowly though steadily, has yielded a greater per capita of agricultural produce including live stock and dairy produce, and leads in the value of farms and implements. In general there is less conservatism, more progress, and less stagnation or actual decline in population and wealth in the agricultural sections. Fennimore and Mt. Horeb have had a notable growth in the last decade. The difference in rate of settlement of the mineral townships and the agricultural townships and the subsequent changes in population density are marked. The density of the population of the agricultural sections was small, but has increased at a slow rate; that of the mineral sections was large at first, much larger than the agricultural, but has since slowly declined or remained stationary.

CHAPTER VII

SUMMARY

The frontispiece for this bulletin is a photograph of a relief model of Southwestern Wisconsin. An examination of this illustration shows no extensive areas of level land. It is with respect to its *roughness* rather than to its climate, its distance to market, its soils, or its mineral resources that this region differs so decidedly from the glaciated section to the east. Then chiefly as a result of this broken surface there is a marked difference in the social and economic condition of the people living in this district as compared with those to the east.

Factors Influencing Development

Mineral Resources and Water Routes

The relative importance of these various factors has not always been in the past the same as it is at present. Mineral resources and easy access to transportation routes were in the early nineteenth century the most influential factors. Owing to its lead deposits and its location on navigable rivers, Southwestern Wisconsin at that time became the most populous part of the state. The peak of the lead production curve was reached in 1845–47 and was followed by a rapid decline. Although zinc mining as an industry was initiated only thirteen years later, it was unimportant until the close of the century. Since 1900 it has been one of considerable importance, though one whose activities have shown wide fluctuations from year to year.

Soil

Even before the lead mining industry had reached its climax, agriculture had assumed an important place among the industries of the region. At the decline of the former, agriculture assumed first place, a position which has steadily grown more and more secure.

Topography

With the increase in the importance of agriculture came a proportionate increase in the influence of topography upon man's activities.

This influence has affected the whole economic life of the region, penetrated to every corner, and touched every individual. It has operated mainly along two lines: the utilization of the land and transportation.

Utilization of land.—With respect to the first, topography has limited the amount of land which can be tilled, modified somewhat the methods of cultivation by limiting the use of heavy machinery and tractors, and finally because of these restrictions has served to emphasize the stock raising and dairy types of farming.

Transportation.—With regard to transportation the difficulties presented by the rough topography have been very real and indeed serious. In the early days the navigable streams afforded the most satisfactory means of communication, but long before the close of the lead era the Mississippi had proved inadequate as a highway.

The greatest single step in the solution of the problem, especially for long distance hauling, was the construction of the railroads. The Military Ridge and the flood plains of the Mississippi and the Wisconsin afforded good sites exceptionally free from heavy grades. Southwestern Wisconsin possesses a considerable railroad mileage in spite of the topographic obstacles. Though its position on a direct air-line between Chicago and the Twin Cities would seem to give it the advantage of through routes, adverse surface features have more than offset the saving in distance and the main traffic lines have avoided it. The railroad accommodations are therefore second rate, characteristic of branch lines.

It is particularly in the construction of highways that the influence of surface features is likely to be most felt. Unlike the railroad, the highway must link every house with every other. Furthermore, as funds for such purposes are often limited, the problem becomes still more serious. A comparison with the glaciated counties immediately to the east affords a striking illustration of this difficulty. A consideration of construction costs in the two regions shows in even the four items for which data are available the decided handicap of the driftless region. The items selected are dependent entirely upon topographic conditions and have practically the same unit cost for the two regions,[1] but because of the rough topography in the driftless counties the average costs for these four items per *mile* exceeded by more than $1500 that in the glaciated counties with their comparatively level topography. This extra charge, however, is small in comparison

[1] The cost per cubic yard of excavating and filling, per linear yard of guard rail, and the unit cost of labor and materials for construction and the making of surveys were practically the same in the two regions.

with that involved in the maintenance and in the heavier cost of hauling goods over rough hilly roads. In additon to topography there is the question of road materials. In the glaciated section gravels are abundant and their development is cheap. In the Driftless Area, on the other hand, gravels are scarce and the production of other materials, for example crushed rock, is very expensive. This condition makes the percentage of dirt roads left unsurfaced very high—eight times that in the more favored counties to the east.

