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L. A. CHASE

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RURAL STATE AND PROVINCE SERIES

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RURAL MICHIGAN

RURAL STATE AND PROVINCE SERIES

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Plate I. Norway pine near Marquette—the property of the city.



RURAL STATE AND PROVINCE SERIES

# RURAL MICHIGAN

BY

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STATE NORMAL SCHOOL

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## PREFACE

In the pages that follow will be found a general and free account of the past and present condition of Michigan agriculture and rural life. It is not the province of the book to contain a careful and detailed analysis of the economic and social problems related to the subject; such a study must await the labors of other students along many special lines in the years to come. So far as it goes, it is hoped that the book will prove of interest and value to the general reader and may serve as a basis for further investigation of particular problems. The book, then, may be regarded as an introduction to the study of the rural situation in Michigan, putting the State before the reading public in quite a new light.

It has not been possible fully to refer to the sources of information since many of these are in manuscript, and information has been gained through personal inquiry, contact, and observation. It will be obvious that the writer is indebted to many persons in the preparation of the work: state officials, members of the faculties of the University of Michigan and the Michigan Agricultural College, secretaries of the development bureaus and of

farm organizations, and others who are personally in touch with some aspect of Michigan agriculture. The writer himself has lived all his life in the State, often in close contact with its rural life at widely separated points in both peninsulas. For this reason, he thinks he appreciates local differences rather more clearly than would be the case if his experience had been confined to one part or peninsula only. To all those who have so readily responded to his request for material and information he renders grateful acknowledgment. For photographs acknowledgment is due to Mr. Ezra Levin of the Michigan Department of Agriculture, to Senator Roy Clark of Benton Harbor, the Superintendent of Schools, Houghton, and the Western Michigan Development Bureau. The frontispiece is by Werner of Marquette.

It should be added that, when omissions of essential matter seem to occur, this, in some cases, is attributable to a failure to obtain such information from those who are alone able to provide it. Not many such lapses on the part of others, however, have occurred. The writer does not doubt that he himself has failed to discover all available sources of information. Since much of the material used in writing this volume is not readily accessible, the writer has been more free with quotations and statistics than considerations of style alone would warrant. He thought his readers would appreciate having this material made thus accessi-

ble. It has been a pleasant task to try to present the State in its rural phase, rather than from the point of view of political history, government, urban or corporate interests.

L. A. CHASE



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# RURAL MICHIGAN

## CHAPTER I

### THE PHYSICAL AND CLIMATIC SETTING OF MICHIGAN

MICHIGAN is the land of the "great water," as the Algonquin origin of the name testifies. It is the State of the Great Lakes, lying in the grasp of the largest fresh-water bodies on the globe.

It is one of the five states formed out of the Old Northwest territory in accordance with the Ordinance of 1787. It is the northeastern member of this group. Ontario, Canada, it has to the eastward and northward, Ohio and Indiana to the southward of the Lower Peninsula, and Wisconsin to the southward of the Upper Peninsula.

The most southerly point of the State is the intersection of the boundary lines of Michigan, Ohio and Indiana, and is officially determined to be north latitude 41 degrees, 41 minutes, 46.20 seconds, where stands the boundary stone. The most northerly reach of the mainland is some 400 miles, where Keweenaw Point touches latitude 47 degrees, 28 minutes, 75

seconds, while the most northerly of the Gull Islands is nearly a degree still farther to the north. The east and west dimension of the State runs through approximately eight degrees of longitude, Port Huron standing in longitude 82 degrees, 25 minutes, 30 seconds, while the far-away mouth of the Montreal River at the most northwesterly extremity of the Upper Peninsula is in longitude 90 degrees, 25 minutes, 25 seconds.

For a state whose area is only 57,980 square miles (about that of Illinois), Michigan is evidently sprawled over much space on the map,—a fact deeply impressed on the traveler from Ironwood to Lansing, or Houghton to Detroit. This alone helps to keep the State disorganized and separatist in tendency, all the more that a waterway broad and deep divides northwestern from southeastern Michigan. It involves, too, variations in temperature, rainfall and duration of sunshine and twilight of the utmost importance to natural vegetation and animal life and to agriculture. Most persons do not appreciate that it is as far from Michigan's copper country to the metropolitan city of Detroit as from Detroit to the national capital in terms of miles in a direct line between the points: and, although traveling facilities are reasonably excellent, the time and distance for the intra-state journey is even less favorable. It is hardly to be wondered at that one sometimes hears talk of Michigan's dissolving itself into two commonwealths, when nature has omitted nothing that works for mutual incompatibility and man has done little to



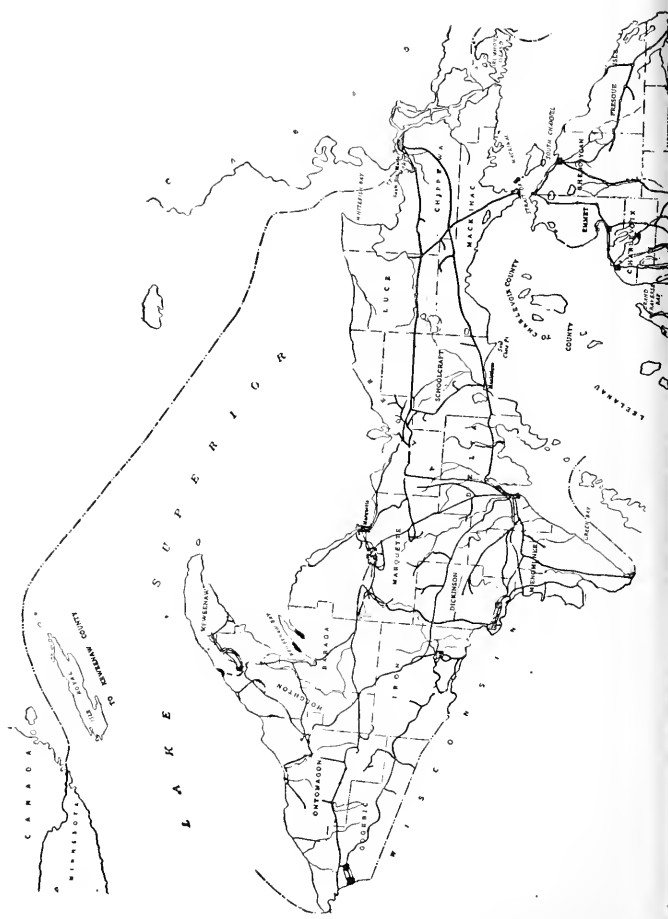
force enduring bonds of unity. Mail and express, freight and passengers transported between upper and lower Michigan, have the choice of making a long detour through three states or traversing the nine-mile ferry-way from St. Ignace to Mackinac City. In addition, there are many leagues of sparsely settled and lightly productive land between the populous extremities of this hyphenated state. The inhabitant of Coldwater or Adrian who may venture as far as Negaunee or Calumet finds himself in quite another world: a land of rock-ribbed rugged barrenness to his casual observation; of sparkling tonic air, of Alpine streams rushing down over their rocky floors to the great lakes never far away; of vast swamps and forests, or the disreputable remains of vast forests; of all languages except perhaps his own. The smiling summer landscape of Clinton County let us say—the succession of diminutive fields, fenced and tilled with care, of orchards and wood-lots, or prosperous-looking farm buildings and neatly kept villages, the oppressive pollen-laden summer atmosphere, the gently undulating surface of the land—convey an equal impression of unreality to the long-time dweller by the shores of Gitchie Gami. At the outset, the student of conditions in Michigan must keep in mind the complete disresemblance, or at least of the possibility of it, of the basis of existence in east and west, in north and south, in this or that nook and corner of the State.

## GEOGRAPHICAL AND PHYSIOLOGICAL FEATURES

Michigan's most striking physical characteristic—as one glances at the map (Fig. 1)—is its peninsularity. This fact is suggested in the Great Seal of the State, —*si queris peninsulam amenam circumspice*,—"if you seek a beautiful peninsula, look around you."

Residents of Michigan commonly speak of "the Two Peninsulas," but in reality, the two major land masses that compose the State are themselves clusters of lesser peninsulas, the most obvious of which are "the Thumb" between Saginaw Bay and Lake Huron, "the Horn" between Grand Traverse Bay and Lake Michigan, and the Keweenaw Peninsula between Keweenaw Bay and Lake Superior. Lesser land bodies project themselves at intervals into the encompassing fresh-water seas, greatly extending the shore-line of the State and, each in its own way, affecting navigation, climate and the economic and social interests of the people. Thus, the Keweenaw Peninsula deflects the Duluth Sault Ste. Marie shipping route to the northward, gains for the agriculture of the region a growing season of one hundred and fifty days, comparable to that of the southern part of the State, and makes available an enormous mineral wealth that otherwise might be imprisoned beneath the waters of the Lake. For thousands of miles this peninsular feature places Michigan in direct contact with the world's most extensive and widely used inland waterway, while it isolates her









from her neighbors and interferes with communication east and west in the Lower Peninsula and north and south in the Upper Peninsula, and divides the peoples of either section of the State from their fellow citizens of the other. It throws the southern peninsula into closest business and social contact with Ohio and Indiana, while the similar trend of the State "above the Straits" is in the direction of Wisconsin. It has created two states in the guise of one. It has produced enclaves like "Copperdom," with the economic and social body of the commonwealth.

The two major land masses which, with their appendages, thrust themselves in among the western members of the Great Lakes group, present noteworthy variations in geological structure and climate and, consequently, in biological, economic and social conditions. Their topography is characteristically glacial, a land surface of glacial drift with occasional moraines, eskers and drumlins, and of lakes, swamps and marshes, some long since extinct and others still extant, while, especially in the north, plainly striated areas of bed rock testify to the movement of glacial ice again and again over the surface of the land. Areas of sand, gravel and clay, quite pure or much intermingled, are interspersed casually among the watered depressions and rocky excrescences of the State. And yet if one have regard to the chief physical tendencies, Michigan comprises three quite distinct sections: the Upper Peninsula and the northern and southern halves of the Lower Peninsula.

It is in the southern section of the southern peninsula that the greatest agricultural development has taken place, while the Upper Peninsula is the seat of an enormous mineral wealth, of past and prospective development. Between these two portions of the State lies a region that once sent to market prodigious quantities of forest products but now lies shorn and largely unproductive, except of brush fires and real estate wild-cattling.

The land surface of Michigan comprises for the most part glacial drift, varied in composition and depth and resting on a foundation of native rock of great geological antiquity. In the southern peninsula, this foundation stone attains its greatest elevation in the southeastern area in a zone extending from the "Thumb" to Hillsdale County, and its greatest depression near Ludington and Manistee. To the northeast the rock is again elevated, not to the same degree as in the southeastern counties, although the superimposed layer of drift is so deep that the highest elevation of the land surface of the Lower Peninsula is a point near Cadillac. From Saginaw Bay westward there is a deep valley in the bed rock and a low elevation of the surface of the land. Indeed, if the drift were removed, the northern section of the peninsula would appear as an island entirely surrounded by water. As it is, the area west of Saginaw Bay has a very low elevation (at St. Charles it is about thirteen feet) above lake level; and in periods of high water, the over-flow from the Maple River (a westward-moving affluent of the Grand



River) proceeds eastward overland to a stream entering Saginaw Bay, bisecting the peninsula.

The glacial drift left by the retreating ice has been heaped up, windrowed and scoured, until the surface presents a succession of ridges, hills and depressions—the remains of ancient water-courses, the outlets of glacial waters seeking the sea by strange paths unknown to the geographies of today. Most considerable of these glacial rivers was the “Grand River Outlet,” whose ample valley extends from southern Gratiot County to a point below Grand Rapids; and its affluent, the “Imlay” Channel, whose course may still be traced on a line from Owosso and Ovid to Maple Rapids. Relatively tiny streams now trickle down the beds of these once mighty waterways.

In flood time, there is a quick expansion and drowning of the old valley floor, and a quick recession to the restricted channels of the present, after a deposit of fluvial silt has been left to enrich the fertility of the soil. On the other hand, while Michigan has no true mountains, there are points in both peninsulas which bear this designation because of their prominent position in the landscape. Thus Mount Judah, six miles north of Pontiac, has an elevation of 1,180 feet above sea-level, and Bald Mountain in the same locality is 1,195 feet high.

There are numerous other hills and kames in the southern counties of the State from 1,000 to 1,200 feet in elevation. The morainic country near Cadillac reaches an elevation of 1,500 feet. The eastern

portion of the Upper Peninsula presents less rugged aspect than the western section. The underlying limestones and sandstones are well covered with drift, while the metamorphic rocks west of the longitude of Marquette frequently protrude above the covering soil, giving the landscape in some places a knobbed rugged outline and, facing Lake Superior, a semi-mountainous appearance. Here, to the east of Keweenaw Bay, are situated the Huron Mountains, the Mecca of sportsmen, whose dim contour seen from the heights of the Copper Range across the wide expanse of the Bay, touch with Neapolitan loveliness one of the most charming vistas in America. To the westward, also, abruptly rising from the Lake, are the Porcupine Mountains, 2,023 feet above the sea, the highest elevation in Michigan, and extending through very much tumbled country in Ontonagon County into the Copper Range. The "Cliffs" of old Keweenaw still charm the traveler and once yielded a prodigious wealth in copper and silver.

Evidently Michigan is not a mountainous state, but its ruffled surface, its sag and swell topography (as Leverett describes portions of it), have a definite relation to agriculture. It establishes great variety of soils. It protects areas from cold northerly winds. It definitely affects air drainage and cloud distribution. It establishes wet, marsh and swamp lands, and other areas whose drainage is normally excellent but excessive in periods of scanty precipitation. It keeps some areas within the cold strata of the lower atmosphere, and elevates others to the warmer upper

air layers. The relation of all this to agriculture is manifest. There are places remote from the influence of the lakes where peaches do well. Such a point is the high morainic ridge near Eureka in Clinton County and, well to the north, a similar ridge near Higgins Lake in Crawford County; while even close to Lake Michigan, bad freezes, such as that which occurred along the southwest shore on October 11, 1906, have done much less damage on the elevated table-land some miles back from the Lake. The first snows of winter appear at Ishpeming sooner than at Marquette eight hundred feet lower down, if also a dozen miles nearer the Lake. Some low areas, such as that in southern Gratiot and Saginaw counties, have suffered much from unseasonable frosts, creating for the pioneers real famine conditions, until the phrase, "starving Gratiot," in the decade before the Civil War, acquired sinister significance. Undoubtedly the encompassing forest complicates the situation, particularly as affecting air drainage. J. M. Longyear of Marquette has observed that Finnish farmers, in clearing their farms, have frequently established their clearings at adjacent corners in order to increase the free space for the movement of the atmosphere and thus reduce the liability to frosts. It appears that the removal of the forest cover in the flat country in the region of the old "Grand River Outlet" (Saginaw and Gratiot counties) has similarly reduced the liability to unseasonable freezings. It is plain, however, that farms located on hills and ridges, in periods of fall-

ing temperature, find the colder air flowing away into the valleys and bottom-lands, thus affording a fair margin of safety on the high lands. It has been noted, for example, that the high ground of the Paynesville "Quadrangle," in southern Ontonagon County, Upper Peninsula, with an elevation of some 450 feet above Lake Superior, escaped killing frosts, when neighboring farms on low-lying lands suffered materially. When it is recalled that there is very little flat country in Michigan, that much of its land surface is undulating, billowy, of a knob and depression, sag and swell description, it is evident that, from this factor alone, agriculture is conducted in varying conditions. It gives the mint and celery country of the southwestern counties of the Lower Peninsula and, at present in its incipiency, of the eastern counties of the Upper Peninsula; and productive fruit orchards at many interior points. It affords numerous areas whose valuable crops must continue to be blueberries, cranberries and wild rice, and, if the vision of Sydney Smith Boyce of Saginaw comes true, the swamp milkweed, from which, it is hoped, a very useful textile fiber may be produced.<sup>1</sup>

#### THE GREAT LAKES SYSTEM

The four enormous lakes, which, with their connecting waters, give Michigan her unique position

<sup>1</sup> On topographical features, see Leverett: "The Surface Geology of Michigan"; Leverett and Taylor: "The Pleistocene of Indiana and Michigan"; Bull. 461 and 559, U. S. Geol. Survey; "Results of Spirit-Leveling in Michigan"; "Dictionary of Altitudes."

among the forty-eight states of the Union, have strikingly determined her development. They opened up the way of settlement, first for the French of Canada, then for the Americans of the New England and Middle Atlantic states. They made possible the exportation of agricultural products when transportation by railroad was in its infancy, and to a still greater extent the shipment of forest products was in their keeping. Without them a relatively small proportion of the wealth of copper and iron of the Lake Superior region would have been accessible to the requirements of the world's industries, nor would the coal and other accessories of the mining industry have been as readily available without this avenue of the import and export trade.

So well is the commercial importance of the Great Lakes waterway appreciated that Michigan has most eagerly promoted such schemes as have from time to time been brought forward for making improvements where nature's work was defective for the purposes of man. In 1855 the St. Mary's Ship Canal was completed, thus affording a shipway between Lake Superior and Lake Huron, while in 1860 and 1873 ship canals were opened from Lake Superior into Portage Lake at either extremity, thus bringing navigation more accessible to the central area of the copper district. Then came the improvements of the St. Clair and Detroit rivers, while today the State enthusiastically urges on the proposed deep-waterway to the ocean by the improved St. Lawrence route. Lake Superior, westernmost of the series of great

lakes, is 602 feet above sea-level. A descent of twenty-one feet brings its waters to Lake Huron. The course through St. Clair River and Lake and the Detroit River lowers the waterway 8.63 feet to the level of Lake Erie. Then comes the stupendous drop through the Niagara gorge to Lake Ontario at 246.19 feet elevation. Some 221 feet of the descent from Lake Ontario must be overcome by canals or slack-water navigation, before the Great Lakes can in any proper sense be put in touch with the world's maritime trade.

These vast "sweet water seas," whose presence on the borders of the State has so definitely influenced the economic history of the commonwealth, have themselves had an intricate, but interesting, geologic history. The advance and recession of the glacial ice, the elevation and subsidence of the surface of the land, from time to time formed and reformed lakes of varied shapes and sizes along the line of the depressions which now contain their dwindled remains. These prehistoric glacial lakes are known by such names as Lake Saginaw, Lake Chicago, Lake Algonquin, Lake Duluth, and Lake Ontonagon, while the Nipissing Great Lakes conformed on a somewhat larger scale to the Great Lakes of the present era. Of these ancient bodies of water in the Michigan area, the outlet was sometimes by way of the Georgian Bay-Lake Simcoe route through Ontario; sometimes via the Chicago-Illinois River depression into the Mississippi, or to the far northward over the line of the low ground between the west end of Lake

Superior and the headwaters of the same mighty stream. Lake Saginaw drained westwardly through a depression corresponding to that which still bisects the northern and southern portions of the Lower Peninsula, where the height of land remains at no more than seventy-two feet above the level of Lake Huron. These low flat and wet partially submerged lands made infinite trouble for the pioneers of this region, but suggested the feasibility of a trans-state canal in the first years of statehood. These lands have by infinite labor and much drainage and with the removal of the forest, become among the most fertile sections of the State, the home of the culture of the sugar-beet, of dairying, of coal and of salt. The shores of these lakes of ages past may still be traced over the countryside. Their beds of deep clay, sand or gravel determine for some sections the quality of its agriculture. Even thus is the hand of the past still heavy in the affairs of today.

The Great Lakes of today are maintained at their variable levels by a large number of rivers and rivulets, none of any great length or volume. Lake Erie receives the Raisin and the Huron; Lake St. Clair the Clinton; Lake Huron the Saginaw and Au Sable; Lake Michigan, the St. Joseph, the Kalamazoo, the Grand, the Muskegon, the Escanaba, Manistique and the Menominee; Lake Superior, the Taquamenon (of the Hiawatha story), the Ontonagon and the Montreal, and many others not related to Michigan. Of these rivers, the Saginaw, which combines the waters of the Cass, the Flint, the Shia-

wassee and the Tittabawassee, drains the largest land area in Michigan—6,250 square miles.<sup>1</sup> It reverses the direction of stream-flow, formerly debouching from old Lake Saginaw at this point. Even in flood time, the Saginaw may steal away some of the overflow from its rival, the Grand River system, which leaves the Maple River in the vicinity of Bannister and Ashley, Gratiot County, and makes an overland current into the Bad River of the Saginaw basin. The Grand River drainage basin is put by Leverett at some 5,600 square miles, while the Muskegon drains 2,700; the Huron, 1,050; the Kalamazoo, Manistee and Au Sable, 1,000 square miles each. In the Upper Peninsula, the Manistique, an affluent of Lake Michigan, has the largest drainage basin, 1,400 square miles, chiefly in Schoolcraft County and including the great Seney Swamp. Of the Lake Superior streams, the Ontonagon, with a drainage area of 1,250, and the Taquamenon, with 800 square miles, including another large swamp area, are the most considerable. Michigan is charged with being the fifth wettest state in the Union.<sup>2</sup>

Michigan possesses a very large number of inland lakes, and formerly the numerous marshes and swamps gave the State a sinister reputation—not without cause—although it was their mosquitoes, and not their “miasmatic exhalations,” that were responsible for the bone-racking ague of the early settlers. Here rise the streams and streamlets of

<sup>1</sup> Leverett.

<sup>2</sup> Miller and Simons: “Drainage in Michigan.”



the State, if not in one or another of the thousands of limpid springs that are derived from the copious subterranean waters of certain sections.

Together, these interior water-courses have been intimately associated with the economic and social development of Michigan. They were the first and natural means of penetrating the inner fastnesses of the region. The early territorial and State statutes referred to them as "navigable," and required that dams should include locking facilities for the passage of commerce up and down stream. Most of them would hardly warrant the designation, "navigable," today, for the effect of deforestation on "run-off" and stream-flow has been to flood the river valleys for a short season and then to leave them scant of water for the balance of the year. Nevertheless, steamers did run up the St. Joseph River to Niles, up the Grand River to Grand Rapids, and still ply the Saginaw for a few miles inland and on at least one ill-fortuned occasion sought a more interior point up the Shiawassee and Bad rivers. In the pioneer period there was much canoeing on all these streams, connected at intervals by portage paths where the Indians had showed the way to the incoming whites. There was much rafting of supplies, of logs and of lumber—a process which moved progressively northward as the lumberman's frontier receded from decade to decade.

## CLIMATE OF MICHIGAN

The effects of the Great Lakes are not confined to the obvious relations with commerce. They have a definite influence on the climate of Michigan. Lake Superior has an area of 31,810 square miles. The superficial area of Lake Michigan is 22,400 square miles; of Lake Huron, 23,010; of Lake Erie, 9,940; and of Lake St. Clair, 460. Thus these five lakes have a total area of 87,620 square miles. The depth of Lake Superior reaches 1,180 feet; of Lake Michigan, 870; of Lake Huron, 750; of Lake Erie, 210, and of Lake St. Clair, 24 feet. Obviously this mass of water absorbs an immense volume of solar heat in summer and reluctantly yields it up again to the contiguous atmosphere, thus raising winter and lowering summer temperatures in the region within the scope of their influence.

The records of the United States Weather Bureau taken at points on Lake Erie show a midsummer temperature ranging as high as 78 degrees during a period of more than eight years at Toledo, while Lake Huron and Lake Michigan averages run a few degrees cooler. The much greater volume of water in Lake Superior and its more northerly latitude keep its summer temperature well below that of its southerly relatives; yet here, too, the warming up process of July and August carries its surface thermometric readings to a point above 60 degrees. That the midwinter temperatures of all these lakes run

down to freezing or only a few degrees above it, merely means that the waters of the lakes have yielded up their heat chiefly to the covering atmosphere, thus delaying the time of killing frosts and winter's cold. If Michigan were inclosed by areas of land instead of water, this process of heat radiation from earth to atmosphere would take place more rapidly and, in the northern districts of the State, early September would find the season of growth for crops brought definitely to an end.

A chart prepared by the United States Weather Bureau's Grand Rapids office, based on observations covering a period of twenty-five years, brings out very graphically the effect of the Lakes in retarding autumnal frosts. In the minds of most persons, the country adjacent to Lake Superior is sufficiently remote to suggest a subarctic flora and fauna with native Eskimos dining on whale-blubber as dwellers by its shores. Yet in areas projecting into the Lake, such as the Keweenaw Peninsula and White Fish point, as this chart reveals, the first killing frost normally appears about October 10. The most southerly counties of the Lower Peninsula, near the center-line of the State and so removed from the Lakes' ameliorating influence, terminate their growing-season on the average at as early a date as Grand Marais or the West Keweenaw shore some four hundred miles to the north. Indeed, the lines passing through points in the Lower Peninsula having the same normal date for the occurrence of the first killing frost of autumn, very strikingly are north and south lines,

not east and west, beginning on the upper reaches of the lakes and terminating at interior points near the south boundary of the State. Thus the line for October 10 joins White Pigeon in St. Joseph County close to the Indiana line, and Grand Traverse Bay far to the north a little below the Straits of Mackinac. St. Johns and Ionia just north of Lansing the capital of the State, normally receive their first killing frosts on September 30, as soon as Mackinac Island. Along the south shore of Lake Superior, the autumnal frost period is fixed at a progressively earlier date, and is three weeks earlier on the Menominee iron range near the Wisconsin boundary than in the copper country many miles to the north. Elevation may have its influence, but undoubtedly the lakes are the decisive factor.

In the spring conditions in a measure are reversed. The wintry waters of the lakes retard the approach of warm weather and of the day of the last killing frost. One notes, for example, that the date of the last killing frost in spring is some ten days later on the western shore of the Keweenaw Peninsula than at points on the western shore of the Lower Peninsula; but the delayed frosts of autumn give the copper region a growing period for vegetation of one hundred and twenty to one hundred and forty days, depending on location, and this is as much as can be said of the country north of Saginaw Bay in the Lower Peninsula, and even of some interior points as far south as Ann Arbor. It is a period only ten days shorter than

much of the west Michigan coast-line enjoys, the predominantly fruit-producing section of the State. Indeed, many varieties of fruit do very well along the "sleak" Lake Superior shore, where defects of soil rather than of climate limit the productivity.