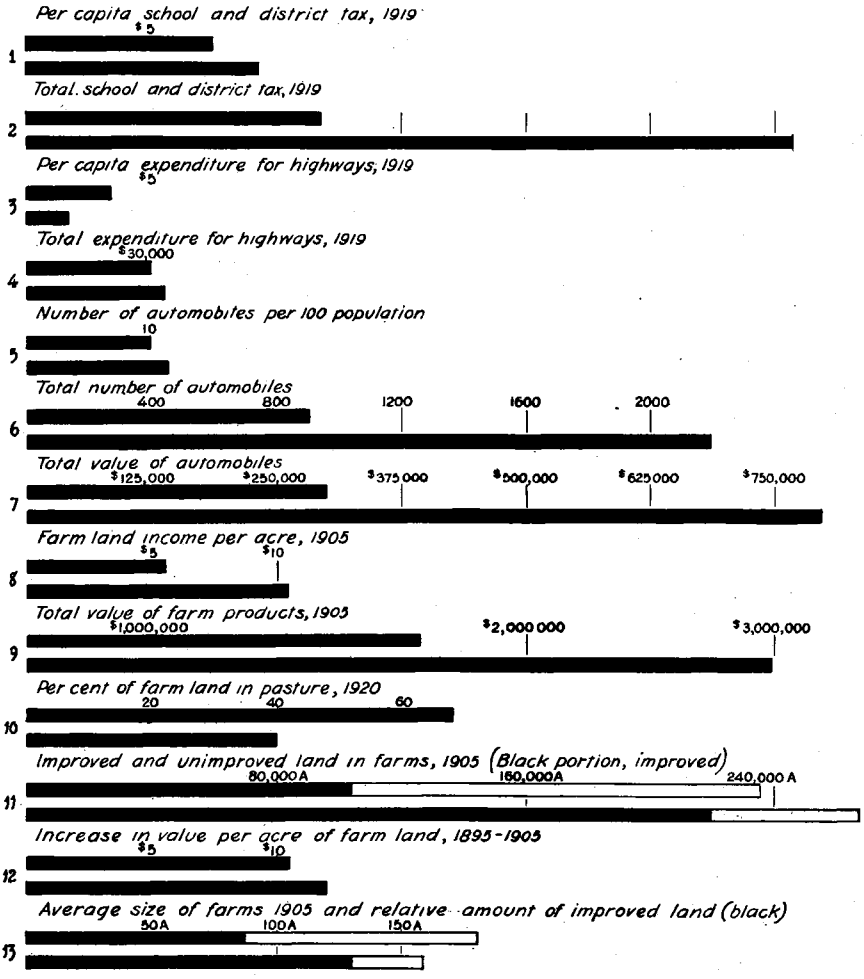

FIGURE 80. Graphs summarizing contrasting conditions on escarpment and back slope. For areas compared see figure 42. Upper bar in each pair represents data for escarpment; lower, for back slope. Graphs 1 to 7 for the year 1919. In graph 2 each division represents $30,000.

Back Slope and Escarpment

Just as topographically Southwestern Wisconsin presents marked contrasts to the glaciated counties, the two major subdivisions within the area are differentiated on the same basis. The escarpment and the back slope of the cuesta comprise the greater part of the region, the former with a grade four times the latter, and with a correspondingly greater dissection. In these two sections is found the same intimate relation of topographic conditions and agriculture and transportation, and also their attendant effects on social and economic condi-

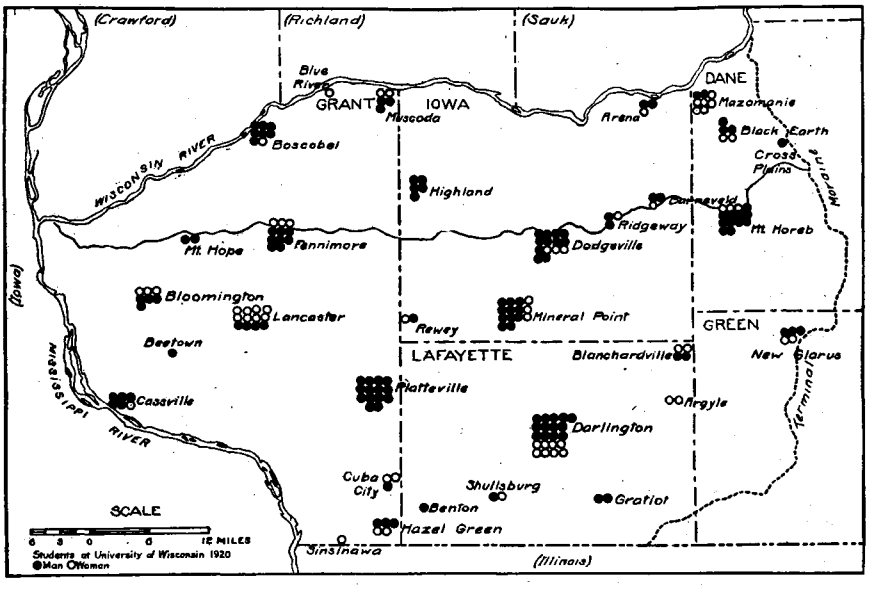

FIGURE 81. Students attending University of Wisconsin, 1920.

tions. Some of these contrasts are shown in figure 80. Thus in 1905 the average farm on the back slope was smaller by 37.5 acres, the acreage improved was larger by 50 per cent, the value of the equipped farm was almost 75 per cent greater, and its income was estimated 33⅓ per cent more.

Conclusion

Associated with and to a degree the result of the difference in economic conditions prevailing on the opposite sides of the Military Ridge is a certain contrast in the social conditions. A better economic en-

vironment has given the south slope a population density twice as great, more luxuries as evidenced by the greater number of automobiles per hundred population, better schools as suggested by a total expenditure 2½ times as great for equal areas, and by the number of students at the University of Wisconsin (fig. 81). Persistence of frontier conditions on the north slope is further shown by the lower percentage of tenancy there. The contrasts developed from the differences in topographic conditions have been somewhat lessened by the mining population in the lead sections. Their methods of farming have been less progressive than those of a purely agricultural population, and their conservatism has led to the exodus of many of the younger generation to other sections.

In general, southwestern Wisconsin will remain dominantly agricultural, and the bulk of the population rural. A fertile soil is its greatest resource, a rough topography its greatest handicap.

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