The manner in which this influence of the Great Lakes is applied is directly related to the normal westerly direction of the winds. Grand Haven on the western shore of the Lower Peninsula has a temperature in winter averaging higher than that of Milwaukee on the opposite shore of Lake Michigan, while its summer temperature runs several points lower. Its coldest days in winter and its warmest days in summer are never so extreme in their range.<sup>1</sup> This explains the presence of a "fruit-belt" in western Michigan and its absence in the eastern or Lake Huron-Lake Erie coast-line, although these lakes are normally of about the same temperature. The trend of the northern peninsula is west to east, so this influence of winds and lakes works out differently. Marquette's hottest summer days occur when the wind is southwesterly, deriving its torridity thus from the superheated land surface over which it is moving. Yet a shift to the northwest will, in a few minutes, cause one to seek protection from the frigidity of the outer air.<sup>2</sup> Such hot blasts as occasionally afflict dwellers by this great

<sup>1</sup> Seeley: "The Climate of Michigan and its Relation to Agriculture."

<sup>2</sup> July 14, 1920, in ten minutes the U. S. Weather Bureau thermometer fell 27 degrees.

cold northern sea never come from the southeast, for in that direction lies Lake Michigan, fifty miles away but yet sufficiently close to exercise, it is presumed, a positively ameliorating effect.

The Lake Superior country is favored with seasonal summer rains almost without fail, this being attributed to the prevailingly northwesterly course of the summer winds. The fact that the winter temperatures do not reach the low points one would expect so far to the north and does find at points due west in Minnesota and North Dakota, is plainly due to the proximity of the tempering, if chilling, influence of this master lake. To realize how much of Michigan is exposed to this influence of the Great Lakes on its climate, one needs to bear in mind that, without measuring closely every indentation and projection of the shores, the coast-line of the Lower Peninsula is some 905 miles in length; that of the Upper Peninsula, 810 miles (a more precise measurement of the line of contact between land and water would considerably extend this distance).<sup>1</sup>

Factors other than the Great Lakes affect the conditions of life and agriculture in the northern and southern peninsulas. The extension of the State through six degrees of latitude affords the northern portions more daylight and more twilight in the growing period than is enjoyed by the southern counties. L. M. Geismar, county agent of Houghton County and formerly in charge of the

<sup>1</sup>The coast-line of the St. Mary's, St. Clair and Detroit rivers is included in the foregoing figures.

State Experiment Station at Chatham, Alger County, has computed the number of hours during which the sun is above the horizon for the period of six months from April 15 to October 15, for latitude 42 degrees north (approximately of Coldwater, Hillsdale and Adrian in the most southerly tier of counties); for latitude 43 degrees north (approximately of Port Huron and Grand Rapids); and for latitude 47 degrees north (approximately of Houghton on the Keweenaw Peninsula, Lake Superior); and he has ascertained the excess of possible sunlight for the forty-seventh parallel to be 56.33 hours when compared with the forty-third parallel, and to be 69.13 hours, when compared with parallel 42.<sup>1</sup> The particular conclusion which Geismar derives from the foregoing study is that the Upper Peninsula of Michigan is very favorable to the growth of the sugar-beet, because the conversion of starch to sugar goes on in the presence of sunlight, and, consequently, that one may expect a greater sugar-content in beets grown in the northern peninsula as compared with the southern counties of the State.

The northern latitudes not only have an advantage over the southern in regard to their quantity of sunlight, but also in respect to twilight. Computations of the end of twilight for various latitudes falling within the boundaries of Michigan, made by W. J. Hussey, professor of astronomy of the

<sup>1</sup>Forty-second Ann. Rept. State Bd. Agr., Mich., 1903, p. 279.

University of Michigan, disclose the fact that for latitude 40 degrees and for June 10, twilight terminates at 9:30 P. M., while for parallel 46, it terminates at 10:29 P. M. A month later the favorable balance is 55 minutes. Combining these surpluses of twilight for all the days of the growing season, the total advantage of parallel 46 over parallel 42 is 100 hours, 44 minutes, and of parallel 47 over parallel 42 is 141 hours, 18 minutes.<sup>1</sup> The processes of growth in plants continue, it is pointed out, during the period of twilight.

This considerable north and south extension of the State introduces other factors less favorable to agriculture in the northern counties. While the mean annual temperature of Michigan is placed by Schneider at 44 degrees, that of the two southern tiers of counties is approximately 48 degrees, and that of Calumet and Sault Ste. Marie in the extreme north but somewhat removed from the influence of the lakes is approximately 39 degrees. The average maximum temperature of the interior portions of the Lower Peninsula is put at 85 to 90 degrees, while that of the Upper Peninsula at Marquette is 58.5 degrees (May-September, thirty-three years' average). Nevertheless, the record for the highest summer temperature is held by Marquette on the south shore of Lake Superior, where, July 15, 1901, the thermometer at the station of the Weather Bureau registered 108 degrees. Winter temperatures in the northern peninsula range about

<sup>1</sup> Computations by C. C. Spooner and L. M. Geismar.



0, and in the southern peninsula some 10 degrees higher. Extreme minimum temperatures range from 25 to 40 degrees in the State, while the record for the lowest winter temperature is also held by the northern peninsula: namely, -49 degrees at Humboldt, February, 1899. Michigan experiences its coldest weather on the highlands of the iron ranges in the Upper Peninsula and in the central elevated areas of the northern section of the Lower Peninsula. With snow on the ground from November to April, sometimes for a longer period, agriculture is crowded into a period of fewer days, of more daylight and twilight than the southern counties enjoy; while the winters present a special problem in the maintenance of live-stock.<sup>1</sup>

The lower temperatures normally prevailing in the higher latitudes seem to be primarily responsible for a "tone" or "tang" in the atmosphere not found farther south. To travelers between the two peninsulas this condition is very noticeable, and is explained by Schneider and other students of the climate of the State as resulting from the lower "absolute" humidity of the northern atmosphere, lower temperature, and the more rapid evaporation from the body, with a consequent feeling of exhilaration. Concurrently, the northern air is free from organic matter, due to the prevailing northwesterly trend of the winds, which thus pass over

<sup>1</sup>U. S. Dept. Agr.: "Climatology of the United States," Washington, 1906, 556 (Schneider). "Surface Geology of Michigan," 17.

undeveloped wilderness north of Lake Superior and then the wide crystal waters of the great lake itself before traversing the haunts of men; and also by the absence of those plants that to the southward pollinize the atmosphere or otherwise freight it with organic substances.

While for some crops, like sugar-beets, the actual quantity of sunshine received during the growing season is of vital importance, it will be of interest to compare the amount of sunshine occurring in the northern and southern peninsulas. The data for such a comparison has been prepared by C. F. Schneider, meteorologist of the United States Weather Bureau at Grand Rapids, who points out that the eastern one-third of the Upper Peninsula, and a strip of territory extending from Alpena to Mackinac in the northeastern section of the Lower Peninsula, are the cloudiest in Michigan. Averaging the records of actual sunshine reported for stations having an automatic recording device, it has been ascertained that in April, 1919, 49 per cent of the possible amount of sunshine was received in the Upper Peninsula, and 47 per cent in the Lower Peninsula. In May the percentages were 67 for the Upper Peninsula, and 62 for the Lower Peninsula. Similarly in June the percentages were 70 and 76; in July, 75 and 75; in August, 56 and 65; in September, 43 and 60; and in October, 34 and 42. These percentages are smaller for both peninsulas during the winter months without much to choose between them. The percentages for the summer

months emphasize the greater prevalence of rainy days in the northern as compared with the southern section of the State. With an agriculture adapted to the peculiarities of each division, these figures do not imply that on the whole one has a decisive advantage over the other.

Schneider points out that "there is more sunshine in the Upper Peninsula in May and July than in the Lower Peninsula, and for the four month period April to July, inclusive, there is somewhat more sunshine in the Upper Peninsula than in the Lower. After the end of July the days grow shorter more rapidly in the Upper Peninsula than in the Lower, and the differences in the amount of sunshine in the Upper and Lower Peninsulas become greater because the winter days are shorter in the Upper Peninsula than in the Lower."

If the normal temperature of the State is favorable to agriculture, so also is the quantity and distribution of moisture. The normal annual precipitation is stated by the United States Weather Bureau to be 32.91 inches for the whole State, which, coming mainly in the growing season, affords an ample allowance for vegetation. The annual supply of moisture is somewhat greater in the northern peninsula, namely, 34.58 inches. The most southerly counties are second in quantity of precipitation: 33.58 inches. The central area fares worst, with 28.95 inches, while the northern section of the Lower Peninsula receives 30 inches. Summer droughts are not unknown, although normally the rainfall

for July is some 3.5 inches and well distributed.<sup>1</sup> At Marquette, for example, the records of the local station of the Weather Bureau indicate that ten days in May, twelve days in June, twelve days in July, August and September and fourteen days in October, normally have precipitation of one one-hundredth of an inch or more. At Lansing, similarly, the number of days with this amount of precipitation is twelve in May, eleven in June, ten in July, August and September and eleven in October. Excessively copious downpours are rare. The typical "rainy day," of moderate protracted precipitation, is a familiar feature of the Michigan climate, whether northern or southern. Yet thunder-storms, occasionally of some violence, occur frequently in summer, taking their toll of barns and other possessions of the Michigan farmer. The State's well-distributed precipitation not only promotes the growth of vegetation, it also maintains stream-flow and lake levels at a fairly uniform stage—a fact of much importance in the creation of power and of navigation.

Hail-storms are both local and irregular in their distribution, but, according to Seeley, are less severe and less frequent near the Great Lakes. Hail-storm charts prepared by the United States Weather Bureau indicate that in 1918, three light and four severe hail-storms occurred in the Upper Peninsula; and eight light and seven severe hail-storms in the Lower Peninsula. In 1919, heavy hail-storms oc-

<sup>1</sup> "Climatology of the U. S.," 556.

curred in Alpena, Montcalm, Kent and Eaton counties; while light hail-storms were reported from Keweenaw, Houghton, Marquette, Ontonagon, Alger, Luce, and Chippewa in the Upper Peninsula: Cheboygan, Benzie, Grand Traverse, Crawford, Iosco, Ogemaw, Roscommon, Wexford, Montcalm, Saginaw, Genesee, Ionia, Kent, Allegan, Ingham, Oakland, Wayne, Calhoun, and Branch counties of the Lower Peninsula: and moderately heavy hail occurred in Monroe, Hillsdale, St. Joseph, Van Buren, Washtenaw, Kent, Arenac, Mason, Wexford, Crawford, Alpena, Cheboygan, and Chippewa counties. Some of these counties reported two, three or four hail-storms in the year. This indicates a wide distribution of hail-storms in Michigan, but their localized character results in a relatively small amount of damage.

In winter, the precipitation does not vary markedly in the different quarters of the State. Normally at Calumet it is 7 inches, while at Ivan, Kalkaska County, in the northwestern Lower Peninsula, it is somewhat greater. Marquette on the south shore of Lake Superior has less precipitation in winter than Adrian near the Ohio boundary. Alpena on the Lake Huron shore and Grayling in the same latitude but in the interior have the same winter precipitation. Detroit, Alma and Sault Ste. Marie have approximately the same precipitation in the winter months. For all these points the range is from 6.1 to 6.6 inches. The premier position of Calumet, Ivan and Grand Haven is due to elevation, to prox

imity to one of the Great Lakes, to the prevailing direction of the wind, or to all of these factors taken together. While Escanaba and Cheboygan are located on the Lake shore, their winter precipitation is less (4.6 and 5 inches, respectively), but each is on the leeward side of the State, and benefits accordingly.<sup>1</sup>

If, however, depth of snow rather than amount of precipitation is considered, a marked difference is noted between the northern and southern latitudes of Michigan. The normally lower temperatures which obtain to the northward produce snow rather than rain in the early and late months of winter, and rarely rise to the level of a thaw. Hence snow that falls in November may remain on the ground until April, occasionally longer. The effect of each storm is cumulative. The result is that Calumet enjoys as much as 120 inches of snow in a year, and Ishpeming nearly that quantity. In 1891 Marquette had 172 inches of snow, while Houghton in the winter of 1919-1920 had the unprecedented snow-fall of 208 inches. On the average, it has been 113 inches during the past twenty years. The counties bordering on Lake Huron in the southern peninsula have a deeper snow covering in winter, although less precipitation than those adjacent to Lake Michigan (50 to 60 inches), because of the cooling effect of the land in one case and the warming effect of the lake in the other.<sup>2</sup>

<sup>1</sup> "Climatology of the U. S.," 556.

<sup>2</sup> Seeley: "The Climate of Michigan," etc., 16-17.

In the southern portion of the Upper Peninsula less than 50 inches of snow falls; in the interior of the southern peninsula, 30 to 50 inches. Thus, dwellers in the north may expect six months of sleighing, of winter sports, of winter feeding for their live-stock, of certain moisture and a safe covering for winter grains and such vegetables as may be left in the ground until spring, of fields ready for the plow as soon as the snow disappears in April, and of a quick run-off of surface waters through the unfrosted soil. Yet to some the seemingly eternal snows of the north country become irksome, even appalling. The annals of the pioneers are replete with declarations of the utter loneliness, the terribly complete isolation which the deep snows of winter enforced on those who ventured to raise their roof-trees by Grand Traverse Bay or on the Copper Range. Today, the telephone and the rural mail service, the tractor-drawn snow roller used on northern highways, farmers' clubs and rural winter life of the deep snow region, have made life more endurable.

Destructive wind-storms are rare in Michigan, though by no means unknown. Their effect is very local. They are rare near the lakes. While Michigan is not commonly thought of in connection with tornadoes, they are sufficiently frequent to be taken account of in the extreme north as well as the extreme south of the State. A genuine "twister" occurred on the Keweenaw Peninsula near the entrance to Portage Lake on June 10, 1920, doing some damage to buildings and throwing down consider-

able timber. A similar performance was observed over Houghton a few miles to the northeast on July 31, 1913, but at most places did not descend to the point of destructive contact with the earth. That these were not the first such visitations to the Upper Peninsula is evident from the large tracts of "down" timber observed by Pumpelly and other early explorers of the interior of the region. In the Lower Peninsula, the record of tornadoes associates them with the south central counties, where a few very violent storms have occurred, such as that in Oakland County, May 25, 1896; at Owosso, Nov. 11, 1911; near Charlotte, 1915; in Jackson, Calhoun and Ingham counties, 1917; between Ann Arbor and Dexter, 1917; and a series of tornadoes at several points simultaneously, including Fenton and St. Johns, March 28, 1920.<sup>1</sup> Normally, however, winds of high velocity are unusual in Michigan. The maximum average hourly velocity is twelve and one-half miles in March and April, and the minimum velocity nine miles an hour in August and September.<sup>2</sup> Rare, too, are those intensely hot dry winds that blight growing crops and parch the earth with their torrid breath. Yet these also do occur, even if seldom, entering the State from its unprotected southwestern angle in both peninsulas, or arising from areas of superheated air within the State itself. Then, if the wind is off shore, the presence of one of the Great Lakes is of no avail,

<sup>1</sup> Seeley, 22-23.

<sup>2</sup> Schneider in "Surface Geology of Michigan," 17, 38.



and one may blister in a fiery blast registering 105 degrees in the shadows, as happened at Marquette in the summers of 1917 and 1918,<sup>1</sup> although the icy waters of Lake Superior are immediately at hand but powerless to relieve.

From January to March, and from June to December, the prevailing direction of the wind in the Lower Peninsula is from the west and the southwest; and while it prevails from the southwest in April and May, there is a considerable amount of east and northeast wind over the surface of the land. Here the westerly winds are warm and moist; the easterly winds are dry and indicative of unsettled weather.<sup>2</sup> In the Upper Peninsula, the prevailing northwest winds of the summer season, in the area adjacent to Lake Superior, bring abundant rains that, as C. F. Schneider observed years ago, keep summer pastures green and luxuriant and warrant belief in the future of this region as a dairy and live-stock country.

<sup>1</sup> July 29, 1917—2 P.M.—at Marquette the temperature was 105 degrees F. and the wind blowing at the rate of twenty-four miles an hour from the Southwest. July 28-30, 1916, the temperature ranged from 100 to 101 degrees F. (maximum) and the wind's maximum velocity was 16.24 and 28 miles an hour.

<sup>2</sup> Schneider in "Surface Geology of Michigan," 38.

## CHAPTER II

### THE INFLUENCE OF SOILS ON THE SETTLEMENT OF MICHIGAN

IN the discussion of the soils of Michigan, it should be understood at the outset that there is little definite knowledge concerning them. The so-called "soil survey" is as yet only in its incipiency. Certain areas, a decade or more ago, were investigated by the United States Bureau of Soils. These lie in the counties of Allegan, Cass, Genesee, and Wexford; whilst others are adjacent to Owosso, Alma, Saginaw, Oxford and Munising. More recently, through a coöperative arrangement between the Bureau of Soils and the Michigan Agricultural College, detailed surveys have been carried on in the counties of Calhoun and Berrien; while reconnaissance work has proceeded in the area adjacent to Saginaw Bay, the "Thumb" district east of it, and the southeastern portion of the State. At present (August, 1921), work is in progress in St. Joseph and Ottawa counties in the Lower Peninsula, and in Ontonagon County in the Upper Peninsula. The earlier surveys are not now regarded, either by the United States Bureau of Soils or the Department

of Soils of the Michigan Agricultural College, as meeting present standards and it is proposed to re-work them.

In addition to the soil surveys just adverted to, a reconnaissance survey of the soils of the State, intended primarily to determine their glacial origin and resulting characteristics, has been carried forward by the Michigan Geological Survey under the immediate direction of Frank Leverett. The manuscript soil maps of this survey relate to twenty-nine counties,<sup>1</sup> and are on file in the office of the State

<sup>1</sup>The list of counties and areas surveyed are as follows:

County	Square miles surveyed:
Alcona .....	680
Alpena . . . . .	579
Antrim .....	478
Benzie .....	319
Charlevoix .....	414.4
Cheboygan .....	724
Clare .....	569
Crawford .....	561.66
Emmet .....	467.5
Grand Traverse .....	458
Iosco .....	553
Isabella .....	576
Kalkaska .....	561
Lake .....	571
Leelanau .....	342.6
Manistee .....	540
Mason .....	493
Mecosta .....	565.5
Missaukee .....	567
Montmorency .....	555.5
Newaygo .....	847
Oceana .....	539
Ogemaw .....	572
Osceola .....	574

Geologist at Lansing. They cover a total of 15,970.66 square miles, or 10,221,222.4 acres. In addition to the foregoing surveys, thirty "quadrangles" in the Lower Peninsula have been surveyed by the same agency, the manuscript maps of which are on file in the office of the State Geologist. These quadrangles aggregate approximately 6,600 square miles, or 4,224,000 acres. A similar survey of the Upper Peninsula covers 16,660 square miles, or 10,662,400 acres, a manuscript map of which has also been prepared by Leverett. The total of these items is 38,630.66 square miles, or 25,107,622.4 acres, which Leverett has mapped thus for the Geological Survey of Michigan. Earlier surveys conducted by the State Geological Survey cover Huron, Sanilac, Wayne and Monroe counties; while certain quadrangles have been mapped by the United States Geological Survey.<sup>1</sup> (See Fig. 2.) These surveys, it is to be understood, do not primarily relate to the agricultural possibilities of the soil. As yet no survey seems to contemplate a complete inventory or land classification, made with regard to all factors

County	Square miles surveyed:
Oscoda .....	570.5
Otsego .....	522
Presque Isle .....	669
Roscommon .....	530
Wexford .....	572

Total, 15,970.66 square miles, 10,221,222.4 acres.—From statement by State Geologist, Aug. 16, 1921.

<sup>1</sup>This statement is based on data submitted by the United States Bureau of Soils, the Department of Soils of the Michigan Agricultural College, and the State Geologist.

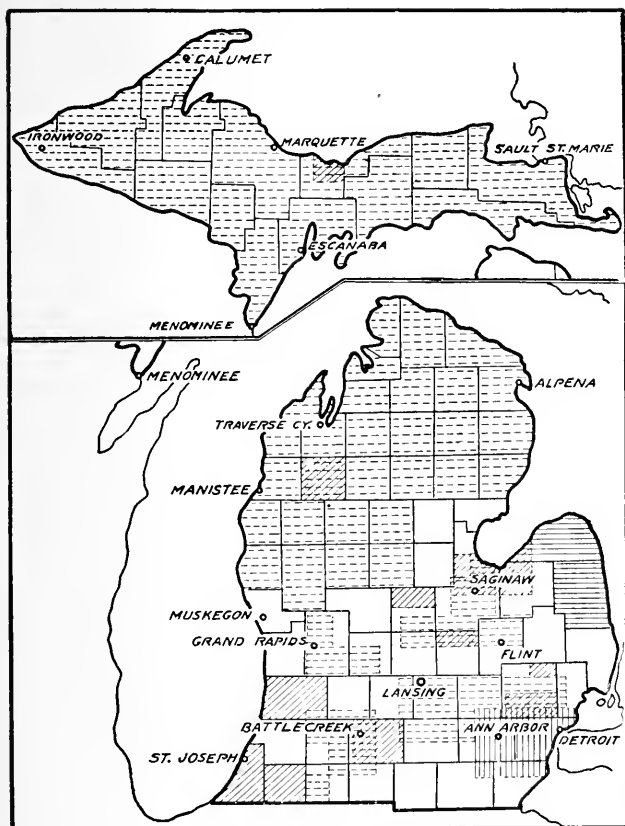


FIG. 2. Progress of soil-mapping in Michigan.

Diagonal lines: Mapped by United States Bureau of Soils.  
 Vertical lines: Mapped by United States Geological Survey.  
 Horizontal lines: Mapped by Michigan Geological Survey.  
 Dotted lines: Mapped by Frank Leverett.

that may affect the desirability of a given tract of land for agricultural purposes or rural life.

The land surface of Michigan was relatively very accessible to settlement, but outside opinion regarding its quality was not in all cases flattering. The most notorious instance of this unfavorable opinion is contained in the report of the United States surveyors, in charge of General Tiffin, who were expected to locate some two million acres of land in Michigan as bounty for the soldiers of the War of 1812. The report of this survey represents the southern portion of the Lower Peninsula as a succession of lakes, swamps and marshes, between which was "a poor, barren, sandy land, on which scarcely any vegetation grows, except very small scrubby oak. In many places that part which may be called dry land is composed of little short sand hills forming a kind of deep basin, the bottom of many of which are composed of a marsh similar to those above described." General Tiffin closes his observations with the pronouncement that not more than one acre in one hundred—if in one thousand—would admit of cultivation.<sup>1</sup> This was an opinion of 1815. Mrs. Nancy B. White, recalling her departure from New York for Michigan in 1857, says her parents thought "we could hardly have made a poorer selection; we would have fever, and ague, and mosquitoes to contend with besides other hardships too numerous to mention."<sup>2</sup>

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," XVIII, 660.

<sup>2</sup> *Ibid.*, XXII, 240.

Detroit was said to be "founded in an ancient mudhole."<sup>1</sup> The road from Detroit to Dearborn, says William C. Hoyt, "was the worst probably over which man and beast ever traveled." A. L. Driggs describes Michigan in 1835 as "a howling wilderness." There were fact and fancy in these allusions to the Michigan of the pioneer; and it was only gradually that surveyors, travelers and settlers made the true character of the country known. Indeed, even today, in the absence of any comprehensive soil survey and classification, there is much ignorance of surface conditions in the less developed areas of the State; and this ignorance has been taken advantage of in full measure by dishonest land sharks both within and without the State, to the detriment of its good reputation.

There is in reality extraordinary variation in soil, as well as climatic conditions throughout the two peninsulas. Clays, sands, gravels, loams alternate with muck and marsh lands, with lakes and swamps, in some localities within very narrow limits, so that a description applicable to one parcel of land would be wholly inapplicable to an adjacent tract. With this condition, the repeated glaciation of the region within the Great Lakes has had much to do. Glaciation has created morainic ridges and eskers, usually of sand and gravel, drumlins and kames and ancient lake beaches, once wave-swept but now many miles inland, producing at the same time deposits of lake clays occasionally of great

<sup>3</sup> *Ibid.*, V, 61.

depth. It has produced sandy "outwash aprons" overlying soil of great agricultural value. It has created depressions, where surface water accumulates, giving soils of all grades of moisture, deposits of muck and peat, marshes, swamps and lakes. These conditions are characteristic of Michigan in a very high degree, and, as relates to the distribution of surface waters, more so in the early period of settlement than at present. Drainage and the removal of the forest cover have changed wet and subaqueous soils into arable land of good agricultural possibilities. On the other hand, the removal of forest from the surface of the land, particularly from the uplands, and the cultivation of the soil, have favored denudation and erosion. In consequence, hill-tops have become barren, hill-sides have worn away, their surface soils have been removed to the adjacent low grounds or carried away in the run-off into the water-courses and permanently removed, to the ultimate impoverishment of the land and its abandonment for the uses of tillage.

Commonly the richer soils bore a dense forest of hardwoods: maples, elms, ash, beach, oaks, and hickories. White and Norway pines, spruce and balsam grew on the sandy uplands. Sometimes the situation was reversed, as where, in the Upper Peninsula, white pines flourished on the clays of southern Ontonagon County and hardwoods on the sands of the Seney swamp country. Sometimes tall pines towered above the oaks and maples in the same half-acre, as along the Thornapple and the Maple rivers. Cedars



and tamaracks stood in the swamps. Nut-bearing trees were at home in the southern peninsula and in the southern portion of the northern peninsula. Enormous tulip-trees, or whitewood, caused the first settlers great trouble in becoming rid of them. Compensation came with the wild fruits and berries that throve from Point Keweenaw to the southernmost counties.

The first settlers of these same southern counties found attractive oak openings,—attractive because of their natural beauty and because they relieved the pioneer of the burden of deforesting the land. "Scales' Prairie," says Charles A. Weissert, "was a beautiful stretch of country about sixty acres in extent, surrounded like the banks of a lake with a high forest and dotted with occasional islands of burr oak trees which rose above grass six feet tall that undulated in long billows before the breeze. Into this stretch of open land deer and bear often wandered, and thousands of flowers attracted swarms of wild bees."<sup>1</sup> To Bela Hubbard the oak openings of Oakland County appeared as "a majestic orchard of oaks and hickories varied by small prairies, grassy lawns and clear lakes."<sup>2</sup> About Manchester, L. D. Watkins found white, red and yellow pine, and burr oaks, with hickory and a few scrub oaks on the sand hills.<sup>3</sup>

The pioneers are constantly recurring to the charm

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 665.

<sup>2</sup> *Ibid.*, 449.

<sup>3</sup> *Ibid.*, XXII, 264.

of these miniature prairies set down in the Michigan wilderness. By preference they established their farmsteads on them rather than essay the prodigious labor of creating a new clearing for themselves. The origin of these treeless tracts is not beyond question. Peculiarities of the soil may have caused some of them. J. A. Jeffery, formerly professor of soils at the Michigan Agricultural College, has remarked concerning one such prairie not far from Niles that it would not grow clover or wheat beyond a very light yield until after being cropped with rye and cowpeas, the rye cut off and the cowpeas turned under, when a normal clover crop was reported to have been secured. In some instances the soil of these openings is said to have been light, in other cases very good. There is much testimony that annual burnings carried on by the Indians in connection with their hunting operations were the chief reason for the existence of the oak openings or prairies. So far as known, they do not exist in the Upper Peninsula nor in the northern area of the Lower Peninsula. Elsewhere the clearing of the land has made their extent and location a matter of tradition, but they were undoubtedly very numerous and in the aggregate quite extensive. One finds references to them in most southern counties. They supplied pasture for the wild deer and for the live-stock of the settlers. With marsh-grass, they afforded winter forage.

## THE LOWER PENINSULA

In the Lower Peninsula, agriculture began in the southern area adjacent to Lake Erie and the waterway connecting Lake Erie with Lake Huron. Here the elevation was normally low with poor drainage. The soils, composed mainly of glacial and lake clays, retained moisture with extreme tenacity, but with proper drainage became highly productive. The finely divided lake clays about Detroit, if excellent for truck-gardening, were also poor road material; and the narratives of the pioneers are replete with accounts of harrowing and disastrous experiences in their progress from the metropolis westward. In hot dry weather, these clays became hard and extremely difficult to manage; yet they produced a primeval forest of elm, soft maple, basswood and black ash with some beech, hard maple, oak and whitewood on the higher and better drained portions. Under drainage, they have yielded wheat, corn, oats and hay and sugar-beets. Along the rivers were silt soils, very fertile but suffering from overflow, furnishing luxuriant meadow grasses and a timber growth of ash, basswood, elm, walnut and butternut, willow, cottonwood and other varieties of trees. In the depressions were muck soils, and back from the shore were sandy lake-beds with some loams, as, for example, in the Pontiac area and in Northville and Plymouth townships of Wayne County.

In Monroe County to the southward, the south-

easternmost county of the State, the surface was unusually level save where broken by old lake beaches or other glacial formations, here an inconspicuous feature of the landscape, or where scoured by water-courses. The clays have yielded well of wheat, oats and corn, and their richness in calcium carbonate derived from decomposed limestone within the county and to the northward, has adapted the section to fruit-culture, particularly the grape. Grapes grew wild here in great abundance and of great size, vines being mentioned six and eight inches in diameter.<sup>1</sup> Hence came the name of the most southeasterly river in Michigan, the "Raisin," the scene of a military tragedy in the War of 1812, along whose marshy shores dwelt many French inhabitants a century ago. The sands produced potatoes, beans and buckwheat, with record yields of squashes. The State Geologist has also dwelt on the possibilities of Monroe County for sweet potatoes and sugar-beets, but as yet there is little to chronicle under this head. The marshes contributed cranberries, celery and peppermint, while from Monroe plantings of wild rice have been sent as far as the lakes of the Keweenaw Peninsula in the far north. The forest cover resembled that of Wayne County, with the addition of a notable belt of hickory in Milan Township.

From this coastal area population moved west and northwest into the interior of the territory and, after 1837, the State. It passed beyond the ancient

<sup>1</sup> See map of the surface formations of the southern peninsula of Michigan.

sandy lake-bed west of this clay area adjacent to the shore, into the boulder clay region of Washenaw and Oakland counties, resulting in the founding of Pontiac in 1818 at an elevation of some 350 feet above the level of Lake Erie, and at Ann Arbor in 1824, at an elevation of 300 feet above the same datum. Adrian in Lenawee County was established on soil described as that of a sandy lake-bed but with boulder clay in the vicinity, in 1825, at an elevation of less than 250 feet above Lake Erie. Moving westward from this point, the settlers encountered a variety of soil conditions: morainic soils predominating in Hillsdale County, boulder clay in Branch County with some sandy lake-beds; outwash plains in St. Joseph County, found again in Cass County with morainic soils, again terminating in the variegated soils of Berrien County and the dunes of the Lake Michigan shore. In this southern tier of counties, settlement took place at Coldwater, platted as a village in 1832, while Niles, well to the westward but favorably situated on the St. Joseph River, had already come into existence in 1829. In the second tier of counties, settlement reached Jackson in 1829, Battle Creek in 1831, and Kalamazoo whose site was selected in 1829. In Jackson County there are considerable outwash plains, which soil also predominates in the counties to the westward as far as Lake Michigan. As settlement moved westward from Ann Arbor through this second tier of counties, the elevation of the land rose steadily, Jackson standing some 60 feet higher than Ann

Arbor. There is a descent of 120 feet to Battle Creek, and an additional descent of 50 feet to Kalamazoo. This may serve to illustrate some elemental facts in the settlement of the oldest agricultural counties of the Lower Peninsula.

Settlement moved northwesterly from the head of Lake Erie and its connecting waters as early as due westerly. Settlement reached Genesee County some six years after the founding of Pontiac to the southeast. Clinton County was reached nearly as soon, while Louis Campau took up land on the site of Grand Rapids in 1831. With reference to the soil in this area, there is lake clay west of Lake St. Clair, bowlder clay, outwash plains and moraine formations in Livingston County, bowlder clay again in central Ingham County with other soil types already noted surrounding it. Moraines and bowlder clay belts largely cover Eaton County, while moraines predominate in Barry County, with some outwash plains in the west and south. Finally, in Allegan County on the Lake Michigan shore, a mixture of soil types occurs. A similar condition obtains in Ottawa County to the northward, with a small portion of it represented as bowlder clay. Moraines are an important feature of the soil surface of Kent County, with lake-bed sand adjoining Grand River, bowlder clay southeast and northeast of Grand Rapids, and outwash plains north and south of it. Zones of bowlder clay and of sand pass through Ionia, Clinton and Shiawassee counties, interspersed with morainic formations, which continue into

Genesee County with lake clay in the vicinity of Flint. Lapeer County has boulder clay, lake clay, moraines and swamp lands, returning again to lake clay in the river area of St. Clair County. The elevations in this second and third tier of counties do not run quite so high as those to the southward, Grand Rapids standing at approximately 50 feet above Lake Michigan, Flint 135 feet above Lake Huron, Lapeer more than 100 feet higher, St. Johns less than 200 feet, and Charlotte nearly 350 feet above the same datum.

Along the shore of "The Thumb" east of Saginaw Bay is a belt of lake clay and, farther back, another belt of sand, with areas of boulder clay and morainal soils. A wide and deep bed of lake clay surrounds Saginaw Bay and projects itself southwestward through Saginaw and Gratiot counties. Moraines and dunes appear here and there in this region. This area has a very low elevation above Saginaw Bay, and this fact, together with the character of its soil and topography, rendered the whole district one of the wettest in the State before cultivation and artificial drainage made it one of the most productive. The normal fertility of the clay areas is reinforced by the frequent inundation of parts of the region.

North of this Saginaw Bay-Grand River section lies a country in which to the Straits of Mackinac sandy soil predominates, although it is at points interspersed with clay. It is the area in which the glacial drift lies deepest and in which the morainal elevations are the highest. Cadillac stands at more

than 700 feet above the level of Lake Michigan and Lake Huron, Grayling at 550 feet, and Roscommon nearly the same, all in the heart of this region. Although Saginaw and Bay City, at the southern edge of this northern half of the Lower Peninsula, had received settlers before Michigan became a state, much of the region remained unoccupied until the period subsequent to the Civil War, when the removal of much of the timber from the southern counties compelled recourse to the vast forests beyond Saginaw Bay and Grand River. This was the native habitat of the white pine, crowded off the richer soils to the southward by the more aggressive hardwoods. The demand for its forest resources brought an extension of railroad facilities into this section and of settlement; but with the steady deforestation of the region, millions of its acres became and have remained non-productive through defects of soil for normal agriculture, and for many of its counties the census of 1920 shows a positive decline in population. Thus Kalkaska County, which had 8,097 inhabitants in 1910, reduced its population to 5,577 in 1920. Alpena County returned 19,965 persons in 1910, and 17,869 a decade later. Oscoda County fell from 2,027 to 1,783.<sup>1</sup> A notable decline occurred in Manistee County whose census returns indicated a loss of 5,799 inhabitants.

As illustrative of the natural vegetation of this region, the results of a study undertaken in 1902 by B. E. Livingston may be summarized, covering

<sup>1</sup> Preliminary Announcement of Population, Aug. 14, 1920.



an area of some 600 square miles in Rosecommon and Crawford counties, now comprised largely in the State's forests adjacent to Houghton Lake and Higgins Lake.<sup>1</sup> Moraines and outwash plains, sandy in composition, mainly characterize the district. There are small areas of swamp in the depressions and of clay soil. At some other points the clay underlies the sandy outwash of the surface, in some places at considerable depth. On the uplands were found the hardwood type; the white pine; the Norway pine; the jack pine; and on the lowlands appeared the open meadow type; the tamarack-arborvitæ and the mixed type. This region had been deforested and suffered much from fire, but where the soil and moisture conditions were favorable, Livingston found evidence that the white and Norway pines were reproducing themselves, and orchards promised well on the ridges and sandy loams. He observed, as others have done, that the frequent burning of the humus had impoverished the soil and by so much retarded its development for agricultural and sylvicultural purposes. His opinion regarding the future of the region was that, "on the uplands most of the different kinds of soil have been tested for agriculture, the clay hills and the clay plains, both of comparatively small extent, make excellent farming lands. The gravelly and loamy sand of most of the ridges is easily tilled, and, with enough care,

<sup>1</sup> Rept. of State Bd. Geol. Survey of Mich., for the year 1903: Lansing, 1905: 9ff. Cf. Leverett and Taylor: "The Pleistocene of Indiana and Michigan."

yields good crops, but the soil is too light, and the amount of energy necessarily expended in cultivation is much greater than in heavier soils. On the worst sand plains, originally covered with very open stands of jack pine and scarlet oak, tillage is almost out of the question. With constant manuring and cultivation this sand can be held in place and made to produce fair crops, but the expense, in time and energy, if not actually in money, make such crops cost more than they will actually bring on the market. Some of this land is so situated that irrigation would be possible, and this may sometime become a practical line of investment. The grazing of cattle on the Norway and jack pine plains is practicable, and is being carried out successfully by several holders in Roscommon County. Several forms of bunch grass and the shade of the scrubby oaks and pines are the valuable features. But it requires many acres for a few cattle, and it is doubtful whether the small land-holder can ever accomplish much in this direction. The swamps which are abundant in the region, would all make excellent garden land if properly cleared and drained."

#### THE UPPER PENINSULA

That part of the Upper Peninsula lying east of the latitude of Marquette is relatively flat and, because of insufficient natural drainage, contains much land unfit for agriculture. Much of it is underlain with limestone, and where other conditions are favor-

able, as southeast of Marquette and adjacent to Big Bay de Noc, contains some excellent agricultural land. The extreme eastern portion adjacent to Sault Ste. Marie is composed mainly of heavy clay soil, which has for years been one of the best hay-producing sections of the State. Near the shore of Lake Superior and south of Marquette are sandy districts less suited or quite unfit for agriculture, although, near the lake, excellent for fruit. The western half of the Peninsula contains much rugged country, with outcrops of bed rock. In Ontonagon County and portions of Houghton and Gogebic counties are districts of deep clay soil, some of it undoubtedly potentially the most productive in the State, where clover grows wild in remarkable luxuriance, and where yields of potatoes exceeding five hundred bushels an acre have been secured. By a curious inversion, white pines grow on these "Ewen clays" and hardwoods appear on the "Seney sands" east of Marquette, and do extremely well in both cases. In the west is the area of the metamorphic rocks containing iron and copper, with lesser quantities of gold, silver, graphite and marble. The eastern section of the Peninsula is a region of stratified limestones, sandstones and shales, in places lying so close to the surface as to make tillage difficult or impossible, although, as in the Big Bay de Noc section north of Point Detour, a vigorous hardwood forest, especially of hard maple, once clung to the surface and, where permitted so to do, is reproducing itself today. Here, alone in the Upper Peninsula,

so far as is known, the butternut grows wild in abundance, as does the wild cherry, indicative of conditions favorable to the domesticated types.

It is quite impossible to generalize concerning soil conditions in the northern peninsula, since frequently within a very few miles one traverses varying types of soil. On the copper range, for example, areas of rugged country, with naked outcrops of greenstone, pass quickly into fertile valleys of clay soil, of lake sand, or of swamp. The general impression of the whole region gained from a cursory journey by railroad from Sault Ste. Marie to Ironwood, is that of a barren undeveloped land, whereas, some miles off the line areas of great natural fertility exist and in some instances (as in the "Green Garden" district southeast of Marquette, in the Ford River country, and on the "Garden" peninsula) presents a well-established and productive agriculture.

If the geology and topography of the eastern and western sections of the northern peninsula present contrasts to each other, so does their normal elevation. Thus Newberry and McMillan, in the heart of this eastern area, have an elevation above Lake Superior of 154 and 122 feet respectively. To the westward, Chatham, where an experiment station of the Michigan Agricultural College is located, is 265 feet above the same datum. But when the Marquette iron range is reached, at the eastern edge of the high western table-land, Negaunee stands from 763 to 817 feet above Lake Superior, and Ishpeming close by 868 feet at the maximum recorded point.

Continuing westward, Michigamme and Sidnaw, with an elevation of 979 and 762 feet, illustrate the greatly increased altitude of the western half of the Peninsula, which continues to Ironwood in the extreme west, whose elevation above Lake Superior is about 900 feet; along the height of the Copper Range on the Keweenaw peninsula, where Calumet is more than 600 feet above the same lake; and far to the southward, where Iron Mountain has nearly as great an elevation above the level of Lake Michigan.<sup>1</sup>

It is in this western area that the maximum elevation in the State is reached in the Porcupine Mountains (2,023 feet above sea-level). Lake ports, like Marquette, Munising, Houghton, Hancock, Escanaba, Gladstone, and Manistique, have, of course, a much lower altitude than interior points such as have been designated here. It is also striking that the height of land in the Upper Peninsula is generally much closer to Lake Superior than to the lakes on its southern shore, so that the streams flowing into Lake Superior are usually very short and rapid, and carry a small volume of water. Even so, small streams, like the Carp, the Au Train and Dead River, have had their water-powers utilized quite to their full capacity.

It was under these conditions of soil and elevation that settlement in the Upper Peninsula took

<sup>1</sup>These altitudes are derived from the "Dictionary of Altitudes," published by the U. S. Geol. Survey, where the datum is sea-level.

place. With the exception of old towns, like St. Ignace and Sault Ste. Marie, dating from the French period, it set in much later in the northern peninsula than in the southern. National sovereignty was not asserted here until 1820, and the full extinction of the Indian title came a generation later. Mining, rather than agriculture, attracted the first settlers after the fur traders; and mining awaited the elimination of the Indian title to the land and the geological and linear survey of the region by the State and the United States. By 1845 mining was definitely under way on the copper range in what is now Keweenaw County, and a year or so later on the Marquette iron range about Negaunee and Ishpeming. Then the immense forest resources of the Peninsula attracted still other settlers. From those who came to the district as miners and lumbermen, numbers eventually turned to agriculture, notably so among the Finns. At last, steps are being definitely taken to attract and place on the undeveloped lands those who will be farmers from the outset. Leverett estimates the tillable lands of the Upper Peninsula at 65 per cent of the total. Some regard this as over-optimistic; but in any case, the great variation in the character of the soil renders it important that great care should be taken to select good agricultural lands, of which there are an abundance, since the heavy snows maintained for five or six months in the year represent a sufficient handicap without adverse soil conditions to contend with. Because of the ample amount of

forage, wild and domesticated, produced on the vast untilled areas of the Peninsula, there has been a large increase in the acreage devoted to grazing. Western sheep have been brought hither in considerable numbers during seasons of drought on the western ranges. It is presumed that these grazing lands will eventually come under cultivation.

#### MUCK-LANDS

It has been estimated that formerly one-seventh of the surface of Michigan was covered with swamps and marshes comprising much soil that is described as muck and peat.<sup>1</sup> There was thus a certain measure of truth in the early unfavorable opinions regarding the unsuitability of large tracts for agriculture. These muck-lands were distributed quite uniformly throughout the two peninsulas, more commonly in inter-morainal depressions and along the waterways, where natural drainage was insufficient.<sup>2</sup> The largest such area in the State is in the northern peninsula, extending east and west between Marquette and Sault Ste. Marie (though well within these limits) and filling in much of the territory between Lake Superior on the north and Lakes Huron and Michigan on the south. There are considerable areas of excellent tillable lands in this portion of the Peninsula, but there are larger areas which must await drainage and careful husbandry

<sup>1</sup> Davis: "Peat": Mich. Geol. Survey, 1907, p. 289.

<sup>2</sup> *Ibid.*, Plates 16 and 17.

to yield farm crops. The presence of this great tract of wet land is primarily due to the formation of ledges of rock near the lake shore which interfere with river drainage. Throughout the northern section of the State, lower temperatures and the normal absence of hot drying winds retard evaporation and decomposition of peat-forming material. Eventually these peat deposits may become of great commercial importance as fuel. Already a beginning has been made in the manufacture of fertilizer. In the northern peninsula little attention has been given to the extensive muck-lands of the district, since there remain large areas of as yet undeveloped cut-over lands. Celery of excellent quality but not of a large quantity has for some years been marketed from the region of the Taquamenon swamp east of Newberry. Here the soil is reported to be clay of considerable depth. To the westward, on the Seney swamp experiments have been undertaken to ascertain the practicability of here growing mint and cereals. The soil has a substratum of sand. Along the Sturgeon River in southern Houghton County an extensive drainage operation was rendered abortive, it is said, because of the non-reduction of the vegetable deposits to a condition suitable for plant growth. More recently attempts have been made to convert these deposits into fertilizer.

In the southern peninsula, large areas of muck-lands are now under cultivation. The celery and mint production on these lands in the southwestern



counties has become very well known.<sup>1</sup> In other districts corn has done very well, and some muck-

<sup>1</sup>Davis gives the following analysis of muck soil used in the growing of celery: Kalamazoo soil:

Sand and silicates .....	19.16	
Alumina .....	1.40	
Oxide of iron .....	3.94	6.9
Lime, Magnesia, Potash, Soda .....	7.62	
Sulfuric acid .....		1.31
Phosphoric acid .....	.88	
Carbonic acid .....	1.95	
Organic matter containing 2.53 nitrogen ..	63.76	
Water .....	6.51	
Grand Haven celery soil (Lower Peninsula)		

Parts per 100:

Sand and silicates .....	24.09
Alumina .....	1.71
Oxide of iron .....	3.52
Lime .....	5.02
Magnesia .....	.62
Potash .....	.20
Soda .....	.33
Sulfuric acid .....	1.04
Phosphoric acid .....	.69
Carbonic acid .....	1.05
Organic matter containing 2.32 nitrogen ..	61.73
Water .....	10.85

Newberry celery soil: Parts per 100:

Sand and silicates .....	24.56
Alumina .....	2.21
Oxide of iron .....	1.30
Lime .....	4.18
Magnesia .....	.75
Potash .....	.42
Soda .....	.40
Sulfuric acid .....	.67
Phosphoric acid .....	.46
Carbonic acid .....	1.10
Organic matter, containing 1.75 nitrogen ..	63.75
Water .....	7.31

—Davis: "Peat," 293.

farm enthusiasts urge that these lands are available for general farming without discrimination; but experience seems to have demonstrated that sugar-beets, especially as regards sugar-content, are not adapted to such soils.

The farmers on muck-lands are well organized with a view to the improvement of methods through their collective experience. Eventually these muck-lands, once regarded as a liability, may become an economic asset of great value, because of the fuel, the fertilizer and the crops which they produce, when the depletion of the resources of the land at present suffering exploitation, brings the bogs, swamps and marshes within the margin of economical production.

#### UNDERGROUND WATER

Unlike some districts of the United States and Canada, there are no important, if any, portions of the State that are not supplied with underground water, usually of a chemical composition and temperature rendering it at once serviceable to man and beast. There are, indeed, few counties from Keweenaw in the extreme north, to Monroe and Berrien at the extreme southeast and southwest corners of the Lower Peninsula, in which artesian wells and springs do not occur, and at some points in great abundance. Artesian wells are usually secured at depths of less than one hundred feet, frequently much less than this. The Marshall sand-

stone is a famous reservoir of artesian waters. The glacial drift being deep over most of the southern peninsula, springs commonly emerge at the base of an ancient lake beach or from the drift along a water-course or lake shore. One sometimes finds them debouching from the bed rock, as in the case of those which flow in great profusion out of the limestone bordering the Au Train near Lake Superior. In country adjacent to the Maple River in Gratiot County, there are few farms which do not have their ready flow of water from wells sunk in the covering clay. Along the eastern and western shore-lines of the southern peninsula, artesian wells are abundant. At Alma in 1897 a calculation made by a student in Alma College was to the effect that the seventy-two wells in the place were producing 222 times as much water as the people were using. Indeed, in seasons of drought a more conservative method of utilizing these subterranean waters might better serve the private and public welfare. The geology and topography of the State are favorable to their formation, but in some localities, at least, they are demonstrably not inexhaustible. In many sections they are an extremely convenient source of a rural water supply, and are much prized even in urban communities. Fortunately, unlike some other natural resources, nature replenishes the depleted stocks of underground waters, except in the case of some springs which depend immediately on surface conditions, and which have become extinct with the removal

of the forest cover or with artificial surface drainage.

In the Upper Peninsula, the dip of the paleozoic rocks in the eastern portion of the district is from north to south, the divide, as already stated, being rather close to Lake Superior. This affords conditions favorable to artesian wells along the southern zone approaching the shore of Lake Michigan; and, in fact, such wells have been found at or near Menominee, Escanaba, Gladstone, Manistique, and St. Ignace, at Newberry in the Taquamenon swamp area, and at Ewen, in Ontonagon County, but, so far as is known, not near the Lake Superior shore, although an attempt was made to secure such a well at Grand Marais. A. C. Lane, State Geologist in 1903, considered portions of the Lake Superior shore west of Marquette, and west of the copper range, favorable to such wells, but in the main this region is free from them. On the copper range itself and the iron ranges, the geologic structure is unfavorable to their existence. At some points, as along the bluffs facing Portage Lake on the Keweenaw Peninsula, springs are abundant and of ample flow.<sup>1</sup>

<sup>1</sup> For analyses of waters from wells throughout the State, see the Report of the State Bd. of Geol. Survey for 1903, which also contains much data in regard to the water supply of the State. Other data may be found in other reports of the Geol. Survey and in special "Water Supply Papers."

## VEGETATION AN INDICATOR OF SOILS

An idea of the natural productivity of the soil is commonly gained from the character of the vegetation, especially forest growth, found naturally upon it. The early settlers of Michigan have in numerous instances left accounts of the primeval vegetation which they encountered as they pressed into the wilderness; and special studies have from time to time appeared in the publications of the State Geological and Biological Survey, the University of Michigan and elsewhere. How the fertile clay soil about the site of Detroit brought forth abundantly the native fruits of the earth is described in glowing terms by the founder of the city. Of the Detroit River, "the banks," writes Cadillac, "are so many vast meadows where the freshness of these beautiful streams keeps the grass always green. These same meadows are fringed with long and broad avenues of fruit-trees which have never felt the careful hand of the watchful gardener; and fruit-trees, young and old, droop under the weight and multitude of their fruit, and bend their branches toward the fertile soil which has produced them. In this soil so fertile, the ambitious vine which has not yet wept under the knife of the industrious vine-dresser, forms a thick roof with its broad leaves and its heavy clusters over the head of whatever it twines round, which it often stifles by embracing it too closely. The woods are of six

kinds: Walnut trees, white oaks, red, bastard ash, ivy, white wood trees and cotton wood trees. But these same trees are as straight as arrows without knots, and almost without branches except near the top, and of enormous size and height."

Of the country about the headwaters of the Raisin, Grand, Huron, Kalamazoo and St. Joseph rivers in the vicinity of Manchester, Jackson County, L. D. Watkins has left a description, which states that on the openings "the principal timber trees were white, red, yellow pine, and burr oak, hickory, and a few scrub oaks on the sand hills. On the border of streams, on the bluffs, and on the north side of lakes we found a great many trees that in regular order of distribution would be far to the north or south of us. These strangers form with our indigenous forests, a regular conglomerate of the forests of three sections, each with its peculiar forest grove. From the southward we have the Buckeye, white wood, honey locust, Kentucky coffee-tree, mulberry, black haw and many others. From the north came hemlock, pine and spruce."

Eaton County, says Edward W. Barber, "was a region of great trees, beech and maple, elm and ash, basswood and cherry, with scattered oak and black walnut, a thick undergrowth of saplings; and where the land was low by some swamp or stream wild grape-vines climbed to tall tree tops."<sup>1</sup> Harriet Munro Longyear has described the forest growth of Clinton County as she saw it in 1836. "Much to

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXII, 264.



Plate II. The rolling topography typical of many parts of Michigan.





their (her family's) surprise," she writes, "they found the state satisfactory. They liked the beautiful forests with their beautiful trees. My father was captivated at first sight, arguing that land which supported such a growth of trees would raise anything planted. There were the black walnut, butternut, hickory, black cherry, bird's-eye maple, curled maple, sugar maple, silver-leaf maple, beech, basswood, sycamore, ironwood, white, black and burr oaks; many being three and four feet in diameter, and the tulip-tree with its beautiful foliage and lovely blossoms."<sup>1</sup> A heavy growth of hickory stood on the present site of East Saginaw.<sup>2</sup> A letter "From a gentleman in the Michigan Territory," writing under date of October 1, 1823, remarks "how incorrect are our ideas in New England respecting this territory. I find the land (near Detroit) rich and luxuriant, generally heavy timbered, and interspersed with numerous streams of good, pure water. It is a limestone country, and level, but in few instances too much so for cultivation."<sup>3</sup> The banks of the Thornapple were lined with immense trees that darkened the waters with their shade. Far over the current leaned the silvery trunks of sycamores equaled in height only by elms that over-topped the surrounding forest. Beneath the taller trees cedars darkened the gloom of the woods. Scattered along the banks were pines,

<sup>1</sup> *Ibid.*, XXXIX, 360.

<sup>2</sup> *Ibid.*, VII, 275.

<sup>3</sup> *Ibid.*, VII, 74.

which seemed to realize that they were not natives and were in strange company for they grew in groups with branches fraternally interplaced.”<sup>1</sup>

Of the forest of the valley of the Shiawassee River, Bela Hubbard wrote: “The woods of this part of Michigan comprised a very mingled growth. Oaks, not gnarled and spreading, as in the more open lands, but at once massive and tall, and of centuries’ age; the elm, that most graceful and majestic of trees of any land; the tulip, or white-wood, magnificent in size and height above even the Titans of the forest; the broad and green-leaved linden; the clean-bodied beech; the saccharine maples, so superb in their autumnal dresses—dyed, like Joseph’s coat of many colors; the giant sycamore, ghost-like with its white, naked limbs—these are the common habitants of the forest. We have reached, too, the latitude of the evergreens, which from hence northward to the farthest limits, became a distinguishing feature of the Michigan forest, imparting to them a more wonderful variety and majesty. Many a towering pine, 150 feet in height, now began to lift its head above its fellow inhabitants, green through youth and age, through verdure and frost. In many places the desert gloom was deepened by the dense and somber shade of hemlocks, which bent their graceful spray to the earth, and almost shut out the light of day. We took the measure of a white oak that stood at the border of the timbered land and the openings. It

<sup>1</sup> *Ibid.*, XXXVIII, 664.

was thirty-five feet in circumference,—nearly twelve feet diameter.”<sup>1</sup>

North of a line drawn from the southern end of Lake Huron to the mouth of Grand River was pre-eminently the native habitat of the white pine in Michigan. As already indicated, it was found south of this line, most notably in the much-prized type designated “cork” pine. The clays and loams of the southern counties were mainly preëmpted by the hardwoods, leaving the sandy plains and ridges of the northern area to the pines and spruces. Even in this section, where heavier soils appeared, the hardwoods were likely to supersede the pines. Thus Leverett notes a maple forest on the clay ridge at the headwaters of the Manistee and Au Sable rivers. On the other hand, the tendency of things to go awry north of the Straits, which Lovejoy has noted, is illustrated by the presence of white pine on the deep heavy clays about Ewen in southern Ontonagon County, while hardwoods flourish on the deep sands near Shingleton, where the soil augur of J. A. Jeffery, Land Commissioner of the Duluth, South Shore and Atlantic Railway, showed sand down at least six feet in depth. Spalding and Fernow describe the distribution of the white pine in Michigan as follows:

“In Michigan the distribution of the species is entirely controlled by the character of the soil, all sandy areas being pinery proper, with large areas of pure growth of several square miles in extent containing only white pine. Occasionally, and especially

<sup>1</sup> *Ibid.*, III, 192.

on the driest and poorest sandy gravels, the red pine (*Pinus resinosa*) associates and sometimes predominates, the white pine not representing more than ten to twenty per cent of the number of trees. In the northern regions jack pine (*Pinus divaricata*) takes the place of the red pine. The typical pine forest on fresh sandy soils consists of white pine (45 to 55 per cent of the dominant growth) mixed with red pine (25 to 45 per cent) with scattering hemlock (10 to 15 per cent) and occasional fir and hardwoods. On moister sand with loam or clay subsoil hemlock and hardwoods replace the pine, the red pine vanishing entirely and the white pine occurring only in large isolated individuals. Into wet or swampy places the white pine also penetrates in single individuals among arbor vitæ, hackmatack, and spruce. As the loam in the composition of the soil increases, the hardwoods increase numerically, the white pine occurring only in single individuals and groups, and red pine and hemlock only occasionally. Finally, the heavy clay soils toward the southern range of the species give absolute preponderance or exclusive possession to the hardwoods, mainly sugar maple, yellow birch, and beech, although occasionally white pine appears scattered, or even in smaller or larger groups.”<sup>1</sup>

Of particular areas a number of special studies have been carried on to ascertain the character and correlation of the flora, fauna and physical condi-

<sup>1</sup>Spalding and Fernow: “The White Pine,” Washington, 1899, 14; map facing p. 11.

tions of the regions considered. Such a study has been made, for example, of Walnut Lake in Oakland County and its environs, by C. A. Davis of Ann Arbor.<sup>1</sup> Of the flora of the highlands adjacent to the Lake, Davis says: "The distribution of the trees, now left only in woodlots, indicates that the forest was formerly dense, and the trees of good size, the kind of association found depending upon the type of soil covering a given area. The heavier soils of the moraines, the clay loams, where well watered, were covered by the hard-maple and beech, associated with red, white and burr oaks, basswood, walnut, hop hornbeam and other trees of the mesophytic or moist, drained soil type. In slightly drier areas the hickories and white oak dominated, although in strong mixture with some of the other kinds, and on sandy loams this association passed into nearly pure white oak, then to black or yellow oak and white oak associations, and finally, on very dry sites, becoming a forest, with black and scarlet oaks, of the oak openings type, on such areas as the sandy, glacio-fluvial deposits, both south and north of the lake."

"One who has traveled about the southern peninsula of Michigan," writes B. E. Livingston, "can hardly have failed to notice, for instance, the differing vegetations of the pine plains, the oak forest, and the beach and maple forest. There is hardly a single plant found common to the first and last of

<sup>1</sup>"A Biological Survey of Walnut Lake, Michigan," Lansing, 1908, p. 228.

these groups." A group of plant species associated together in a region under given conditions of climate, topography and soil, Livingston designates a "plant society," and he proceeds to describe such plant societies in Kent County. The soil is mainly sandy. The topography is morainic, with outwash aprons and glacial drainage valleys in the intervals between the moraines. On the uplands, Livingston discriminates five plant societies: (1) the beech-maple society, comprising beech, sugar maple, enchanter's nightshade, wild licorice, woodnettle, eat-nip, pokeweed, richweed, nightshade, and red-berried elder; (2) the maple-elm agrimony society, comprising sugar maple, American and rock elms, agrimony, spikenard, honewort, spice-bush, moonseed, black snake-root, and wild black cherry; (3) the oak-hickory society comprising white and red oak, shag-bark and pignut hickory, false Solomon's seal, northern bedstraw, *Aster laris*, and paneled cornel; (4) the oak-hazel society comprising the white and red oak, *Aster laris*, *A. macrophyllus*, New Jersey tea, hazel, spurge, *Helianthus occidentalis*, *Solidago casia*, and hoary pea; (5) the oak-pine-sassafras society, comprising the white and red oak, white pine, sassafras, plantain-leaved everlasting, wormwood, sand burr spurge (narrow-leaved form), huckleberry, lupine, sweet fern, bracken, and *Solidago nemoralis*. Societies 3, 4 and 5 were found on steep slopes where erosion is at present rapid, as along the margins of the stream valleys and along old glacial

channels. Livingston thinks the character of the soil made no difference here. All the heavy clay soil in the southern townships, whether rolling moraine or till plain, he finds to have been occupied by the beech-maple society (society 1). The oak-hickory society was usually found on the light loamy soil, with transition zones between it and the beech-maple society held by the maple-elm-agrimony society (No. 2). The very sandy loam bordering the valley of the Thornapple River was found to be occupied by the oak-hazel and the oak-pine-sassafras societies.<sup>1</sup> The Grand Rapids sand plain was mainly covered with societies 4 and 5. Hemlock was found in the north-western section of the county in the beech-maple society. White pine existed in the northern portion of the county. There were instances where white pine grew in the beech-maple group. The intermediate society 3 was found on the loamy soils and on the dryer clay areas. On the lowlands plant societies are differentiated with reference to their position in, or adjacent to, lakes, swamps, marshes, springs and streams; and the conclusion is reached that the degree and character of soil-moisture, rather than the type of soil itself, determines the distribution of plant species in this region, and presumably elsewhere. It is suggested also that the recent geologic history of the district may have had its influence. Since, as already known, the conditions of

<sup>1</sup> Rept. State Bd. Geol. Survey of Mich. for the year 1901; Lansing, 1902; p. 81.

soil, topography, surface drainage and soil-moisture varies exceedingly throughout the two peninsulas, it is not surprising that the natural flora and the products of agriculture likewise vary even in the same locality.



## CHAPTER III

### OTHER RESOURCES OF MICHIGAN

THE possessors of the land came into a rich inheritance of natural wealth—of forest life, of edible and medicinal plants, of aquatic animal and vegetable organisms, of valuable rocks, minerals, metals and fuels. The varied conditions of climate, topography, soil and geological structure favored a great variety of natural resources. This in turn has affected the distribution of population and of industries. The limitation of agriculture to restricted areas has perpetuated undeveloped regions still open to exploration and exploitation by the industrial pioneer.

#### THE FORESTS

To the first white settlers, the timber resources of Michigan appeared inexhaustible, and they fiercely assailed the forest as the chief hindrance to a livelihood from the soil it encumbered. Yet the pioneer was peculiarly dependent on the forest for the means of existence. It yielded building material of every sort and of a quality that today is scarcely to be obtained. It afforded shapes of every form and quality for implements and tools, furniture and

equipage. Prostrate it served as fences, while its succulent twigs saved hungry live-stock from winter starvation. Erect it warded off the blasts of winter, and it bestowed upon the surface of the land its covering of humus which, of itself and through the organic life it housed, fertilized the soil and rendered sterile sands agriculturally productive, retained soil-moisture and retarded the run-off of rain and snow, withheld erosion while preserving an even flow of spring and stream. It sheltered bird and animal life useful to man. It furnished primitive road material in a land of swamps and marshes. It dripped delicious sweets and exuded essential gums and pitch. It hived the bee whose honey made a substitute for sugar. By the distribution of the moss carried on its trunks, it became a primitive compass to guide the wilderness wanderer, while out of its depths weird music sighed or wailed in breeze or gale. At the last its ashes evoked the soil into increased productivity and contributed a primitive saleratus and lye to the requirements of housewifery. Yet the ubiquitous forest must go, if the more valuable contributions of tillage were to be gathered in. And it did steadily disappear, and continues to withdraw, it is estimated, at a rate which uncovers 100,000 acres of virgin soil each year.

Nevertheless, the forest in Michigan is still far from extinct. An estimate of the United States Forest Service (1919) put the standing timber in Michigan at 53,000,000,000 feet B. M., which experienced lumbermen regard as a conservative state-

ment. A recent war-time estimate by the Forest Service (not very close, it is admitted) judged 58 per cent of the standing timber—then put at 45,000,000,000 feet B. M.—to be hardwoods, of which 10 per cent was believed to be oak, 45 maple, 15 beech, 10 birch, 7 elm, 6 basswood, and 2 per cent ash. Of the total stand of softwoods, about 5 per cent was estimated to be white pine, 1 Norway pine, 6 jack pine, 66.5 hemlock (formerly despised but now precious because nothing better can be obtained at a moderate price), 5 spruce, 8 tamarack, 6 white cedar, and 2.5 per cent balsam fir.

The estimated forest area of Michigan is 3,500,000 acres. There is in reality no accurate estimate of the amount of standing timber in Michigan. The Bureau of Corporation's Report on the lumber industry (1914) put the total stand in Michigan at 47,600,000,000 board feet, including 2,000,000,000 feet of white and Norway pine, 15,000,000,000 feet of hemlock, 5,200,000,000 feet of other conifers, and 25,400,000,000 feet of hardwoods. The Bureau was not assured of the correctness of its figures, and the United States Forest Service, in its report on timber depletion in response to a Senate Resolution (1920), was so doubtful of its estimates that it did not venture to give separate statistics for each of the Lake states, but presented a combined rating for these states as follows: Eastern hardwoods, 69,350,000,000 feet; eastern softwoods, 40,760,000,000 feet. The most detailed figures on this subject are buried in the files of the State Board of Tax Commissioners

at Lansing. The data there contained have not been assembled in such a way as to show what timber remains standing in Michigan; and the Tax Commission seems unable—and the Public Domain Commission seemed unable or unwilling—to undertake the necessary investigation of these records. The Public Domain (now Conservation) Commission, charged with the duty of maintaining the forests belonging to the State itself and of protecting those of private owners, is quite without definite information concerning the magnitude of the task which it has been set to do. Therefore, one must continue to suppose that there is a certain quantity of each sort of timber still standing in Michigan, and that this is disappearing at a rate which even the most optimistic lumbermen do not assert will leave any marketable standing timber in the State at the end of fifty years, if present methods are not radically revised. This must necessarily ensue, if the present estimated annual cut in Michigan of 1,000,000,000 feet is adhered to. It will normally increase.

The extraordinary abundance and excellence of the forest growth in Michigan has already been noted. So inexhaustible did it appear that three generations of settlers took no pains to preserve or reestablish it. Black walnut was worked into fence-rails; white oak made good "sheeting" for dwellings; bird's-eye maple would make excellent stove wood; and potash was more prized than the splendid trees of which it was the residue gathered in from the "burn-pile."

The first farmers sought to avoid forests by locating on the prairies that dotted the southern counties; but there was need of lumber for home consumption and for exportation to the deforested areas of the East and to the treeless country west of the Great Lakes. Michigan prairies, too, were relatively of limited extent and the timbered country was required for agriculture. Saw-mills arose where water-power was most readily available, and soon lumber and logs were making their way down the Huron, the Flint, the Saginaw, the Grand and other streams—by boats, by rafts, in cribs; and then by railroad, to and on the Great Lakes and beyond them,—a process which has gone on for a century and which has not yet reached its conclusion. What the mills could not use, the fire consumed. “Niggering off,” as the phrase went, raised no misgivings where home-making demanded infinite labor with saw and ax and where the best effort of man seemed scarcely to scratch the limitless forest resources of the State.

The forest slowly retired before the resolute assaults of the woodsman. Much timber was removed from the southern counties prior to the Civil War. The period following the war saw the great pinery in the northern half of the southern peninsula gradually disappear, until now the State is gathering in the few slight remnants of its former magnificence as a memento of what will never be again; and finally the northern peninsula, primarily prized for its mineral wealth, produced its crop of millionaires through the exploitation of its forest wealth. Railroads, like

the Pere Marquette, were constructed with the definite purpose of removing such portions of the forest as were valued for the lumber market. Ivey estimates that from two-thirds to four-fifths of the traffic of the Pere Marquette was at one time composed of forest products. This traffic was transitory, and where the character of the soil precluded agriculture, such lumbered railroads eventually fell on evil days. Thus the Pere Marquette has recently sought permission to abandon its Kalkaska branch because there is no traffic that replaces its erstwhile lumber and log freight. Between 1870 and 1890, it has been estimated that 12,000,000 acres of Michigan territory was deforested, that is, one-third of the total area of the State; and while some of this land was converted to the uses of agriculture, numbers of acres remain in a disused cut-over condition.

Since the prosperous days of the lumber industry of the late eighties and nineties, when Michigan led the country in the magnitude of its output, there has been a progressive decline in the product of its saw-mills. In 1909 this was 1,889,724,000 feet; in 1912 it was 1,488,827,000 feet; in 1915, 1,100,000,000; and in 1918, 940,000,000 feet, when its production was exceeded by twelve states, including Minnesota, Florida, Alabama and Wisconsin.<sup>1</sup> Of lath the number reported to the Forest Service for 1916 was 109,323,000; 1917, 84,352,000; and 1918, 48,533,000 pieces. Of shingles, 201,171,000 pieces;

<sup>1</sup>U. S. For. Serv.: "Production of Lumber, Lath and Shingles," 1918, p. 13.

1917, 203,907,000; and in 1918, 148,565,000 were similarly reported.

The combined hardwood and softwood types of trees in Michigan represent a great variety of merchantable types, and help to explain the presence of many important wood-using industries in the State, such as the manufacturing of planing-mill products, boxes and crates, agricultural machinery, automobiles, pulp and excelsior, handles, furniture, toys and novelties. Of these varieties, maple—particularly sugar maple—has held a foremost position among the hardwoods and white pine among the conifers. Maple was native to all parts of the two peninsulas. In 1910 Michigan was credited by the United States Forest Service with producing more maple lumber than all the remainder of the country put together, and in 1918 with 40 per cent of the country's output. In the latter year the 178 mills reporting gave their product of this wood at 287,000,000 feet. It bulked large as planing-mill material, where it figured much in the manufacture of flooring. The Bureau of Forestry's report on "the Wood-using Industries of Michigan" (1912) put the consumption of sugar maple by Michigan planing-mills at 185,000,000 feet in 1910, of which 156,000,000 feet were grown in the State. In many other industries also this wood holds an important position. In the northern portion of the State, it is employed in large quantities in the wood-carbonization plants, in association with iron ore, for the production of chemical by-products of the iron smelting furnaces.

The original stand of sugar maple in Michigan must have been enormous, and while it has disappeared in much of the virgin forest area of the State, it survives in the wood-lot of many a Michigan farm from Lake Superior to the southern boundary, frequently as the highly prized sugar-bush, while it is still an important element in the large timber holdings of the northern peninsula.

As a present timber resource, white and Norway pine—once the glory of the Michigan forest—have dwindled in importance. The output of white pine in Michigan in 1918, as reported by 124 mills, was 46,664,000 feet, this being 2.4 per cent of the white pine cut in the entire country. Near Lake Superior and at a few points in the Lower Peninsula, a very few restricted stands of virgin white pine remain. The Interlaken State Park in Grand Traverse County has some very fine specimens, and there is another good stand not far from Grayling. As far back as 1910, the manufacture of boxes and crates in Michigan consumed 27,394,360 feet of white pine grown within the State, while more than that quantity was imported for this purpose. In the manufacture of sash, doors and blinds, twice as much white pine was brought from without Michigan as was then used from the domestic supply. In a miscellaneous group of wood-using industries, 54,000,000 feet of extra-state white pine was consumed as against 2,605,000 feet of home-grown material.<sup>1</sup> One commonly hears that good

<sup>1</sup> Wood-using Industries of Michigan.



white pine lumber, Michigan-grown, is now quite impossible to secure. This is not strictly true, but so nearly so that one is justified in treating the wood as a negligible factor in the local lumber market.

Magnificent oaks stood in the primeval Michigan forest. They were sought for ship timber and for general construction purposes, and occasionally a house was mainly built of it from sill to roof-boards. The 1918 report of the Forest Service ignored the Michigan cut, undoubtedly for the reason that it was insignificant. In 1910, the manufacture of furniture consumed 1,856,795 feet of white oak grown within the State, and similarly 1,000,000 feet of red oak; and 100,000 of burr oak. The manufacture of agricultural implements in that year took 322,000 feet of white oak, and 50,000 of red oak. Car construction utilized 90,000 feet of red oak grown in Michigan, while 1,430,059 feet consumed were grown outside the State. Of the 520,000 feet of white and red oak employed in the making of caskets, none grew in Michigan. While 1,020,000 feet of white oak was imported for the construction of boats and ships, only 185,000 feet was home-grown.

Hemlock, once despised by the carpenter and joiner, constituted one of Michigan's most important timber species in 1918, with its cut of 266,000,000 feet. This was 15.7 per cent of the country's total output, only Washington and Wisconsin exceeding Michigan in hemlock production.

Sixty-five mills reported an output of 7,523,000 feet of spruce in 1918, as Michigan production; while the birch contributed 48,807,000 feet reported by 131 mills; 29,788,000 feet of elm came from 162 mills; 5,627,000 feet of ash from 134 mills; 29,788,000 feet of basswood from 162 mills and 46,181,000 feet of yellow poplar from 143 mills, producing 18.1 per cent of the country's production.<sup>1</sup> The elm is one of the handsomest and most robust trees, and forms a striking and attractive feature of the south Michigan countryside today. It yielded in 1918, 28,841,000 feet of lumber—17.3 per cent of the national total. Michigan beech constituted only 2.8 per cent of the American product with more than 9,000,000 feet to its credit. Although some suppose its range to be restricted to the southern counties, it abides near the Lake Superior shore, in situations where, by all the rules, it has no license to be.

Of the manufactures related to agriculture, the report of the findings of the Forest Service expert, already adverted to, shows that agricultural implements consumed more yellow poplar than any other type—4,261,000 feet, none of which was grown in Michigan. Then follow white ash, 1,139,000 Michigan grown; white pine, 1,844,000; sugar maple, 900,000 feet; while other Michigan varieties are represented by white elm, basswood, white oak, cottonwood, silver maple, Norway pine, hickory, hemlock,

<sup>1</sup>U. S. Dept. Agr., Bull. 845: "Production of Lumber, Path and Shingles in 1918."

elm, beech, cork elm, red oak, chestnut burr oak, red ash and yellow oak. These woods used in this industry comprised 6,792,250 feet in 1910. The imported woods amounted to 9,821,980 feet, including such exogenous types as red gum, cypress, short-leaf pine, paper birch and pitch pine. Boxes and crates required 165,671,926 feet of home grown lumber, including 27,000,000 feet of beech; hemlock, 26,000,000; sugar maple, 23,000,000; and basswood, 12,000,000. Handles took more than 37,000,000 feet of Michigan material, of which sugar maple was by far the largest item, 23,000,000 feet; and the drift of handle factories to the northern peninsula, where maple is still an important element in the existing stand of timber, illustrates the great importance of this wood in the handle industry. Sugar maple leads among the Michigan woods used in the vehicle industry, 6,839,500 feet; while the indispensable hickory was imported to the extent of 6,084,400 feet, and 381,700 feet of Michigan hickory was consumed. The aggregate consumption of Michigan wood in this industry is given as 15,784,600 feet, while just about the same quantity was imported. Into tanks and silos went 2,665,000 feet of tamarack, 850,000 of white pine, 100,000 of hemlock, 35,000 of sugar maple, 25,000 of beech, all Michigan grown, an aggregate of 3,675,000 feet, 17,021,000 being imported. In 1910, then, Michigan factories consumed 1,282,561,200 feet of lumber, while the State's total cut is placed at 1,681,081,000 feet. There were large importations as well as exportations, as

is still the case. Ninety-nine kinds of wood were used by Michigan manufactures in 1910, of which sugar maple, white pine and hemlock supplied more than half the total consumption. Sugar maple comprised a quarter of this aggregate.<sup>1</sup>

The presence of an extraordinarily rich and varied forest growth brought to Michigan many industries using wood in their productive processes. Almost every little city has had its factory for making some implements or articles employing wood in its construction. Thus threshing-machines and other farm implements were manufactured at Birmingham as early as 1854. Corn-planters were made at Grand Haven, fanning mills at Plymouth and near St. Johns, pumps at several places, wagons and carriages at Flint, furniture at Grand Rapids, Owosso and elsewhere, caskets at Owosso, plows at Albion, threshing-machines at Battle Creek and Port Huron, portable houses at Bay City and St. Johns, harrows at Detroit, forks and hoes at Jackson, baskets at Lowell. The Forest Service report of 1912 lists thirty firms manufacturing agricultural implements in Michigan, twenty-six firms making boats and ships, two hundred and fourteen manufacturers of boxes and crates, twelve firms making caskets, twenty-two chair manufacturers, three manufacturers of excelsior, ninety-nine furniture factories, thirty-one handle factories, four manufacturers of matches and tooth-picks and twelve of musical in-

<sup>1</sup> Wood-using Industries of Michigan, Washington, 1912.

struments, one hundred and twenty-five manufacturers of sash, doors, and blinds, in addition to a very large number of concerns producing planing-mill and other products of wooden construction. These factories consumed, in 1910, 1,282,000,000 feet of wood, costing \$29,650,000. The ten years intervening since the publication of the Maxwell Report, which afforded the foregoing data, has seen the development to stupendous proportions of the automobile industry of Michigan, itself an enormous consumer of forest products. While definite information is not available, there seems a tendency for wood-using industries to transfer the scene of their operations to the northern peninsula, whose forest resources are less depleted. Statistics prepared by the Upper Peninsula Development Bureau early in 1920 indicate the presence in the Upper Peninsula of eighty-six saw-mills, four tanneries, four paper mills, six wood carbonization plants, six handle factories, two box factories and one excelsior plant. The establishment at Iron Mountain of a plant for the manufacture of wooden parts required by the Ford Motor Company was itself a significant indication of the drift northward of the wood-using industries. In addition to this very large output of factory products, the State has been called on to furnish out of its forest resources great quantities of mine props for the underground workings of its own iron and copper mines, of poles and posts, the estimated product of the Upper Peninsula in 1920 being 3,000,-

000 fence-posts alone; together with great quantities of general building material, hoops, staves, ties, and charcoal furnace wood.

The industries and products here enumerated clearly have a relation to agriculture, through their connection with the economy of the farm and the farm-home. There are also unfinished materials, such as posts, poles, pickets and rails for which the Michigan farmer has been indebted to the forest, as well as such home-made articles as barrel-hoops, handles, whipple-trees. The yield could be much greater if fire had been kept from the cedar swamps and oak uplands.

Long ago the people of Michigan began the systematic undermining of this remarkable industrial development based on its timber resources. As rapidly as human labor, assisted by power and fire, could do the work, the splendid hardwood-forest of the southern counties was swept aside by the pioneers. Great trees were felled in windrows, such portions of them as could serve the settler's requirements were preserved, and the remainder freely consigned to the flames. Log-rollings afforded recreation and merry-making to the primeval home-builders in the Michigan wilderness. The brilliant illumination of the night on which the burn-piles were reduced to ashes in the presence of the gathered neighbors, hither come in quest of such conviviality as the occasion might afford, appears to have impressed ineffaceably the memories of the older inhabitants of the State. It signified agriculture, food, sunshine

and smiling fields, light and air and long vistas from farmstead to farmstead. That was good. If it was wasteful, it was also necessary, if civilized life were to subsist in the haunts of wild beasts and savage men. As the people gained a foothold in the land, the product of their saw-mills went forward to regions which had already suffered from forest depletion or where the forest had not existed in historic times. That also was good and necessary. But as time progressed, the agencies of forest devastation got out of bounds, and they have continued to the present moment. They have undermined the legitimate and necessary utilization of forest products, until Michigan has arrived at the point when it is yielding less wood than it requires, is importing forest products from other states and countries, is losing wood-using industries to regions better supplied with forest resources, and is face to face with serious inconvenience and deprivation from its own improvidence and over-consumption of this most imperative necessity.

If the wasteful removal of the forest in the agricultural sections of the State was excusable, the persistent devastation in those areas where there was little hope of replacing timber with farm crops cannot be extenuated. Here in the process of deforestation, the young growth was shattered and destroyed with the mature trees. A relatively small portion of the felled trees was economically utilized. Those cast off were carelessly left on the ground to cumber it with débris and to afford every facility for the ignition and spread of wild fire throughout great

areas. These "brush fires" killed the young growth that eventually would have reconstituted the forest of merchantable timber of cut-over lands; they destroyed the humus of the soil, the decomposed forest litter containing much nitrogen which could only be restored by the painful and costly process of re-fertilization, which conserved soil-moisture, and maintained those animal organisms that convert raw soil to forms suitable for plant-food. On the lighter sandy soils of the State, which prevail in many counties on both sides of the Straits of Mackinac, these periodic burnings and re-burnings were definitely calamitous, producing veritable sterility in some quarters, so that a blasted heath is found where vegetation useful to man should be. Such lands as these, when settled on by the poor, the misdirected and deceived persons, yield nothing but hardships, penury, disaster, a delinquent tax sale and a damaged reputation for Michigan farm lands.

The removal of the covering forest from the hill-tops so characteristic of the State's topography, promoted denudation and erosion—the creation of worthless land where the forest once stood, perhaps, too, destroying the fertility of the surrounding arable fields which have received the sandy outwash of the scoured and denuded uplands. Where this outwash reached the water-courses, they were choked with sand-bars; and they became torrential in brief seasons when the run-off was excessive, and scant of water at other times. Some welcomed wild fire as a land-clearing agency, without perceiving that such



clearing operations were best conducted with fires under control in seasons of sufficient moisture to prevent burning from getting out of hand. Some even welcomed such forest devastation because of the wild berries that would arise in the haunts of the pines and hardwoods. Carelessness and indifference were the rule even when a moment's thought would seem to have suggested caution and restraint. It is quite so even to the present hour.

It was inevitable that much virgin timber should vanish in these forest conflagrations. A pioneer has described the fires in the vicinity of Owosso in 1856, when lanterns were required in the daytime and even the fish in the river were suffocated by the smoke.<sup>1</sup> "Among the most vivid recollections of my early boyhood," writes Arthur Hill, "are those of certain days when the smoke from the burning forests about Saginaw was so dense that children living in the outskirts lost their way in coming to and going from school." Such destructive conflagrations occurred in 1871 and 1881.<sup>2</sup> In 1911, the official report of the forest fires of the year records 191 fires, which burned on 152,407 acres, with an estimated damage—notoriously low when emanating from such a source—of \$3,470,000.<sup>3</sup> The United States Forest Service estimated the area burned over in 1919 at 500,000 acres, and the spring and autumn of 1920 saw multitudes

<sup>1</sup> "Mich. Pioneer and Hist. Soc. Collections," XXX, 371.

<sup>2</sup> "Mich. Forestry: Some Questions Answered, etc," Lansing: Mich. Forestry Commission, p. 1.

<sup>3</sup> Rept. State Game, Fish and Forestry Warden, 1912, 108-109.

of brush and forest fires wherever and whenever conditions became favorable. In reality every year chronicles its ruthless devastation of our forest resources, virgin and second-growth, and there is not the least indication that the State is effectively meeting this major problem in conservation.

#### MINES AND QUARRIES

Metalliferous rocks are found chiefly in the Upper Peninsula, where the covering of glacial drift is much shallower than south of the Straits. Yet the southern peninsula has made its contribution of coal, which is wanting in the northern peninsula, of gypsum, of limestone, and, of chief importance, salt. Both sections are well supplied with gravel for road material, clay suitable for brick and, in the southern peninsula, for the manufacture of pottery, and with building stone, glacial boulders and quarry material, although their distribution is not uniform and equal.

Michigan had no sooner embarked on statehood than it created the State Geological Survey and placed it in charge of Douglass Houghton, a physician and man of scientific attainments of Detroit. This first geological survey of Michigan comprehended four departments of work in the fields of zoölogy, botany, geology and topography. The investigations were continued through four seasons (1838-1841), and then the field work was discontinued through lack of funds consequent on the financial depression of that time. Houghton then con-

ceived the plan of a combined linear and geological survey of the public lands of the United States under the control of the General Land Office. He was engaged on this survey at the occurrence of his untimely death in Lake Superior near Eagle River in a storm in the autumn of 1845. Houghton's researches and published reports are credited with laying the scientific foundation and information for the enormous mineral development that has ensued in both peninsulas. His published reports related to the presence of salt, marl, coal, gypsum and other minerals of the southern peninsula, to copper, limestone and minor minerals in the northern peninsula; and a party of his surveyors immediately in charge of William Burt is credited with ascertaining the presence of iron ore on the Marquette Range in 1844.

Before active mining operations could be undertaken, it was necessary to extinguish the Indian title to the metalliferous lands of the region. The Saginaw Valley, where coal and salt were later developed, was relinquished by the Indians very largely in 1819, while the mineral region of the northern peninsula came into the possession of the United States in 1843 (revised in 1854). Then, following the survey of these lands, exploitation was earnestly undertaken, first under permits issued by the Secretary of War, and then under an act of Congress in 1847 providing for the sale of mineral lands at a fixed price. Large tracts of mineral lands came under private ownership through grants made in aid of canal, road

and railroad construction. Surveys were continued at intervals for many years and even now the Geological Survey of Michigan undertakes from time to time field work that, it is hoped, will reveal additional resources that may enrich the commonwealth.

Unlike iron, copper made its presence known to the first explorers of the Lake Superior country, and had hitherto been extensively utilized by the Indians in the manufacture of weapons and utensils, of which there are several notable collections both within and without the State and which are still being increased by occasional discoveries here and there throughout the district. Michigan copper, unlike that found in Montana, Arizona, Utah and many other places, is a formation of pure copper uncompounded with other elements. Rarely it forms a metallic cement combining pebbles in a conglomerate formation. More commonly it is dispersed through the rock in large masses and in granules, frequently at great depths below the surface, but occasionally exposed on the surface itself. It was these exposed masses of copper that engaged the attention of the early Jesuit and other French and English explorers.

The native mining operations suggested locations for similar enterprises by the whites, as in the case of the Isle Royale Mine at Houghton. In Michigan the copper veins were distributed along a rather narrow axis from Porcupine Mountain near the Lake Superior shore westward from the Keweenaw Peninsula and near the center line of this peninsula for quite its entire length, with points of major dis-

tribution, such as northeastern Ontonagon County (Minnesota and Michigan mines), near Portage Lake (Isle Royale and Quincy mines), near the boundary of Houghton and Keweenaw counties (Calumet and Hecla, Ahmeek, Wolverine and Mohawk mines), and near Eagle River (Cliff, Phoenix and Keweenaw Copper Company's mines). Contrary to an impression sometimes encountered, there is no mining of copper beneath Lake Superior, but the copper deposits emerge on Isle Royale and other islands in Lake Superior and on its Canadian shore, but in amounts that have seldom been remunerative to its miners. Some of the mines on the Copper Range have been operated for many years, a very few having their inception before 1850. The deposits are manifestly very far from being exhausted. The metal is being secured in some instances from shafts extending to a depth of more than a mile, which makes costs high; nor is the ratio of copper recovered to the rock raised to the surface high, in some instances amounting to ten or eleven pounds of metal to the ton of rock in mines that have, nevertheless, been operated at a profit.

Unlike iron ore, copper when elevated to the surface must be "stamped" to dislocate the metal from its rock container, and this process is performed where there is ample supply of water, at present on Portage and Torch lakes and, in most instances, on the shore of Lake Superior. Unlike iron ore, too, much of the metal is smelted in the same district where it is mined. A leeching plant at Lake Linden

also recovers much copper from the refuse deposits of the old stamp mills, subjected to a secondary process which has proven very successful in regaining additional quantities of copper.

Little copper is consumed locally, although various schemes for its use in local manufactures have been projected. Most of the metal goes out of the country by water to the eastern consuming centers and to Europe. Alexander Henry, the first to attempt copper mining operations in the region, predicted the failure of such attempts through the remoteness of the market and the insuperable difficulty of exporting the product. The opening of the artificial waterway at Sault Ste. Marie (1855) and into Portage Lake (1860 and 1873), with the completion of several lines of railway into the copper district, has falsified these predictions, and more than one billion pounds of copper have been produced in the area since the inauguration of mining seventy-five years ago. The labor was performed at first chiefly by experienced miners from Cornwall, who still constitute a distinctive and interesting human element in the local population. Later came Finns, and more recently Slavs and Italians. The directing personnel is largely of New England stock, and much New England capital has been absorbed in the copper country. Boston has always figured largely in the industry on the side of finance and market operations. Together with old established mines, the district comprises mines in the stage of initial development, where excavation has not yet been begun

or where it has not reached the copper district, or has not uncovered remunerative quantities of it. While there are areas in which mining operations have long since ceased and the land has returned to its wild neglected status, there are other areas in which for the first time mineral exploitation is being carried forward. Copper mining in Michigan suffered from the recession of business following the conclusion of the World War, but the return of normal relations throughout the commercial world is expected to reestablish the industry on a reasonably satisfactory basis.

A by-product of the copper industry is of particular importance to Michigan agriculture. Arsenite of lime is recovered from the smelters and is serviceable as a grasshopper and general poison. It was of advantage in the grasshopper "epidemic" of 1920 to have an abundant supply of this substance readily available, and it was freely utilized.

With the exception of Brazil, the Lake Superior region has the largest deposits of iron ore known to exist in the world. These occur in Michigan, Wisconsin, Minnesota and in Canada. The deposits in Michigan are found in three ranges: The Marquette, the Menominee and the Gogebic. The exploitation of the Lake Superior iron ores followed the discovery of this mineral on the Marquette Range, as already stated, in 1844. The following year a company organized at Jackson carried on explorations in the same district and located the famous "iron mountain" near Teal Lake, between the pres-

ent sites of Ishpeming and Negaunee, about twelve miles inland from Lake Superior. The next year a small amount of ore was taken out and smelted at Jackson. Bog iron ore was distributed at various points in the southern counties of the State, and for its utilization a number of forges, or furnaces, had been erected. Such a forge appears to have been first employed for smelting this Lake Superior ore. In 1847, a forge was established on the Carp River close to the present site of Negaunee, for the purpose of converting the iron ore, which was found in a loose formation on the surface of the land, to a form that could be transported out of the country. This and other forges erected in this vicinity prepared the iron ore in the form of "blooms," in which condition it was shipped out of the district to eastern markets. After some years, blast furnaces were erected and the process of smelting the ore was begun. The iron was shipped from the mines to the forges or furnaces, most of which were constructed close to the lake shore, and thence went forward by water. At first conveyance was by wagons, later by railroad. Ore docks were built in the harbor of Marquette, first of simple construction involving much labor in transferring the mineral from train to dock and from dock to ship. Then a type of dock was designed whereby the railroad ore cars deposited their load directly into pockets, whence in turn the ore was sent through shoots into the hold of the vessel along side. The marvelous perfection of present equipment of such docks per-



mits the loading of a cargo of 10,000 or more tons of iron ore in two or three hours, while at the port of destination the reverse process is likewise rapidly completed through the use of great "clams" or "Hewlitts," which snatch many tons of mineral out of the ship at a single "bite," placing it on the dock for shipment by railroad to the furnaces and consuming centers of Ohio and Pennsylvania. The abundant forests of the Lake Superior district have afforded wood for the manufacture of charcoal employed in the smelting of a portion of the iron ore mined here, but most of it is smelted and utilized outside of the Lake Superior region. The local smelters using charcoal derive from the iron and the wood by-products, including acids and other chemicals of great commercial importance and add materially to the industrial status of northern Michigan.

The iron deposits of the Marquette Range have a general eastern and western trend, with Negaunee at the eastern end, while its western extension approaches L'Anse. At various points mines have been opened: at Negaunee, Ishpeming, Michigamme, Republic, Gwinn and other locations, the ore being exported largely through Marquette, although the completion of the Peninsular Division of the Chicago and Northwestern Railway to Negaunee in 1864, made shipments possible out of the Lake Michigan port of Escanaba. For some years, too, ore reached L'Anse, to which port the line of the present Duluth, South Shore and Atlantic Railroad was opened in 1872, and where an ore dock of the pocket

type was erected, later to be dismantled. From these mines of the Marquette Range an aggregate product of 121,059,070 tons (1854-1916) of iron ore has gone forward to market. The ore exhibited great tensile strength because of its relative freedom from phosphorus, sulfur, arsenic and other impurities, and while the early production running as high as 65 per cent pure iron to the mine-run of ore has not been maintained—the present percentage being about 50,—the ore is still highly favored by consumers of the metal.

Southwest of the Marquette Range some fifty or sixty miles is the Menominee Range, the second to be developed in Michigan. Mining operations here began about 1870, and the total output to 1916 was 104,902,919 tons. The product goes out through Escanaba from such mining points as Iron Mountain, Crystal Falls, Iron River and Stambaugh. Water-power development on the Menominee River has assisted in furnishing hydro-electric power for the use of the mines and the mining towns.

In the westernmost county of the Upper Peninsula not far from the Montreal River, the last of the three iron ranges of the State was opened up about 1880, following exploratory work by Pumpelly and Brooks. The outlet for the product of this district was by way of Ashland, Wisconsin, to which a railroad was shortly constructed—now a portion of the Chicago and Northwestern line—and at which docks were provided. The deposits extend over into

Wisconsin, and this fact is a sufficient reason for the pressing of Michigan's claim to the territory west of the Montreal River, resulting from the original alleged erroneous survey of the interstate line at that point. The mining properties are located at Ironwood, Bessemer, Wakefield and other points in Gogebic County, and up to 1916 had yielded an aggregate of 95,607,671 tons of ore.

In the iron industry, as in other mining operations, production is maintained at each mine for a greater or less period of years and when ore bodies become exhausted, the mine is abandoned and the workings allowed to fill with water. In 1917, the active iron mines in Michigan numbered thirty-four on the Marquette Range; eleven on the Menominee Range; and twenty-two on the Gogebic Range. The ores uncovered have varied greatly in texture, solidity and chemical composition. They have been designated by such discriminating terms as hematite, specular, magnetic and laminite. On the Marquette Range hard ores were found at Republic and some other points, and were formerly much desired for smelting purposes, while the soft ores were discarded as unsuited to the furnaces. Improved smelting methods have reversed the situation. The ores of the Menominee and Gogebic ranges are soft hematite in character. An analysis of the Michigan iron ores, published in the report of the State Geologist for 1917, showed the following results as an approximate average for each range:

## Percentage of Content.

<i>Marquette Range:</i>	Iron, 54; phosphorus, .03; silica, 8; manganese, .24; moisture, 8.
<i>Menominee Range:</i>	Iron, 53; phosphorus, .04; silica, 8; manganese, .18; moisture, 7.
<i>Gogebie Range:</i>	Iron, 53; phosphorus, .04; silica, 7; manganese, .39; moisture, 11.

At the beginning of mining operations, masses of ore were often found about the surface of the ground, the result of glacial action, and in outcrops, occasionally in the form of "iron mountains." The first mining consisted, then, in removing this most accessible portion of the visible ores. Later, open pits were frequently sunk, such mines still obtaining at a few points, as near Wakefield. Such exploitation of the ore bodies had the character of quarrying, which in time was extended beneath the surface of the ground; and eventually true shafts of considerable depth were driven along the veins, involving extensive surface construction of hoists and other equipment. While there is some "bog ore" in the Upper Peninsula, as in the Seney swamp, this is of no commercial importance. The question is often asked as to how long the iron ore and copper deposits in the Lake Superior region will continue to be workable. In 1921, the State Geologist reported a visible supply of iron ore in Michigan of two hundred million tons, with an annual production from twelve to eighteen million tons. It is evident that the industry has a definite period of duration not very prolonged. There remains the possibility of utilizing low grade ores, not at present being worked,

and of discovering through exploration ore bodies that will materially add to the present ore reserves. The first possibility must rely for its realization on private enterprises; the second, on liberal support of the State Geological Survey as well as on private efforts.

While Michigan is not ordinarily classed as a silver-producing state, its production of this metal in the year 1919 amounted to 441,430 fine ounces. In the pioneer days of copper mining, silver in its pure native form was not infrequently uncovered in conjunction with the red metal, and many stories are related of the practice among the Cornish miners at the old "Cliff" and other mines, of depositing small nuggets of silver in their boots and elsewhere about their persons on the theory that whatever besides copper was revealed in their mining operations belonged to the miner himself,—a view not shared by the owners of the mine but circumvented only with difficulty. Occasionally the silver was recovered embedded in nuggets of copper, and the mass was then popularly referred to as a "half-breed." A very remarkable silver formation on a diminutive island near the north shore of Lake Superior was discovered shortly after the Civil War, and while the "Silver Islet" lay just outside the territorial limits of the State, Michigan citizens were primarily concerned in developing its rich vein of the metal and were the beneficiaries of their enterprise from which \$2,000,000 to \$3,000,000 in the aggregate were realized. The area of the Poreupine Moun-

tains in the western part of the Upper Peninsula has yielded small amounts of silver for years, and in the early seventies of the last century, a number of mines were opened in the vicinity of Ontanogan River, an outlet of Lake Gogebic into Lake Superior; but the elaborate expectations of the promoters were not fully realized. In recent years much of the product of Michigan silver accrues from refining operations connected with the copper industry.

It was inevitable that a region rich in mineral resources should attract the attention of the gold-seeker. The presence of this precious metal was discerned in the quartz, but the State Geologist, in his report for 1885, is doubtless correct in giving credit to the Ropes Gold Mine for the first systematic effort at gold mining in upper Michigan. The gold-bearing serpentine is located some six miles northwest from Ishpeming, and here gold was discovered in 1881. Regular mining began in 1882. A stamp mill and concentration plant were erected, and the bullion found its way eventually to the United States mint. The product was a combination of gold and silver in the ratio (1885) of about 2 to 5. Some rich rock was discovered. In one instance seventeen pounds of rock yielded \$103 of gold.<sup>1</sup> The gold content of the rock was variable in amount, being described as "pockety," and although in the fifteen years in which this mine was worked, gold and silver to the value of approximately \$650,000 was removed, of which in the aggre-

<sup>1</sup>"Mineral Statistics," Mich., 1885, p. 159.

gate 80 per cent was gold, the mining operations were eventually abandoned, and the property today has little surface indications of the mining activity that once obtained there.<sup>1</sup> Yet there are some even now who insist that the mine will eventually be reopened and will richly repay the confidence which has been placed in it. Evidences of the presence of gold were found throughout a considerable area adjacent to this mine, and not a few other efforts to recover the metal were undertaken, in some instances with very encouraging results. From one of these short-lived mines, some \$7,000 of gold were taken out in a few months, but the vein soon dwindled to inadequate proportions. In the Dead River district and even within the city of Marquette, auriferous deposits were uncovered near the surface, but for years interest in gold mining in Michigan has remained dormant.

Persons of a speculative turn of mind may sometimes wonder what the industrial development of Michigan would be like if, with its enormous wealth of metallic minerals, an adequate supply of coal existed within the State. Southwest from Saginaw Bay an extensive area productive of coal reaches as far as Jackson and Calhoun counties, but the vein is normally thin, and, except in the territory close to Saginaw Bay, has been of no great economic importance. As far back as the territorial period, outcrops of coal were observed and very early its removal was undertaken. Thus it was mined near

<sup>1</sup> *Ibid.*, 1899, p. 299.

the Shiawassee River at Corunna and near the Grand River at Grand Ledge. For years mines were worked close to Jackson, and for a quarter of a century excellent coal has been secured at St. Charles in Saginaw County and close to Bay City. Even as far north as Arenac County a very thin formation was uncovered, while detached masses occasionally appeared in the morainic accumulations beyond the region of the coal formations proper. Yet all told the State's production is small compared with its requirements, according to the United States Geological Survey, amounting to one-tenth or one-thirteenth of the consumptive demand in normal years. The coal measures lie close to the surface, so close, indeed, that occasionally mining operations have been hindered by the insufficiency or absence of the covering rock, permitting the encompassing drift and surface waters to cumber the openings driven into the coal measure. Unfortunately, the Upper Peninsula, the seat of an enormous wealth of metallic minerals, seems wholly lacking in coal of any sort. Even if the coal of the Lower Peninsula were adequate for State needs, it is non-coking in quality. However, the admirable waterway system encompassing Michigan on almost every quarter affords a ready avenue for the importation of coal from neighboring states.

If Michigan lacks coal, it is superabundantly supplied with peat. Occasionally one hears of attempts being made to perfect processes for its economical utilization as fuel, but, so far as is known, little suc-



cess has as yet been attained. The cost of dehydrating the substance is the chief impediment. Near Chassell on the Keweenaw Peninsula, the National Humus and Chemical Company has exploited local peat deposits in the manufacture of fertilizer and stable litter. Its great absorbing qualities favor its use in the stable, and, when artificially nitrogenized, in addition to its original nitrogenous content, recommend it strongly for fertilizing purposes, independently of, or following, its use in the stable. This industry, however, is as yet too near its incipiency to write positively of its success. It appears to contain very attractive possibilities.

In the district between the copper country and Marquette close to the western extremity of the Huron Mountains and the head of Huron Bay, is an extensive formation of slate, on which quarrying operations were carried on for fifteen or twenty years in the seventies and eighties of the last century. A narrow gage tramway was constructed to convey the product from the quarries to the dock five miles distant. Several companies were early organized to work the formation and high hopes were entertained of financial success. Undoubtedly the slate is of excellent quality, except one feature which is held responsible for the failure of the enterprise: it was considerably shattered in its natural state and its removal involved much wastage. Expert opinion has recently held that an improved method of quarrying would have obtained better results, but it has also been pointed out that very much slate is available

in more accessible parts of the United States and that market conditions irrespective of availability are frequently difficult to meet. The formation extends westward to the head of Keweenaw Bay and even beyond it, and hopes are still entertained that, with more scientific handling of the waste product, commercial development may again be secured. Undoubtedly the slate formations lie close to water transportation on Lake Superior and, with other conditions equally favorable, the industry may revive. The site is one of great natural charm, and has attracted the tourist and hunter since the quarries were closed some thirty years ago. Although distant from the railroad, agriculture has attained considerable development in the vicinity, and lumbering is active. The old workings are now in a decayed condition, the pits water-filled and the buildings aged and weather-worn.

The glacial drift of both peninsulas abounds in bowlders suitable for building purposes, and in some places the surface of the land was thickly strewn with them, occasionally of great size. Before the use of concrete became common early in the present century, foundations, walls and even pavements were composed of this rough bowlder material. There existed also in both peninsulas outcrops of bed-rock, chiefly sandstone and limestone, likewise available through quarrying for construction purposes. In the Lower Peninsula such formations and quarries were operated in Ionia, Kent, Eaton, Calhoun, Hillsdale, Jackson, Shiawassee, Iosco, Huron, Barry and

Saginaw counties, but these enterprises have now been discontinued, so far as information now at hand indicates. The sandstone of these formations was likely to take on a yellowish hue because of the oxidation of the iron carbonate in the cementing material. The most important formations of workable sandstones were found in the northern peninsula adjacent to Lake Superior at Marquette and on both shores of Keweenaw Bay. During the last quarter of the last century, a number of quarries were opened in both areas and continued to produce large quantities of excellent building stone until the local supply was exhausted or market conditions became unfavorable. The Marquette quarries, just south of the city, yielded a brown sandstone that was very much sought, the raindrop variety having a particularly pleasing appearance. A hard attractive brown sandstone also was derived on the western shore-line of Keweenaw Bay between L'Anse and Pequaming, while on the opposite side of this waterway the famous Portage Entry redstone was taken out for many years in very large quantities. Indeed this formation was quarried until very recently, when the cost of removing the over-burden, then become of considerable depth, and also apparently a change in taste among the users of building stone, made quarrying unprofitable. From these sandstones of Lake Superior many well-known structures in many cities of both the United States and Canada were erected, the stone being transported great distances both by rail and water. Its proximity to the shore of the

lake facilitated shipment, where gravity could be relied on to bring the rough stone from the pits to the finishing mills beside the docks. The stone, when first extracted from its matrix, was readily workable into any desired design by machine tools, and then, when exposed to the air, dried and hardened into a condition of great duration both as against fire and weather. The many abandoned open pits along the south shore of Lake Superior testify to the very active demand once entertained for this building-material, a demand now transferred to the less sightly but more adaptable and cheaper concrete construction. At present (December, 1921), there remains only one active sandstone quarry operating in Michigan, near Grindstone City, Huron County.

From 1860 to 1916 Michigan produced 236,724,878 barrels of salt, valued at \$98,815,061.<sup>1</sup> The output of salt in 1919 was 2,492,378 short tons. Salt was one of the first mineral resources of Michigan to which attention was given by the State Geological Survey. Douglass Houghton, the first State Geologist, was convinced of the presence of salt in the Saginaw valley and he persuaded the legislature to make provision for exploratory work under State direction. Investigations were conducted both in the valleys of the Grand and the Saginaw rivers, but early results were not encouraging and State efforts were discontinued. Some years later private agencies resumed these investigations and by 1860 the definite success of salt production in Michigan was estab-

<sup>1</sup> "Mineral Resources of Michigan," Lansing, 1916, p. 159.

lished. There remained the problem of eliminating impurities from the product—particularly bromine, iron and gypsum,—and in 1869, the State inspectorship of salt was created to promote greater purity in the saline output. Seven years later, an association of salt producers was organized to control the marketing of the product, and by 1880 Michigan was producing nearly half the salt of the country. Since that time the State has continued to hold first place in most of the years to the present time, occasionally yielding the primacy to New York. Although there is some evidence of salt in the rocks of the Upper Peninsula, the State's production has during this period been confined to the southern peninsula. By 1890 salt was being produced in the counties of Saginaw, Bay, Huron, St. Clair, Iosco, Midland, Manistee, Mason and Gratiot. More recently Wayne has taken first place, that county's production in 1916 amounting to 9,000,000 out of 16,000,000 barrels produced in the State. This shows the shifting of the major output from the Manistee-Ludington area in the northwestern Lower Peninsula, which in turn had taken the supremacy from the Saginaw district. Indeed, the whole region fronting the St. Clair and Detroit rivers overlying a deep layer of rock salt, is now the most important salt territory of Michigan, although important regions of rock salt are likewise found underlying Manistee and Mason counties in the northwest, and Alpena and Presque Isle counties of the northeast. The Saginaw salt has been obtained from a brine found at a depth of

600 to 1,000 feet or more, while the Manistee salt is derived from a brine artificially produced through the injection of fresh water from the surface of the ground into the salt formation, in penetrating which it dissolves a quantity of salt which the return flow of water to the surface conveys thither, where it is concentrated and purified. Formerly the evaporation of the water from the brine was cheaply performed by the use of waste fuel and waste steam from the saw-mills of the locality, so that the timber supply has adversely affected the salt industry of Michigan. Yet recent statistics of salt production show that the industry is on a much larger scale now than ever before. For the past forty years the State has produced more than one-fourth of the national supply of this most necessary article. In addition, by-products, such as bromine, calcium chloride, bleaching and caustic soda, have been derived from the salt industry. During the war the production of bromine, especially at Midland, assumed great importance. The reserves of salt remain very large, in some places the deposits having a thickness of 500 to 800 feet, at moderate depths. Definite information concerning exact distribution and available quantity of salt in the State is wanting. However, it seems evident that the ancient oceanic beds in which this product is obtained are sufficient for all future requirements.

In the early period of the gypsum industry, the product was largely utilized as "land-plaster," but with the increasing use of artificial fertilizers, this

has lessened in importance, so that at present gypsum goes more largely into the manufacture of gypsum plasters employed in the building-trades, plaster-board, fire-proofing and calcimines.<sup>1</sup> In 1916, mixed wall-plaster constituted the most important of these gypsum products, its value being then 62.7 per cent of the total of raw and calcined products of the State. Stucco had 26.2 per cent of the total value of gypsum products in that year. In 1916 five mines, two quarries and eight mills were reported by the State Geologist in operation. Kent County is the main location of the industry, since the gypsum formations here are extensive and accessible. Still other gypsum beds exist in Iosco, Arenac, Ionia, Tuscola, and Eaton counties in the southern peninsula, and near St. Ignace, Mackinac County and on St. Martin's and adjacent islands of the northern peninsula. The gypsum beds of the State have been officially described as inexhaustible. The production for 1916 was 457,375 tons, and in 1919, 339,125 tons. This is the maximum yearly output. The total production of the United States for that year was 2,750,000 short tons. New York was then the largest producer of gypsum, Iowa second, and Michigan third.<sup>2</sup>

At a number of localities in Michigan are situated mineral springs of considerable therapeutic reputation. In 1914 twenty-two mineral springs were re-

<sup>1</sup> "Mineral Resources," Mich., 1916, 161.

<sup>2</sup> U. S. Geol. Survey: "Mineral Resources," 1916, Pt. II., 255.

corded by the United States Geological Survey, as yielding 931,343 gallons of mineral water. In 1919 the number reported was ten springs yielding 1,570,906 gallons. These springs were located at Saginaw, Grand Rapids, Mt. Clemens, Maltby, Ogemaw County and Northville, Wayne County. The total value of these waters in 1919 was put at \$132,312, at an average price of eight cents a gallon.<sup>1</sup> The Michigan Geological Survey notes a progressive decrease in the output of these waters since the high point of more than 8,000,000 gallons in 1902. As they are chiefly potable rather than medicinal, local conditions related to the water supply have their influence on the demand for these mineral waters.<sup>2</sup>

Some nine miles from L'Anse in Baraga County is a deposit of graphite which has been worked intermittently for some years. This graphite is of too low a grade for lubricating purposes, but it has been used in the manufacture of paint. In the vicinity of the old Ropes Gold Mine near Ishpeming is a deposit of low-grade asbestos, as yet unworked.

If Michigan is poor in its coal resources, it is even more inadequately provided with oil and gas, so far as existing knowledge goes. There are a number of wells within the city limits of Port Huron, apparently an extension of the Ontario field. The oil from one group of these wells is consumed in the manufacture of lubricants, for which it is said to be

<sup>1</sup>U. S. Geol. Survey: "Mineral Waters in 1918," 515.

<sup>2</sup>Mich. Geol. Survey: "Production and Value of Mineral Products in Michigan," Lansing, 1917, 184.



especially well adapted.<sup>1</sup> Small quantities of oil have been discovered in borings in the neighboring territory, but not of economic importance. In the Saginaw Valley, test borings have been made at several points and some oil obtained thereby, but, while the geological formation is regarded as favorable, a commercial yield of oil has been obtained at widely separated points in Michigan but with meager results. Lenawee County in the southern portion of the Lower Peninsula, and Schoolcraft County in the southern part of the Upper Peninsula have had oil booms as recently as 1920, but little has been achieved in either territory. In both peninsulas are large formations of oil-bearing shales which may eventually be drawn on for petroleum. Small outputs of oil have been recovered at Allegan, Kalamazoo, Killmaster, Ludington, at East Lake, Stronach, Mt. Pleasant and Osseo. The aggregate product has been quite negligible.

Raw material, as marl, limestone, clay and shale, for the manufacture of cement abounds in Michigan. The largest deposits of nearly pure calcium carbonate are in the northern portion of the southern peninsula, and in the eastern part of the northern peninsula, and hence at points more remote from markets and the sources of fuel. According to the Michigan Geological Survey, more than one hundred marl deposits each above fifty acres in extent and with an average depth of at least ten feet have been discovered in

<sup>1</sup> Mich. Geol. Survey: "The Occurrence of Oil and Gas in Michigan," Lansing, 1912, 56.

the southern peninsula of Michigan. The Survey regards this as probably less than one-fourth of the total number in this peninsula. Some deposits are 1,000 acres in extent and have an average depth of twenty or more feet. The Upper Peninsula also has marl deposits. Marl is found in twenty-two counties of the State. The total area is estimated at 27,000 acres. Some of these marl deposits are unfavorably situated for development, but many others are advantageously located and are at present being exploited in the manufacture of cement. Shale is distributed very widely throughout the State, often in close association with other raw materials required in cement making. Cement manufacture began in Michigan in the early seventies at Kalamazoo, where marl and clay were employed in a vertical kiln. While this enterprise was a financial failure, other plants sprang up and the industry developed very rapidly after 1895. The later stage of the industry involves the use of rotary kilns and powdered coal as fuel. Since 1896, thirty-five cement plants are said to have been built or projected in Michigan, of which eleven were still in operation in 1917. Of these eleven, six were using marl and clay, and five limestone and shale. Cement plants have been located at Alpena, Fenton, Bellaire, Bellevue, Bronson, Coldwater, Kalamazoo, Elk Rapids, Farwell, White Pigeon, Charlevoix, Marlborough, Bay City, Lupton, Chelsea, Cement City, Spring Arbor, Lakeland, Athens, Three Rivers, Gray Village, Wyandotte, Newago, Mocherville, Union City, Petoskey, Man-

chester, Lima, Quincy, Grass Lake, and Brighton. This distributed the industry widely over the entire Lower Peninsula of Michigan, thus utilizing the widely extended marl and limestone deposits and distributing the output widely among the consumers. That output in 1918, according to the United States Geological Survey, was 3,554,872 barrels, a decrease from the 1917 production of 4,688,899 barrels.<sup>1</sup> It is economically desirable that cement factories should be erected in the Upper Peninsula to supply the local requirements. There is abundant raw material available, and while the local market is not as extensive as in the southern portion of the State, it exists and might well be supplied from a plant within the district.

Limestone is distributed widely over the State, but that of commercial importance is found chiefly in the northern portion of the Lower Peninsula and in the eastern part of the Upper Peninsula. Deposits here lie close to transportation routes by rail or water, and in recent years have been largely exploited. These limestone formations contain deposits of a high calcium carbonate content, which have been utilized as fluxes in blast furnaces at Sault Ste. Marie, Marquette and Duluth, at the carbide works at Sault Ste. Marie, and at the copper smelters in the copper country. The purity sometimes attains 98 per cent of calcium carbonate. The dolomites which are also found here and elsewhere in the State, while utilizable as linings for open

<sup>1</sup> "Cement in 1918": U. S. Geol. Survey, p. 572.

hearth furnaces and in the manufacture of paper by the sulfite process, are mainly employed as road material and railway ballast, while building stone is thus derived in Monroe County. Still other quarries of limestone are in Eaton, Wayne and Huron counties, which are valued because situated in areas where outcrops of rock are seldom encountered suitable for quarrying. Recently there has been a tendency to employ the high calcium limestones in the North as a soil corrective, for which they are well adapted. Near Ishpeming is a formation of marble, designated the "verde antique," which yields a greenish marble barred with white bands of dolomite, which when polished is extremely beautiful. This marble area is now being commercially exploited. In the southern peninsula limestone is employed in the manufacture of concrete, as noted in another paragraph. The value of limestone produced in Michigan in 1917 is stated by the State Geological Survey to have been \$3,320,895.<sup>1</sup> In 1918 the United States Geological Survey ranked Michigan sixth in the production of limestone.<sup>2</sup> The product in that year was 134,813 tons, valued at \$8.80 a ton. The Geological Survey notes that the demand for building lime had declined almost to the vanishing point.<sup>3</sup>

In 1917 Michigan produced 236,612,000 common bricks, which represents a decrease from the output

<sup>1</sup> See Rept. on Mich. Limestones in "Production and Value of Mineral Products in Michigan," Lansing, 1915, 111.

<sup>2</sup> "Lime in 1918": U. S. Geol. Survey, p. 817.

<sup>3</sup> *Ibid.*, 822.

for several years preceding. Drain tile were also manufactured of a value of \$734,042. The figures for 1916 show also 5,539,000 vitrified bricks produced, valued at \$80,915. In addition there were small amounts of fire-proofing and hollow building tile or blocks.<sup>1</sup> There has been a steady increase in the production of pottery, which, in 1917, amounted to \$1,187,981, attributed to the increased output of porcelain and decorated ware, and porcelain sanitary and electrical supplies. The manufacture of flower-pots is an important element in this total, and other items include clay pipes, crucibles, spark-plugs and insulators. Michigan clays are employed in the manufacture of flower-pots, but imported clays for porcelain pipes and other white ware, since Michigan lacks kaolin for this purpose.<sup>2</sup> The brick-making and related industries are confined very largely to the southern half of the Lower Peninsula where suitable raw material is available. Wayne County, where lake clay is abundant, is a particularly important center for the manufacture of common bricks. The Michigan Geological Survey has stated that most of the surface clays in Michigan are of low grade, and, due to their sandy or calcareous nature, most of these clays are adapted for making only common brick and tile or low grade pottery.<sup>3</sup> Exposures of clay or shale beds suitable for the manu-

<sup>1</sup> "Production and Value of Mineral Products in Michigan," 1917, 153-154.

<sup>2</sup> *Ibid.*, 155.

<sup>3</sup> *Ibid.*, 151.

facture of vitrified, fire and front brick, vitrified tile and fire-proofing are likewise stated not to be abundant. At Grand Ledge, Jackson, Corunna, Bay City and Flushing, shales of the coal-measures have been utilized for making vitrified and front brick, vitrified tile, sewer pipe, conduits and fire-proofing. Slip clays suitable for glazing pottery are found in Ontonagon County.<sup>1</sup>

#### GAME AND FISH

The forest and prairies, lakes and streams of Michigan were the natural habitat of multitudes of animals of many sorts, some of them serviceable to man and some noxious and even dangerous. This animal life varied from period to period with the migration of the species and the destruction wrought by enemies human and otherwise. The figure of the huntsman depicted on the shield embodied in the State's coat-of-arms, with the attending moose and elk supporting this same shield, were symbolical of the part played by this wild life in the pioneer era of Michigan history. Charles S. Wheeler has enumerated some fifty species of animals found in early Michigan, including the bison, caribou, elk, moose, common deer, panther, lynx, wildcat, gray wolf, fisher, sable or pine marten, red fox, gray fox, ermine or white weasel, mink, badger, skunk, otter, wolverine, black bear, raccoon, four bats, two moles, two shrews, flying squirrel, black and gray squirrel, fox squirrel, two

<sup>1</sup>"Production and Value of Mineral Products in Michigan." 1916, 178.

chipmunks, striped gopher, woodchuck, beaver, five kinds of mice, muskrat, common rabbit, white hare, porcupine and opossum. He states further that "three hundred and thirty-six kinds of birds have been reported as residents or migrants. Dr. Miles reports 43 reptiles, including turtles, snakes, frogs, toads and lizards; also 161 land and fresh-water mollusks."<sup>1</sup> George W. Sears, traversing the Michigan wilderness some eighty years ago, from Saginaw to the Muskegon River, encountered droves of wild turkeys amid heavy timber almost hourly. Deer were everywhere "on all sorts of ground and among all varieties of timber. Very tame they were too, often stopping to look at the stranger, offering easy shots at short range and finally going off quite leisurely." W. J. Beal has left us an account of the game animals of his Lenawee County home, where "black bear occasionally devoured pigs as they were allowed to run among oaks and beeches to fatten on the nuts known as shack or mast." where "wolves were thick enough, often making night hideous by their howling which resembled the howling of a lonesome dog," and where "occasionally the screams of a wildcat terrified some belated footman. Foxes were numerous and cunning. Deer, badgers, porcupines, minks and muskrats were plentiful. Deer ate the young wheat of the fields. Wild turkeys were often seen in flocks and sometimes wintered on corn left in the shock in the field. Partridges and quail were abundant, wild pigeons so numerous that at times of wheat seeding

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," XXXII, 359.

the farmer had to watch his fields to save the sceding. Coon, mink, otter and muskrats were hunted and trapped for their fur. Opossums, turkey buzzards and eagles were occasionally seen, but no crows had arrived." Fox squirrels, he tells us, came later from the South to join their many relations already domiciled in the State. In the northern peninsula there is considerable temporary testimony to the inadequate game supply in the pioneer period, so that the Indian population, as David Thompson relates, was sparse through the poverty of the means of subsistence and, according to the Elder Henry, was on occasion forced to cannibalize to save a remnant of the family or tribe.

From all this array of animal life, the first settlers of Michigan derived an income from the catch and sale of furs, and the trade remains surprisingly large after all these years of destructive forays by their human foes on the denizens of the woods. Miss Johnson quotes from the trader, Burnett's ledger of 1796-1797, as follows: "Sold 99 packs composed of 5 bears, 5 pound beaver, 10 fishers, 58 cats, 74 doe, 78 foxes, 108 wolves, 117 otters, 183 minks, 557 bucks, 1,231 deer, 1,340 muskrats, and 5,587 raccoons."<sup>1</sup> C. A. Weissert of Barry County notes among the furs dealt in, the marten, beaver, mink, muskrat, otter, raccoon and fisher.<sup>2</sup> At points of vantage throughout the two peninsulas arose the posts

<sup>1</sup>Johnson: "Michigan Fur Trade," Lansing, Mich. Hist. Commission, 1919, 97.

<sup>2</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 659.



of the fur trade: On the tributaries of the Saginaw and the Grand, on the St. Joseph and the Kalamazoo, and by the Lake Superior shore, while Mackinac and the "Soo" were famous outfitting points and places of concentration for the enormous traffic in peltries throughout Michigan and the great Northwest. Some interior points were designated by names of household familiarity among the pioneers of Michigan. It was thus with Knagg's place and Williams' exchange in the Shiawassee Valley and Campau's post on the Saginaw. Hither the trapper brought his catch of beaver, so much an article of barter in the fur country that it served as currency in lieu of coin. The slaughter began with the Indians and the French and has never ceased even to this hour. It brought extermination to the buffalo, the elk, the moose, the caribou, the panther and the wolverine, as also to the passenger pigeon and the wild turkey.<sup>1</sup> The State Game, Fish and Forest Fire Commissioner refers to estimates by dealers in the 1920 fur trade, which put the catch of furs in that year as selling from three to six million dollars; and the Commissioner estimates the normal annual output in Michigan as worth two million dollars.<sup>2</sup>

Beaver and other furs are still secured, but recourse has recently been had to the creation of an artificial supply through the propagation of highly valuable species of foxes. In 1920 the Bureau of

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," XXXIII, 358.

<sup>2</sup> Rept. Mich. State Game, Fish and Forest Fire Dept. of the Public Domain Commission, 1919-1920, 8.

Biological Survey of the United States Department of Agriculture estimated, on the basis of incomplete information, the investment in the silver fox ranches in Michigan at \$522,785, and that these ranches were stocked with some 661 animals. This is regarded as an under-estimate. Muskegon on the Lake Michigan side of the southern peninsula has become one of the most important centers of fox farming in the United States, while a beginning in this industry was made, in 1920, at Houghton and Marquette. Fox farming in Michigan has become a well-established industry.

The preservation of fur-bearing animals is involved in the movement for greater forest protection, since the forest and cut-over lands provide for wild life of many kinds. It is recognized to some extent that the destruction of the forest and bush areas by fire means the removal of game and a valuable traffic arising therefrom. Skins of bear and beaver, mink, otter and other small fur-bearers, usually are marketable at a good price. A list of fur quotations from January, 1920, places the price of a lynx skin at \$12 to \$20, wildcat from \$3 to \$5, wolf at \$15 to \$25, to which was added (until 1921) a bounty of \$35 for his destruction as a noxious animal. Mink skins were quoted at \$12 to \$16, skunk at \$1.50 to \$8, weasel from \$0.50 to \$2, and muskrats, a leader in the market, at \$3 to \$4. Bear pelts, and bears are not uncommon in the north Michigan woods, were salable at \$20 to \$40, marten at \$25 to \$35, and raccoon at \$5 to \$9. Ordinary foxes went at \$15

to \$25. Badger was quoted at \$1.50 to \$2. Beavers, once the king of the trade, were valued at \$15 to \$35 each, and the fisher and otter were given as high a rating.<sup>1</sup> The high price of furs of the late post-war period had the effect of greatly stimulating the destruction of fur-bearing animals, until even muskrats became exterminated in some localities where they had once flourished.<sup>2</sup> The destruction of the forest cover through commercial operations and fires likewise has diminished the game supply of the State in the opinion of the Commissioner and of sportsmen.

In the open November season (now limited to ten days) there continues to be a very large annual destruction of deer in the northern counties, estimated by the Commissioner in 1920 at 28,000 head. Below the Straits of Mackinac the depletion in the number of deer was so great by 1920 that the State Game, Fish and Forest Fire Commissioner thought it advisable to take measures for their augmentation. The major portion of the kill of deer now pertains to the Upper Peninsula, where, in spite of a shortened season for hunting, 1920 witnessed the largest shipment in the five years preceding, the number passing the Straits being 5,079 head. In 1918 two herds of nineteen individuals of elk were released from refuges to covert in Alpena and Presque Isle counties of the southern peninsula. Two years later it

<sup>1</sup> "The *Grand Rapids Herald*, Jan. 11, 1920, 4.

<sup>2</sup> "Rept. State Game, Fish and Forest Fire Commissioner," 1919-1920, 8, 9.

was estimated that the original number had increased 100 per cent.<sup>1</sup> In 1922 sixty Norway reindeer were introduced into northern Michigan.

There is said also to be a large increase in the number of migratory wild ducks and geese and other fowl as a consequence of the treaty for their protection contracted with Canada and reinforced by legislation. Of particular importance to Michigan agriculture is the undoubted increase in the numbers of many varieties of insectivorous birds in the State, the consequence of protective legislation and education of the people, whose appetite for noxious insects and weed-seeds ought to be a highly appreciated contribution to the State's agricultural welfare. On the other hand, the predatory fox is also reported to be growing in numbers, in spite of the bounty paid for its destruction; while the undoubted increase in the number of wolves and coyotes, especially in the northern peninsula, has caused much concern to the sheepmen of the district. Squirrels, too, are said to be increasing, especially in some parts of the State, and make some trouble to the farmers' granaries. Isle Royale, close to the extreme northern boundary in Lake Superior, is remarkably well stocked with moose—an animal seen only on rare occasions on the mainland. The deputy of the State Game, Fish and Forest Fire Commissioner, stationed on the island, reported (1920) upwards of one thou-

<sup>1</sup> "Rept. State Game, Fish and Forest Fire Commissioner," 1919-1920, p. 15.

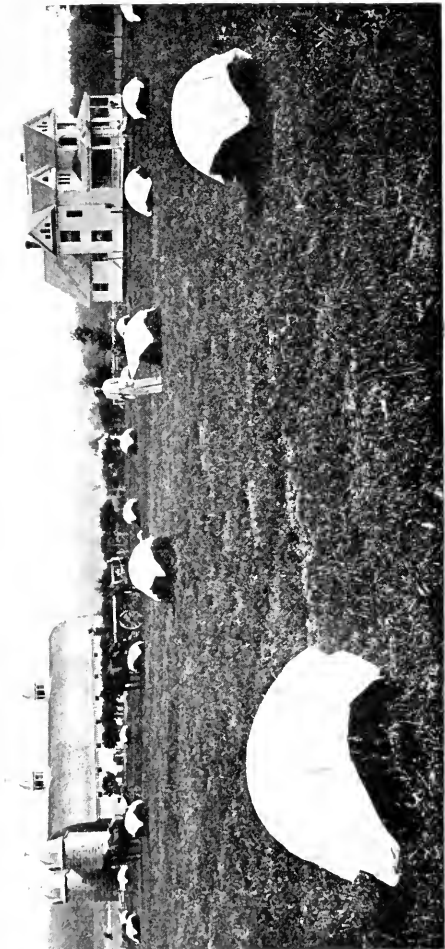


Plate III. Haying time in western Michigan.



sand moose there, an estimate regarded as moderate by the Commissioner.

In 1916 the Public Domain Commission established a game farm four miles southeast of Mason, Ingham County, whose principal service has been the propagation of ring-necked pheasants, for the purpose of stocking the wild lands of the State. In 1920, 58,468 eggs were produced on this farm, of which 38,463 were sent to individual applicants for hatching, and 4,461 adult birds reared on the farm were distributed in general field covert, principally in the southern counties of the Lower Peninsula. The State Game, Fish and Forest Fire Commissioner, who was responsible for this undertaking, reports general success in securing pheasant colonies even in northern counties where results were not anticipated. It was believed that this bird would well replace the ruffed grouse whose depletion, it was hoped, would be offset by this imported variety.<sup>1</sup> In 1919, the propagation of wild turkeys was also begun at the State game farm and a few birds were released in 1921. The bird was formerly very abundant, if the accounts of pioneers are to be credited, but has been completely exterminated in a wild state.<sup>2</sup>

<sup>1</sup> "Rept. State Game, Fish and Forest Fire Commissioner," 1919-1920, 12.

<sup>2</sup> How "Nature, despite man's grasping ways, provides more abundantly than ever food and shelter for the birds and animals," is described by George Shiras, 3d, in *The National Geographic Magazine* for August, 1921, page 202ff. Shiras is very familiar with wild life and the conditions

"Our lakes were well stocked with excellent fish," writes L. D. Watkins of Manchester, "bass, pike, pickerel, perch, sunfish and blue-gills were the most common and were easily taken."<sup>1</sup> Harvey Tower, writing of the Oceana County of seventy years ago, informs that from ten to fifty barrels "to a haul" of whitefish were not unusual; while the Indians of the Sault Ste. Marie caught them with their hands amid the rocks and rapids. Bela Hubbard enjoyed the rare sport of landing with his hands, after a vigorous tussle, one of a school of sturgeon discovered gamboling in the waves breaking amid the bowlders near the shore. "I do not wish you to lose faith in my veracity," Mrs. A. M. Hayes of Hastings assures her readers, "but I have seen squaws spear sturgeon near-by on the river that would weigh all the way from sixty to one hundred pounds."<sup>2</sup>

under which it lives in the Lake Superior country. His thesis is that the primeval forest yielded less sustenance and poorer cover for birds and animals than is now afforded by the vegetation that has replaced this original forest cover, with a resulting increase in animal life in this region. There is historical evidence of the truth of this opinion. David Thompson, the fur-trader, who was familiar with the Lake Superior shore more than a century ago, refers to the paucity of game here. Forced cannibalism among the Indians was not unknown. Similarly, it has been pointed out that the northern Michigan cut-over area affords excellent conditions for bee-keeping, since the vegetation it now carries comprises many plants that yield nectar. The State Inspector of Apiaries in 1921 adverted to the presence of alsike and white clover, wild red raspberry, blackberry, fire-weed, basswood, boneset, aster, etc., on the uplands of this region as favorable to bees.

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," v. XXII, p. 265.

<sup>2</sup> *Ibid.*, VIII, 225; v. III, p. 199; v. XXVI, p. 240.



Michigan is estimated to have 16,000 miles of rivers and small streams and it has innumerable inland lakes—the home of many varieties of edible fish, such as pike and pickerel, perch, bullheads, bass and trout, the aggregate output of which secured by commercial fishermen and sportsmen, while not statistically ascertained, is undoubtedly very large. The Great Lakes encompassing the State yield the great supply of marketable fish, amounting in 1917 to 29,737,335 pounds. In that year 3,183 persons were engaged in this occupation in the State, and the total product was valued at \$1,668,529.<sup>1</sup> Of the Great Lakes in the Michigan area, Lake Huron contributed the largest fraction of the total supply—13,363,207 pounds. Lake Michigan was second in rank, with some two million pounds less product than Lake Huron; while Lake Superior, with an output of 2,891,431 pounds, was a very poor third in rank. It seems to be a fact, not generally understood, that the growth of fish in Lake Superior is much less rapid than in the lakes of a more southerly latitude. This is attributable to the lower temperature prevailing in this greatest fresh-water sea and to the diminished supply of vegetable matter consumed by fish as food. John Lowe of the Northern State Normal School, Marquette, has estimated that during the first year of life, a fish in Lake Superior increases some three ounces in weight, while in Lake Michigan the growth is about thrice as rapid.

<sup>1</sup>“Fishery Industries of the U. S. Bur. Fisheries,” 1919, 123. 124.

It has become evident that the fish supply of the Great Lakes is diminishing, and the great importance of the industry has promoted the establishment of hatcheries both by the State and the United States for the propagation of fish for planting in the inland waters and in the Great Lakes. Hatcheries owned or operated by the State under the direction of the Michigan Fish (now Conservation) Commission were located (December, 1920), at Paris, Mecosta County; Comstock Park, Kent County; Henrietta, Wexford County; Drayton Plains, Oakland County; Detroit; Sault Ste. Marie; Grayling, Crawford County; and Bay Port, Huron County; while other hatcheries were under construction at Manistique, Schoolcraft County in the Upper Peninsula; Oden, Emmet County; Hastings, Barry County; Benton Harbor, Berrien County; and Harrisville, Alcona County. From these fish hatcheries during the year 1920, the number of fish distributed throughout the State aggregated 128,225,300, including fry, fingerlings and yearlings. These included 12,132,000 brook trout (fry and advanced fry); 6,458,500 rainbow trout; 9,018,000 wall-eyed pike; 53,870,000 perch (fry); 18,000,000 whitefish (fry); and 891,000 lake trout (fry). During the past twenty years, according to the superintendent and secretary of the Michigan Fish Commission, most of the work of fish propagation in the Great Lakes has been maintained by the United States Bureau of Fisheries, which operates hatcheries in Michigan at Northville, Alpena, and Charlevoix. The list of species

of fish planted by the Michigan Fish Commission in the year 1920 also includes brown trout, large-mouthed and small-mouthed black bass, bluegills, bullheads, landlocked salmon, and rocky mountain whitefish, whose numbers are in most instances less than one million.

#### WATER SUPPLY

At favored spots along the waterways of Michigan, the early settlers erected their water-wheels and mills, where the farmer ground his grain and reduced his logs to lumber. Such points were the rapids of the Grand at Grand Rapids, the big rapids of the Shiawassee at Owosso, the big rapids of the Muskegon at Big Rapids and at almost countless other locations throughout the State. Many grist-mills still use this economical source of power, though steam has replaced water as the motive force for the lumber industry. Today, it is hydro-electric power that gives the water-courses of Michigan their chief economic importance. The development under this head gives Michigan a leading place in the United States. The potential water power of the State has been estimated at 332,000 horse power, of which the total actual developed power was put at 213,000 horse power.<sup>1</sup> The Geological Survey of Michigan has investigated the available water power of the Upper Peninsula.<sup>2</sup>

<sup>1</sup> Statement of the National Bank of Commerce in New York, March 10, 1920.

<sup>2</sup> See 1910 Report.

Of the various hydro-electric power companies operating in Michigan, the Escanaba Traction Company, which has a series of stations on the Escanaba River in the Upper Peninsula, is credited by the Michigan Public Utilities Commission with the greatest kilowatt capacity (Dec. 31, 1918), namely, 100,800; while the Consumers Power Company's twenty-one stations on the Manistee, Muskegon, Grand, Lookingglass, Shiawassee, Au Sable, and Kalamazoo rivers, with 75,900 kilowatt capacity, was the largest actual producer of current in 1918, the output approximating 228,000,000 kilowatt hours.<sup>1</sup> Other large producers of power are the Cleveland Cliffs Iron Company (26,000,000 K. W. H.) operating on the iron range near Marquette; the Indiana and Michigan Electric Company (54,000,000 K. W. H.) on the St. Joseph River; and the Detroit Edison Company managing five plants on the Huron River. A considerable number of concerns are operating single stations of a few hundred kilowatts potential capacity, and still other plants municipally owned and operated, like those at Marquette and Escanaba. The agricultural significance of this electric power development is chiefly in connection with the inter-urban railroad, which has become a highly prized service in many parts of the State.

<sup>1</sup>Statement of the Michigan Public Utilities Commission, 1920.

## CHAPTER IV

### THE OCCUPATION OF THE LAND

THE land of Michigan originally belonged to the Indian inhabitants. Territorial sovereignty came to the United States by its treaty with Great Britain in 1783. Actual possession of the southern peninsula resulted from Jay's Treaty, becoming effective in 1796; while it remained for the Governor Lewis Cass in 1820 to assert American sovereignty north of the Straits of Mackinac. Title to much of the land, however, was first bestowed on the United States through a series of treaties with the Indians.

Notable among these treaties is that of Detroit in 1807, ceding a tract in the southeastern area of Michigan; the Saginaw Treaty of 1819, ceding a large region in the east-central portion tributary mainly to Saginaw Bay; the cession by the Pottawatomies in 1821, of lands in the southwest between the St. Joseph and Grand rivers; while the large territory north of this river, embracing the northwestern and northern parts of the Lower Peninsula and much of the eastern portion of the Upper Peninsula, not already granted, as far west as the Chocolay River near Marquette, was ceded by the Ottawas and Chippewas in 1836. The region west of this line was

granted by the Chippewas to the United States by a treaty contracted at La Pointe, Wisconsin, in 1842 and a supplementary treaty in 1854, while the Menominees had already yielded their claim to the country east of the lower Menominee River in 1836.<sup>1</sup>

Thus, with the addition of sundry minor grants, did the United States possess itself of much of the soil of Michigan with whatever it might contain. Those who suppose that the Indians were commonly robbed of their lands should read these treaties which are the foundation of all land titles in the State.

Previous to the settlement of these lands, it was necessary to survey and subdivide them. Unlike the states of the East and South, Michigan happily was comprehended within the excellent scheme of land survey provided by the old Congress of the Confederation in 1785, and thus was spared the haphazard and costly practice obtaining in the older commonwealths. The Congressional plan, first applied to the famous "Seven Ranges" of Ohio, contemplated the bisecting of the future state east and west by a "base line," the division of the land into equilateral townships of thirty-six sections of one square mile each in area, the designation of the townships by their position north or south of the base line and their range east or west of the meridian

<sup>1</sup> Royce: "Indian Land Cessions in the United States," (Bur. of Amer. Ethnology, 18th Annual Rept.); Washington, 1896-97.

line, and of the sections by successive numbers within the township. Of the surveyed portions of the territory plats, maps and records were to be kept, so that it would be relatively easy to locate authoritatively any tract of land in the surveyed area, and thus in the main avoid costly litigation and conflict of title. Subsequently provision was made for the subdivision of sections into fractional portions; and while the description of tracts of land by "meets and bounds" is occasionally met with in Michigan, much of the land is located under the old Congressional plan of 1785; and the Auditor-General of the State has earnestly sought to make the practice universal in order, among other things, that the identity of all lands subject to taxation shall be beyond question.<sup>1</sup> In 1920, Auditor-General O. B. Fuller estimated the total number of descriptions of property on the tax rolls of Michigan at some 1,500,000. Of the 300,000 descriptions of property on which taxes are annually returned as delinquent, he states the number of these that are erroneous to be from 15 to 20 per cent of the total, partly due to error in the caption of the plat, and partly due to indefinite description of the property. He has knowledge of faulty descriptions only in cases in which property is returned as delinquent for taxes, but he believes that in the southern—and therefore the oldest—counties of the State 40 per cent of all property is described by meets and bounds in spite of the form of description ap-

<sup>1</sup> Hinsdale: "The Old Northwest," ch. XIV.

proved by the United States survey, although the tendency is believed to be steadily in this direction.<sup>1</sup>

The records of the General Land Office at Washington indicate that the survey of lands in Michigan began in 1826. The meridian line was located at longitude 84 degrees, 22 minutes, 24 seconds; and the base line at 42 degrees, 26 minutes, 30 seconds. Their point of intersection on the boundary between Jackson and Ingham counties became the starting-point for running the lines of the "Congressional" townships into which much of the State has been divided, and which in many, but not all cases, constitute the unit of local government in the rural sections. Next came the location of the section lines, along which today in many instances rural highways have been established, sometimes along the "quarter-line" instead, thus giving to the countryside of Michigan a checker-board arrangement, in some respects more convenient than esthetically pleasing. On these lines the surveyors set corner-posts and quarter-posts, notched and inscribed to indicate their exact position, while "meandering stakes" marked the course of streams and the shore-line of lakes. Through defective surveying, corners of sections and townships did not always "close" accurately, and the traveler by road still encounters strange "jogs" or deflections from the direct course, caused by the necessity of correcting a defective corner, or of setting a boundary on a new meridian if the nominal requirement of a township six miles square was to be even approxi-

<sup>1</sup>O. B. Fuller, Auditor-General: Letter of Sept. 20, 1920.



mately adhered to. At a few places in Michigan, where grants by the French and British governments had been made previous to the American occupation of the land, the system just described was not employed.

In connection with the linear survey, notes were taken of the main physical features of the land surface: the timber, soil, moisture, streams, lakes and swamps; and special pains were taken in the Upper Peninsula to ascertain the rock and mineral formations, specimens being sent to Washington with their accompanying field notes, as indicative of the mineral resources of the region. It was while engaged on this combined linear and geological survey that Douglass Houghton lost his life in Lake Superior in the autumn of 1845, and it was a party of his surveyors that discovered the presence of iron ore near Negaunee in 1844. In some instances, through carelessness or fraud, grossly inaccurate surveys were perpetrated, necessitating the repetition of the work.

The life of a United States surveyor in the pioneer period was hard and laborious and not devoid of unpleasant, even dangerous, features. The deputy surveyor was accompanied by chainmen and axmen to assist him in his work. Life was in the open, exposed to storms and mosquitoes and flies. Camp equipage, provisions and instruments must be packed to the place where they were required. Food must be prepared as best it could. Beds were made on spruce and balsam boughs, with boots perhaps for pillows. There was no "eight hour day." Notes,





the loss of which might be irreparable, must be carefully recorded and preserved. Sickness and accident must be endured as best they might. Yet these men were the pioneers of civilization in Michigan, as they forced their way through the dense forest and across the morasses and water-courses of the inter-morainal depressions, as they labored in the shadow of giant trees and the deep silence of the wilderness, and slept to the howling of the wolf and the hooting of the owl—if they slept at all. They were laying the foundations of rural life in Michigan.<sup>1</sup>

The United States lands having been surveyed, their sale or other disposition by the Government was in order. At various points in the State land offices were opened according to the center of gravity of the business: at Detroit, White Pigeon, Ionia, Sault Ste. Marie, and Marquette, where last all land office business for the State has been centered with the discontinuance of all other offices at less strategic points. The Marquette office still (1919) has 73,000 acres of United States land at its disposition, mainly in the northern section of the State, the largest holdings being in Schoolcraft and Chippewa counties and on Isle Royale. In the pioneer period, the journey to the "local" land office was often long and arduous, yet it was rarely undertaken, for did not two hundred dollars possess a man of a quarter

<sup>1</sup> An interesting account of the life and work of a U. S. surveyor is found in "Mich. Pioneer and Hist. Soc. Collections," v. XXVII, 306, written by C. S. Woodard of Ann Arbor.

section of fertile soil—its fertility attested by the vigorous growth of stalwart trees that only time and prodigious labor could remove? In the great speculative year of 1836 more than four million acres of these Michigan lands were sold by the Government, computed to be one-fifth of the total United States' sales of that year. The panic of 1837 brought punishment to many who had speculated too wildly in Michigan real estate, particularly the purchasers of town sites in platted cities which, it was hoped, were destined to make their buyers rich out of their rapid increment of value. Eventually, however, most of Michigan's 36,000,000 acres passed out of public into private ownership, much of it by sale, 2,551,000 acres by homestead entry, and still other large quantities by grants of various sorts; 1,021,000 acres to the State for the benefit of its primary schools; 750,000 acres to the State and thence to the corporation which constructed St. Mary's Ship Canal; 500,000 to the State itself for internal improvements (1841); nearly 400,000 to the company which built the canals joining Portage Lake with Lake Superior; 100,000 acres for the construction of the ship canal connecting Lake La Belle on the Keweenaw Peninsula with Lake Superior (1866).

Land, also, was forthcoming for the construction of the "military" road from Fort Wilkins on Keweenaw Point to the Wisconsin-Michigan line by way of Houghton. At a time when it was thought necessary that capital should be interested in railroad building through large grants of lands by the

federal government to the state for that purpose, Michigan was not forgotten. From 1856 a series of acts of Congress conferred on the State those lands bestowed on the companies which built the railroad lines now forming portions of the Chicago and Northwestern and the Duluth, South Shore and Atlantic railroads in the Upper Peninsula, and the Grand Rapids and Indiana, the Pere Marquette and the Lansing-Mackinac sections of the Michigan Central railroads in the Lower Peninsula. The grants were of the right of way and of alternate sections on both sides of it, and by 1880 had amounted to more than 3,000,000 acres.

It thus appears that no inconsiderable fraction of the area of Michigan was freely relinquished by the national government, primarily to the State, but eventually to the private concerns interested in exploiting its natural resources. The construction companies receiving these bonus lands from the State have in turn disposed of them wholly or in part. These grants have, therefore, to a considerable extent become incorporated in the common general mass of farm lands. In the southern peninsula, the Grand Rapids and Indiana, and the Pere Marquette railroads have thus wholly disposed of their land grants, save such portions as they may have chosen permanently to retain. In the Upper Peninsula the Chicago and Northwestern Railway still retains nearly 200,000 acres of its land grant; the Detroit, Mackinac and Marquette Land Company now possesses some 150,000 acres of the lands originally

granted to the railroad of that name now comprised in the Duluth, South Shore and Atlantic Railway system, while the latter retains some 60,000 acres of the old Marquette, Houghton and Ontonogan Railroad grant. The St. Mary's Mineral Land Company, present holders of the St. Mary's Ship Canal land grant, still is in possession of some 92,000 acres. All these holdings are mainly of timber and mineral lands. In the southern peninsula, the Michigan Central Railroad still possesses some 11,000 acres of the old grant to the Jackson, Lansing and Saginaw section of its present system, which carry a price of \$2 to \$10 an acre.

The grants of land by the United States for educational purposes in Michigan were likewise very extensive. According to the famous Ordinance of 1787, section number 16 of each surveyed township was bestowed on the State in aid of primary education. In this manner approximately 1,021,000 acres came into the possession of the State.<sup>1</sup> These lands were disposed of, first by the Superintendent of Public Instruction and then by the Commissioner of the Land Office after 1843, along with other lands granted to the State for educational purposes. At first the minimum price of school lands was set at \$12 an acre, later reduced to \$5, then to \$4. According to Knight, the average sale price of two-thirds

<sup>1</sup>This is the number of acres reported by the Commissioner of the General Land Office. Knight in "Mich. Pioneer and Hist. Soc. Collections," VII, 28, gives the total number of acres patented to the State at 1,067,397.

of this grant disposed of before the year 1885 was \$4.58 an acre. The university lands sold at something over \$11 an acre on the average. Of these school lands the State still (July 1920) owns 8,066.15 acres. In addition to the school lands, grants were also made by the United States to the University, the Agricultural College and the normal schools. Through purchase, also, these became incorporated mainly in the agricultural lands of Michigan. A much larger contribution of acreage resulted from the act of Congress of 1850, which conveyed to Arkansas by name and other states by inclusion "wet or swamp lands" within their borders. Out of this legislation Michigan derived by patent from the United States 5,655,689.56 acres, likewise largely disposed of for the benefit of the primary schools.

The average price of improved farms in Michigan in 1921 is placed at \$91 an acre by the statistician of the Coöperative Crop Reporting Service. This represents an increase of \$4 an acre over the preceding year, although the downward tendency of prices of farm products was beginning to manifest itself in land valuations in some localities.<sup>1</sup> However, in a state where soil and climatic conditions vary so markedly, with differences in market and transportation conditions, extreme variation in the valuations placed on agricultural lands are to be expected. The appraisers for the Federal Land Bank of St. Paul have found that, in evaluating lands, each farm presents a distinct problem in itself, particularly

<sup>1</sup>"Mich. Crop Rept.," Lansing, March, 1921, 4.



in the less developed sections. One of these appraisers found the highest priced land to be in the southeastern counties of Monroe and Lenawee, his valuations running as high as \$200 an acre with instances of sales at a higher figure. Yet he found some lands in those same counties worth not over \$10 an acre. The least valuable farm lands, as might be expected, were in the northern portion of the Lower Peninsula (the Upper Peninsula was out of his jurisdiction), where the most worthless land was ascribed to Muskegon, Lake, Kalkaska and Roscommon counties. In this region the valuations were \$5 to \$15 an acre for uncultivated tillable land, and \$30 to \$40 an acre for the best grades of cultivated lands. Starting with a base line of \$0.00 for some land in every county, his colleague finds his maximum valuation for land to be \$200 an acre in Oakland, Wayne, Macomb, Genesee, Branch and Gratiot counties, \$250 in Saginaw County, \$150 in St. Clair, Lapeer, and Midland counties; \$100 in Huron and Isabella; \$80 in Alcona County, \$70 in Alpena, Gladwin and Clare counties; \$30 in Roscommon County; \$50 in Oscoda County, and \$40 in Montmorency County, while the fruit-raising county of Grand Traverse in the same latitude attains values of \$100 an acre. The appraiser for the Upper Peninsula finds the most highly developed agricultural counties having, consequently, the highest range of land values, to be Menominee, Delta, Chippewa and Houghton, in which his valuations range as high as \$100 an acre, although he concedes that sales occasionally occur

in excess of that price. This is not essentially inconsistent with the opinion of the Assistant State Leader of County Agents in the Upper Peninsula, who reports the highest land values to be reached in Menominee County at \$150 an acre.

It is in the Upper Peninsula and the northern half of the Lower Peninsula that approximately 12,000,000 acres of cut-over lands are located, whose price is an object of interest to the seeker after cheap raw lands capable of development by hard labor into productive agricultural holdings. One railroad company gives the minimum price for its cut-over lands at \$7 an acre. A land company operating in the neighborhood of Chatham and Trenary southeast of Marquette has sold its holdings at an average price of \$17.90 an acre. Another company, with 10,000 acres at its disposal, has placed a price of \$15 to \$20 an acre on its holdings. Another concern, operating between Keweenaw and Huron bays, has sold eighty "forties" at prices ranging from \$10 to \$15 an acre. It should be understood, however, that the sales of these lands go with reservations of mineral and frequently many other rights and privileges which impair the title and of themselves reduce the value of the property. . . . In a state where land values vary so markedly as in Michigan, an average price for farm land as a whole is not very significant; however, the Fourteenth United States Census found the average acre value of land alone in Michigan to be \$50.40. (See Appendix A.)

These prices refer to lands from which the forest

has been removed, "cut-over," which composed nearly one-third of the State's area.<sup>1</sup> These are largely unproductive stump tracts, increasing, it is estimated, at the rate of 100,000 acres each year.<sup>2</sup> At a time when it is difficult to retain Michigan farmers on improved lands in the most favorably situated sections of the State, these northern cut-overs have not proven very attractive to those in quest of land to till. Of late, however, there has been a considerable influx of grazers, chiefly from the depleted ranges of the West, to whom free pasturage for a period of years with the final option of purchase at a low price is given. The abundant summer forage, insured by seldom failing summer rains, the presence of water and favorable proximity to the Chicago market have interested a considerable number of these grazers; and when the problem of winter feeding has been squarely met through the growth of winter forage by the grazers themselves, an increasing demand for these stump lands may be looked for.

Aside from these deforested regions are considerable tracts of wet lands, only Florida, Mississippi, Louisiana and Arkansas exceeding Michigan in the possession of such areas.<sup>3</sup> The counties in the Lower Peninsula below latitude 44 degrees are credited with

<sup>1</sup> Estimate of F. Roth, Professor of Forestry, Univ. of Mich., "Report of the Public Domain Commission," Jan. 9, 1920, p. 555.

<sup>2</sup> Janette: "Michigan's Millions of Idle Acres," Detroit, 1920, p. 32.

<sup>3</sup> Miller and Simons: "Drainage in Michigan," p. 17.

2,175,000 acres of reclaimable wet lands. Beyond this line to the Straits of Mackinac these are estimated at 661,000 acres, while the Upper Peninsula is 25 per cent swamp, or 2,598,000 acres, according to the authors of "Drainage in Michigan." Like the cut-over tracts, these wet areas present a problem to those who would extend agriculture to the idle acres of the State. Much wet land has hitherto been reclaimed by local drainage operations, but for much of that which remains, State aid and management would seem required. Thus the great Taquamenon swamp in the eastern portion of the Upper Peninsula, said to cover 500,000 acres, much of it otherwise fertile clay, will require the removal of a rocky elevation in the lower course of the Taquamenon River before its drainage can be accomplished; and this is a task better proportioned to the resources of the State than of a local drainage district. That the State has considerable tracts of land which, as hitherto utilized, cannot yield a livelihood to their possessors and pay the taxes assessed, is indicated by the reversion to the State since 1893 of 2,300,000 acres. Of this amount, 445,798 acres were re-sold, of which there again reverted to the State 190,598 acres.<sup>1</sup> The number of acres now (1920) in arrears for taxes is stated to be 3,000,000.<sup>2</sup> This is one-twelfth of the total area of the State, and is indicative of the effect of poor soil and other adverse conditions on agriculture. However, it is also significant of nu-

<sup>1</sup> Janette, *supra*, pp. 14. 16.

<sup>2</sup> *Ibid.*, p. 12.

merous wild-cat operations by private agencies and of a defective public policy on the part of the State government itself. No one doubts that there is much excellent agricultural land in Michigan, but this is often segregated in tracts of moderate proportions, without any trustworthy indication of its true extent and general desirability for the home-seeker. The State is at present without a comprehensive and detailed classification of its lands, and it remains to be seen whether the soil survey now in progress under the auspices of the Michigan Agricultural College, the Michigan Department of Agriculture and the United States Bureau of Soils is really to be of very much help in determining the relative desirability, ultimate productiveness and most economical use of each parcel of land. The legislation of 1917 made provision for a soil classification of this character, but for reasons variously set forth, the work, then assigned to the Geological Survey of Michigan, was not proceeded with, and the present survey is under quite different auspices and lacks the coöperation of all agencies that might naturally be expected to participate. If the various types of land are clearly differentiated and classified, it should have the effect of more closely approximating land prices to worth as related to productivity in the economic sense of the term.

With one-third of the area of the State in unproductive cut-over lands, and these in the hands mainly of a few large owners, the problem of their disposition remains unsolved. Marquette County is one of

the most developed in the cut-over section; yet with an area of 1,196,800 acres, it has only 900 farmers and these own only 90,000 acres, 500,000 of which are tillable. Many of the large land holders employ agents to promote the sale of their cast-off real estate. These rough lands do not appeal to native American farmers; and it is, therefore, necessary to interest recent arrivals from Europe, whom necessity and a less fastidious standard of living have prepared for the hardships of this pioneer agriculture. Stumps have to be removed, the virgin sod turned under, fences and buildings erected—a procedure that has been repeated in Michigan during five generations at least, and which must continue for still other generations before the State is beyond the pioneer stage throughout the two peninsulas. The mechanical agencies are now more effective, but the human factor may still be quite without capital and perhaps without the New World experience that fits him fully for his task. The process of creating such a pioneer agricultural community may be illustrated by reference to the settlement of "Aura" between Keweenaw and Huron bays, Baraga County. The land was under control of Charles Hebard and Sons, Incorporated, lumbermen of Pequaming. "In the spring of 1914," writes W. J. Colenso, secretary of the Company, "we put our Point Abbaye lands on the market, and by early summer six or seven families had built houses and began cultivating the soil. We sold these lands on contract, requiring twenty per cent of the purchase price as the first payment, and the balance in

five equal annual payments with interest. To date have sold eighty forties, or 3,200 acres on Point Abbaye. This locality is called Aura, and is located about four miles from this village (Pequaming), and the settlers are all Finns. A large school has been built there by the L'Anse township, and they have a large attendance. These farmers have gotten together and purchased a tractor which will be used in clearing and cultivating the land. This country is rapidly developing into a first-class farming district. We still have about 120 forties of cut-over lands on Point Abbaye to dispose of." The company did not extend financial assistance to these settlers, so far as is known, who are described by J. H. Jasberg, general colonization agent of the Mineral Range Railroad, as quite penniless and able to succeed only by outside work, particularly in the woods in winter. The company built a road into the settlement and sold lumber to the settlers, it is said, at a figure below the market price. This firm is credited with marked liberality in its dealings with employees, and it is likely that the Aura settlers have been afforded rather more favorable consideration than normally elsewhere in the district. It has become manifest to some observers, however, that successful colonization of these cut-over lands requires very liberal terms as regards payments of interest and principal, a carefully elaborated system of financial credits for the purchase of equipment and live-stock, and adequate provision for the installation of improvements and community conveniences and ad-

vantages. Some preliminary work has been done in this direction, but no definite project has as yet (October, 1920) been undertaken. As yet the idea of exploitation rather than that of reconstruction is the common conception, and the State has done very little to promote a different policy.

The United States Census of 1910 indicates that the number of farms operated by their owners was 172,310; by managers, 1,961; and by tenants, 32,689. This signifies that something less than one-fifth of the operators were tenants. Ten years later, before the publication of the results of the fourteenth census as related to farm tenure, a study made by the Michigan State Farm Bureau indicated that tenancy of farms in Michigan had increased 2 per cent in the interval. This survey covered 52,561 farms in thirty counties. In these thirty counties the number of rented farms was 9,637, while farms operated by their owners numbered 42,924. The increase in farm tenancy the Bureau attributed to the inadequacy of long-time rural credits which permitted the purchase of farms without assuming intolerable burden of debt, a disproportionate rise in the price of country real estate as compared with economic value, lack of coöperation "which takes the extreme elements of chance out of farming," and the greater attractiveness of city life. Of the thirty counties, it was found that tenancy was actually increasing in eighteen, unchanged in six and decreasing in six. The counties surveyed were said to be well distributed throughout the State. The survey elicited the fact



that tenancy is much more prevalent in the Lower than in the Upper Peninsula. The percentage of rented farms in the two peninsulas is given as 21 and 8 respectively.

In 1921, the statistician of the Coöperative Crop Reporting Service found that approximately 18 per cent of the farms of the State is rented, of which 15 per cent is on shares and 3 for cash. The average size of these farms is 88.5 acres with a value of \$7,750. The average cash rental paid was \$475 per annum, which averages something over five dollars an acre.<sup>1</sup> The Fourteenth United States Census indicates that, in 1920, the number of farms operated by owners had fallen off 12,904 during the previous decade; while the number of farms operated by tenants had increased by 2,033. The number of farms operated by managers had increased by 358. (See Appendix A.)

As compared with the southern peninsula, land holdings in the north of Michigan are much larger and ownership is concentrated in a few persons and corporations. The situation is set forth by the Bureau of Corporations of the United States Department of Commerce in its report on the lumber industry of July 13, 1914. The investigations of the Bureau led it to the conclusion that of the Upper Peninsula's area of over 10,680,000 acres, about 56 per cent was held by ninety owners. Thirty-two owners held 47 per cent of the area; thirteen 37 per cent, and one, the Cleveland Cliffs Iron

<sup>1</sup>"Mich. Crop. Rept.," March, 1921, p. 4.

Company, owned 14 per cent. The last mentioned corporation, with its subsidiaries, was credited with holding 1,515,392 acres, a tract of land which, if blocked off in a single area, would comprise sixty-six townships whose circumference would amount to 195 miles. There were twelve holders of over 100,000 acres each, nineteen of 40,000 to 100,000; twenty-seven of 15,000 to 40,000; and thirty-one of less than 15,000 acres each but still possessing over 60,000,000 feet of timber. These ninety holders of land in the Upper Peninsula possessed 5,999,026 acres, which comprised 56.2 per cent of the whole area.<sup>1</sup> These extensive holdings were promoted by the large grants of land conveyed by the federal government in aid of various works of internal improvement, roads, railroads and canals, with lavish generosity and with little consideration of the prospective value of the rights bestowed. Thus the railroads of this section received grants from Fort Wilkins on Keweenaw Point to the Wisconsin state line, 221,013 acres were patented to the builders, and 762,803 acres in the northern peninsula alone in aid of canal construction.

In 1850, Congress had bestowed on the states tracts, designated "swamp lands," within their borders, on condition of their being reclaimed; and Michigan thus came into possession of 5,655,689 acres to June 30, 1914. These lands were in turn disposed of in large amounts in aid of the construction of roads and railroads. Thus in 1881, the just completed

<sup>1</sup>"Lumber Industry," II, 188-190-198.

Detroit, Mackinac and Marquette Railroad, joining Marquette with the Straits of Mackinac, received from the State 1,326,688 acres lying in the eastern counties of the Upper Peninsula; and of this grant the Upper Peninsula Land Company—a subsidiary of the present Cleveland-Cliffs Iron Company—came into possession of some 700,000 acres. A group of holders in addition to the Cleveland-Cliffs Iron Company also became the owners of another very large aggregate of these swamp lands. There have been no very considerable alterations in the general situation as regards land tenure in the Upper Peninsula since their report was prepared. Present-day purchasers or lessees of undeveloped tracts in this section must deal with one or another of these large land-holders. Of these undeveloped lands, more than 10,000,000 acres are in the northern peninsula. Much of the acreage not here in farms is in the possession of one or another of these large land-owners. While it is their policy to dispose of holdings except where these are required for mineral or lumber operations, provided their terms can be met, there has been no systematic plan of land colonization yet undertaken by them.

The influx of immigrants had very little direct encouragement or direction from the State itself. In creating the Public Domain Commission in 1909, the Legislature made provision for an immigration commission. The secretary of the Public Domain Commission was permitted to act as immigration commissioner. The organization thus established

was directed to collect, compile and publish information likely to prove attractive to settlers within the commonwealth, but was given slight resources or machinery for accomplishing important results. In December, 1918, an agent of the commission was stationed in New York for the purpose of directing newcomers towards Michigan, but to the end of the fiscal year just preceding the outbreak of the World War, he appears to have persuaded only twenty-four farm laborers to seek a domicile in this State. The War caused a discontinuance of even this effort, and the commission lacked faith in its efficacy. The sugar companies have maintained agents in New York for the purpose of directing immigrants to the beet fields and factories of Michigan, but quite without avail. The attitude of the commissioner was apologetic and evinced little faith in the work the statute set for him to do. It was undoubtedly a fundamental error to combine the office of Immigration Commissioner and Secretary of the Public Domain Commission. No effort was made to secure a commissioner with special experience and aptitude for such work as the law contemplated. Nor were the resources placed at the disposal of the commissioner at all adequate for his task. The State has never had a comprehensive soil classification; and, therefore, the Commissioner of Immigration was unable closely to define and discriminate parcels of land in which home-seekers might be concerned. It was quite impossible for the commissioner to indicate to a

land-seeker definitely the location of tracts of each type of soil, the character of the drainage, soil-moisture, subterranean water, climate, economic and social environment, and such other information as would determine for the inquirer whether or not that location was for him desirable. There remained, therefore, in the view of the commission, little more than the poor expedient of general advertising of the resources of the State directly and through the agency of development bureaus. To obtain such detailed information for the whole State or for any large portion of it will require years.

The basis of Michigan's homestead exemption law is found in an article of the second state constitution adopted in 1850 and attributed to Rev. John D. Pierce, better known for his connection with the early school system. Its inclusion in the legal system was characteristic of the reforming tendencies that centered about the middle point of the last century, and it remains essentially unchanged, a part of the constitutional law of the commonwealth. "Every homestead of not exceeding forty acres of land," runs the second section of Article XIV, "and the dwelling house thereon and the appurtenances to be selected by the owner thereof and not included in any town plat, city or village," or in lieu of this a certain amount of urban property "shall be exempt from forced sale on execution or any other final process from court." This exemption does not apply in case of mortgage or other lawful alienation of title, but in such cases the previous consent of the

wife, if the owner be a married man, must be secured to the document. "The homestead of a family, after the death of the owner thereof," stipulates the third section, "shall be exempt from the payment of his debts in all cases during the minority of his children"; and another section protects the same privilege of the owner's widow during the period of her widowhood. Thus does the State seek to relieve its inhabitants from the liability to eviction from the family homestead, a proceeding prejudicial to family life and the well-being of the community.

#### THE HUMAN FACTOR IN AGRICULTURE

Historically speaking, the Indians were the first agriculturalists of Michigan. This population has in historic times belonged mainly to three Algonquin tribes: the Chippewas (or Ojibways), the Ottawas and the Pottawatomies. Of these the Chippewas and the Ottawas dwelt chiefly in the Upper Peninsula and the northern portions of the Lower Peninsula, and to them may be added a few Menominees adjacent to the river called by their name. The Pottawatomies are associated more especially with the southern sections, but there has been, in fact, considerable intermingling of tribes throughout the two peninsulas. The census of 1910 showed the Indian population of Michigan to be 7,519, and that it had been increasing. Their number in 1920 was 5,614. The most considerable numbers were in Baraga,

Emmet, Isabella, Mackinac, Chippewa and Leelanau counties, all in the north; although counties as far south as Allegan, Saginaw, and Cass made a fair showing. The presence of missions, schools and reservations, together with the distribution of game (for the Indian is still a huntsman) seems to determine the location of this Indian population. This same census also disclosed that among the Chippewas, 109 were farmers, and 286 farm laborers in 1910; that of the Ottawas, 109 were farmers and 278 farm laborers; and that among the Pottawatomies 35 were farmers and 63 farm laborers.

While neither quantitatively nor qualitatively is the Indian a present important agricultural factor in Michigan, the pioneer farmers of European stock had to reckon with him in many ways. While the Michigan Indians seldom were dangerous, except sometimes when in liquor, they frequently were annoying. Even if their labor was not prized, they might on occasions keep an ill-provided family from starvation with their berries, corn and maple sugar, venison and fish. Indian agriculture was crude. It was exemplified by the squaw, not by the men. "They were excellent judges of land," writes C. A. Weissert of Hastings, "and cultivated the prairies or the black soil of the river flats. They planted their corn not in rows but haphazardly, the product being softer and whiter than that brought in by the whites. To preserve it the Indians smoked it and then buried it in the earth." He thinks that this "probably was the

original maize commonly raised by the Indians in this country.”<sup>1</sup> Weissert was writing of Barry County in 1911, and he remarks that “traces of their garden-beds were visible until recent years.” Indeed, evidences of their primitive agriculture were seen in many other points of the State before being obliterated by the tillage of the whites. Even yet the steel point of the plow sometimes turns up the primitive stone hoe and other stone and copper implements of these pioneer tillers of the soil in Michigan. Yet contemporary opinions of the Indian’s agricultural importance do not seem to be flattering. One statement reports that he is too much inclined to loaf, that his methods remain primitive, and that, even as a farmer, he often produces less food than he consumes. The national government has sought to do something to correct these tendencies. In the first of the last century, one Trombley is said to have been maintained as an agricultural instructor for the Indians near the present site of Bay City.<sup>2</sup> Various treaties with the Indians entered into by the United States had promised some provision for Indian education, and at length, in 1891, an act of Congress established an Indian school in Isabella County, which was located on the property of an old Methodist mission adjacent to Mt. Pleasant. Agriculture is included in the course of study of this school, whose 320 acres of land afford opportunity for its practical study.

<sup>1</sup>“Mich. Pioneer and Hist. Soc. Collections,” XXXVIII, 662.

<sup>2</sup>“Mich. Pioneer and Hist. Soc. Collections,” V, 275.



Of the 150 graduates since 1905, 24 are reported to be farmers. The present Congressional appropriation is on the basis of an enrollment of 350 students. The larger number of these Indians of Isabella County are stated to be good farmers.

The first Europeans to establish themselves in Michigan were the French. The motives of their coming were the propagation of the gospel among the heathen and the fur trade. The first settlements were at such strategic points as Sault Ste. Marie, St. Ignace and Mackinac, and Detroit. These spread along the Detroit and St. Clair and about the head of Lake Erie, and eventually appeared in the valley of the St. Joseph River, while detached posts were established on the Upper Grand, Kalamazoo, Shiawassee and other streams. In their settlements there was little significance for Michigan agriculture. Their proper environment was the forest and the water-courses: their implements the paddle and the rifle. In the period following the American Revolution, however, a considerable number of French-Canadian farmers settled in southeastern Michigan, usually in compact groups of farms all fronting on one or another of the rivers of that section. The French were a peculiarly sociable folk and these water-courses afforded a ready means of inter-communication. In a country, too, where springs were scarce and wells were drilled only with much labor in the refractory clay soil, the Écorse or the Rouge were a convenient substitute for the town pump. So, side by side, the Canadian French held their farms

of eighty, one hundred and twenty, one hundred and sixty or two hundred French acres (embracing some four-fifths the area of an American acre), each on a narrow river frontage, of twenty-three to fifty-eight rods. Eventually there were several hundreds of these French farms (442 in 1805) extending eight or ten miles, sometimes farther, up the Rouge, the Raisin, the Ecorse, the Clinton and Huron rivers, with still others on the Detroit and St. Clair.

As a farmer, the Frenchman here was very unlike the Yankee soon to appear. He saw no reason for aggressive energy in clearing the land and putting it to agricultural uses. His tillage was strictly limited. His interest in horticulture was greater, and apples and pears, peaches and cherries were grown in considerable quantities for home consumption and for export by themselves or in the form of cider. As a husbandman, the Frenchman was quite as thriftless as his Indian friends. He is charged with habitually depositing his barnyard manure on the ice of river and lake or of removing his out-buildings when the accumulations became insurmountable, rather than spreading them over the fields: and some state that he threw away the wool sheared from the backs of his sheep rather than spin it into yarn—a practice which, however, was undoubtedly exceptional. Accounts seem generally to agree that, if his farm buildings were shabby and his agriculture not sufficient for home needs, the Frenchman's heart was light, his loyalty certain, his piety complete, his hos-

pitality unstinted.<sup>1</sup> His children were more numerous than his cattle, and today there are in Michigan approximately 100,000 inhabitants reporting French as their mother tongue. The total immigration into the State seems not to have been extensive. Families were large generation after generation. During the past century, however, there has been some immigration from Canada, from the eastern states, and from France itself. Inquiries regarding motives for their coming to Michigan elicit the "rentier" system in Quebec, whereby the eldest son of the family is engaged to work the homestead and provide for his parents, necessitating that the other children seek their fortune elsewhere; or that it was the attractiveness of work in the woods or surface labor about the mines (one does not find many underground workers among the French); or it was to escape military service in the occupied portions of Alsace and Lorraine that brought the normally non-migratory Frenchman overseas and to Michigan. Not many of these have gone into farming, nor are they regarded as an agriculturally important stock. Observers, even among the French themselves, state that they are too conservative, too easy-going. With exquisite humor James Hoar of Lake Linden relates how Farmer Buckwheat from the thither-side of Torch Lake engaged the reverend father of the parish to employ priestly rites for the banishment of the grasshopper, and when results did not approximate

<sup>1</sup>"Census of 1910, Population by Mother Tongue," 980.

expectations, refused the fee. Observers say that the more hardy Finn is replacing the French farmers in the Upper Peninsula. In the Lower Peninsula he has ceased to be a distinguishable factor in rural life.

If the Indian and the Frenchman were first on the ground, it was the Yankee who dominated the institutional growth of Michigan; and who, in so doing, manifested scant regard for his forerunners in the region. There was no accident about his coming. He entered the territory usually, though not always, by the water route which, after 1825, extended from Lake Champlain to Detroit. Not a few came hither from the Genesee Valley in western New York by the same avenue of approach; and others re-migrated from the western reserve of Ohio, which the foresight of Connecticut had set aside along with the southern shore of Lake Erie as a boon to her Revolutionary veterans and as a condition of her cession of sovereignty in that quarter to the United States. If by the same token Massachusetts had not retained any portion of the soil of southern Michigan, her progeny were there in due time. There were instances of overland journeys both to the north and the south of Lake Erie from western New York into southern Michigan; but normally the immigrant made his ingress by Erie Canal boat and lake steamer to Detroit, perhaps to Monroe or even to the Lake Michigan ports of the west shore. Beyond the roads were very bad: one might fare better on the rivers or within the open forest. Gradually and not slowly

the southern counties filled up from Lake Erie to Lake Michigan with these masterful people of the stock that had converted colonies into a nation and whipped Indians and French, British and Hessians in the process. These were to renew the battle with the wilderness and convert it by the millions of acres into farms and homesteads and into desolate wastes.

In 1830 Michigan Territory had a population of less than 30,000. In the ensuing ten years it augmented at the rate of nearly 20,000 each year. It was during this decade that the foundations were laid of institutional life. The town meeting, a heritage from New England, became definitely a part of the governmental system as community after community appeared, mushroom-like, in the Michigan woods. A territorial enactment of 1827, greatly resembling an early pronouncement of the Massachusetts general court, made provision for popular education; but it remained for the Constitution of 1835, embodying the ideas of Isaac E. Crary, to determine the fundamental elements in the public school system: common school and higher education, state directed and nationally assisted, with public libraries but at first without free tuition. The Yankee was a Puritan and as such he did not forget to illegalize Sunday sports, gaming and merchandising; and even today it is without the law in Michigan to indulge in Sunday baseball, theatrical performances, racing, or to operate a place of business. All this applied to the State as a whole, but when adopted, Michigan was predominantly rural, and the town meeting has

continued to be an important and interesting feature of rural life even to the present time, wherever the population is mainly of this same Yankee stock or has come under strong Yankee influences. On the first Monday in April in these sections of the State Michigan farmers still gather within their township at the town hall or school-house, or, if the day is favorable, in the open air in the yard, for the purpose of arriving at a decision in regard to the building or improvement of public roads and bridges, and it may be for the enactment of ordinances and the consideration of other affairs of local concern. It is genuine democracy similar to that which framed measures against the tyranny of George III or exists in the smaller cantons of Switzerland.

As pertains to county government, the example of New York is most closely adhered to. The township supervisors who assess the farmer's property for purposes of taxation meet jointly at the county seat to attend to the administrative and legislative affairs of the county as a whole, while the farmer's deeds and mortgages are recorded with the county register of deeds who produces an abstract of title for a fee. The county surveyor may be called in to run a line or establish a corner, and the county drain commissioner lays out the drainage ditches that run from farm to farm into the natural water-courses. Rural justice is administered in the first instance and in cases of minor importance by one of the four justices of the peace of the township; the constable is the same innocuous official that time and literature have

found him to be elsewhere. Michigan state police, created by the legislature in 1919, is extending its watchfulness into the rural districts for the apprehension of thieves, often of urban domicile, and other law-breakers who trouble the peace in rural Michigan. The township board of four ex-officio members administers township affairs in accordance with the resolutions of the town meeting, corresponding to the selectmen of New England. The township board of health should attend to public health and sanitation within the township where other higher authority does not enter, and it has charge of rural cemeteries in most cases, although cities and villages often locate their cemeteries well without their borders and thus serve rural as well as urban dwellers. The record of rural births and deaths is kept by the township clerk, with whom chattel mortgages are recorded. The township may have made provision for fence viewers, pound-masters, destroyers of noxious weeds and inspectors of fruit-trees. These institutions of local government have a familiar New England influence in the copper country or Marquette as in Marshall or Lansing. It worked effectively also in the realm of finance, for it was New England capital that developed the copper and iron mines of the Upper Peninsula and the first railway lines of the Lower Peninsula.

Most ubiquitous of the foreign whites in Michigan are the Germans. They came early, almost as soon as the Yankee element, and their coming was encouraged by the abortive revolutions of 1830 and of

1848 in the Fatherland. They settled in Wayne, Macomb, Washtenaw and Saginaw counties before Michigan became a state, and then in Berrien, St. Joseph, and St. Clair counties, in Clinton and Leelanau, and in Marquette County by the Lake Superior shore. In 1910, they composed one-sixth the population of Berrien County, one-sixth of Monroe, one-fifth of Huron, one-seventh of Mason, one-fifth of Washtenaw, one-fourth of Manistee, and one-fourth of Saginaw. These are counties of the southern peninsula, and mostly of the southern half of it. They have never constituted such a large proportion of the northern peninsula, although the populous county of Houghton contained (1910) more than 5,000. The aggregate of these people, born in Germany or the children of parents born there, was quite 425,000 in 1910. Or if they are differentiated on the basis of mother tongue, their number in the Thirteenth Census (1910) was 396,513. That would make them about one-seventh of the State's population.

Revolutionary disappointments were not the only occasion for the German migration to America and to Michigan. Compulsory military service expatriated some of these folk, while burdensome restraints and the difficulty of securing land attracted still others to the freer American life and to good farms on easy terms. A south German farm would cost, as Andrew Tenbrook of Ann Arbor has pointed out, perhaps two hundredfold the price of a Michigan homestead, and if the Michigan acquisition were in



a wilderness where hardship and hard labor was the rule of daily life, the German could work and so could his entire family, for that had been the practice in Bavaria and Saxony and would be no novelty here. Intensive agriculture was the necessary régime of old Germany, where every rod of ground must do its bit in the maintenance of a large and increasing population. The habit of thrift and industry learned in the old home was steadily maintained in the American home, and German farmers have habitually been regarded as good workers in Michigan. They excelled as truck-gardeners, and while German cookery did not always commend itself to the Yankee palate, their sauerkraut and kohlrabi became domesticated in many a home devoid of all other German associations. It would have been well if the Old World German practice of preserving the forest cover on hilltops had been retained here to the advantage both of our uplands and lowlands. The Germans were religious and communities congregated here and there throughout the State: Lutherans in Ann Arbor, Roman Catholics in Westphalia, Clinton County, Mennonites at "Holy Corners," Kent County, while Moravians, United Brethren and Dunkards might arouse curiosity by rites unfamiliar to the native churches. For German women to work in the field was normal overseas but attracted disapproving attention here, where standards of life and thinking were different. However, this responsibility for the common income raised the family from poverty to affluence and furthered the economic well-being of

the whole State. It could not exhibit itself in mining as in agriculture, and the mining industry of the northern peninsula has never had a large German element attached to it. Thus the iron mining county of Iron, in 1910, had a German population of only 750 in a total of more than 15,000 inhabitants. Gogebic County numbered 1,430 Germans in a population of 23,333. On the other hand, the "Green Garden" settlement of Germans near Marquette is one of the most attractive agricultural communities in the State, and the corn and cabbages, apples and plums, grown within sight of Lake Superior in the season of 1920 would have done credit to the best agriculture of a more southern latitude.

When Michigan had been ten years in the Union, there appeared on its western shore southwest of Grand Rapids a colony of Hollanders. Religious differences in the mother-land had caused this band of pilgrims to come overseas and, after some investigation, they established themselves in their Michigan "Canaan," where, as the Moses of their exodus, Pastor Van Raalte notes, fruit-raising, with general farming, might prove a desirable form of agriculture. Although some of the immigrants settled in Iowa, the major portion of them came to Michigan. They included heads of families, persons of the middle classes and of rural experience. They were very religious and have been tenacious of their faith and, to some extent, of their language to the present time, although readily assimilated to the common life of the State. They held education in high esteem, as

was manifested by the founding of Hope College as an academy in 1851 and as a college in 1866. They became a highly respected element in the population of Michigan. The settlement began in privation and extreme suffering like that of the Pilgrims of 1620; but their industry and sobriety subdued the wilderness and made of central western Michigan one of the most highly developed farming areas of the State. Even in point of numbers the Dutch element became important. The United States Census of 1910 makes the foreign whites reporting Dutch as their mother tongue to number 92,694 (p. 979). This population is centered heavily in Kent and Ottawa counties. Of Kent's population in 1910 (nearly 160,000), approximately one-fifth was born in Holland or the children of parents born in that country. This represents, no doubt, a considerable urban population. However, the statement still applied to some 7,000 of the county's inhabitants living outside of Grand Rapids. In Ottawa—a more definitely rural county—the proportion of direct Dutch descent was still greater, one-third of the population in 1910 being of Holland birth or parentage for both father and mother. Allegan County also showed a strong Dutch element.

The Finnish element in the rural population of Michigan is very largely, although not exclusively, in the Upper Peninsula. The Finns seem to have been attracted hither chiefly by the opportunity for work in the woods and mines. Finland is, however, primarily an agricultural and not a mining country, a

land suitable to stock-raising and forest industries. The Finn is an excellent dairyman, and in northern Michigan, as in old Finland, whatever he does he is very likely to own a milch cow or two and to care for them with what the Yankee would consider quite absurd solicitude. Finland is a country of dense forests and is extremely well watered; so is—or was—the northern peninsula of Michigan, where the Finn feels very much at home, a sentiment enhanced by climate and topography. Most Finns here have once worked in the mines; but many have come out of the earth to earn a livelihood from its surface.

The Finn is hardy, conservative and clannish. His standard of living normally is not high. He is fit for pioneering, and competent observers believe, probably correctly, that the agricultural future of the northern section of the State is chiefly in his hands. He is of one of the least assimilable stocks in rural Michigan, but he is educable, and such a project as the Otter Lake Agricultural School in Houghton County has effected an improvement in his husbandry. He is by nature refractory and must be handled tactfully. The Finn is very different from some of the other elements in the rural population, taciturn, unemotional, seemingly devoid of humor. He represents the Asiatic Turanian type, with a language wholly unrelated to the native tongues of western Europe; and some of his presumed natural uncommunicativeness and sullenness may be attributed to linguistic shortcomings rather than to a willful resolve to say or do nothing pleasant. In the Old

World, ethnologists discriminate several types of Finns each with its own Finnish habitat: one type less "heavy-headed" and obtuse than the other. Both types seem to be represented in America. Finland is a tri-lingual country, Russian and Swedish being domiciled there with the vernacular. In Michigan, it is not easy at once to determine whether one is dealing with a Finn or a Swede. The name is Swedish and Swedish may be readily spoken by the person in question. The slightly almond eyes and general appearance of the features help to resolve the doubt in favor of a Finnish prime relationship, although here, as in Finland, there may be an intermingling of these stocks by marriage. Normally the Finn was temperate even before the adoption of prohibition, contrary to common opinion, as was shown by his vote in favor of constitutional prohibition. In the copper country, for example, mining locations with a large Finnish element, and certain rural precincts almost wholly Finnish in composition, were overwhelmingly in favor of the prohibitory amendment, leaving it to urban constituencies of definite American and aristocratic tendencies to tip the balance to the contrary side. How far the Finn leans to socialistic doctrines is not easy to determine, although the strike of copper miners in 1912 showed that these views were frequently held, even in rural, as distinct from mining, locations. A similar tendency in Finland has been attributed to the system of land tenure in large estates, to opposition to the tyranny of the one-time rule of the Czar, and per-

haps also to a close connection between Finnish and German higher education and philosophic thought. Tendencies acquired in the Old World may have persisted in America through a failure thoroughly to assimilate the Finn in this country and to his subordinate position in economic life. It is believed that education, proprietorship, and the breaking down of isolation will counteract his interest in Marxian doctrines. On the other hand, the Finn's willingness to dwell in isolated communities and to perform hard labor under rough conditions adapts him to rural life in the undeveloped portions of the State, and it must be remembered that these areas are still very extensive. The fact that these Finnish farmers are at the outset often ill provided with capital increases their readiness to settle on cut-over lands, when those in a more favorable financial situation would prefer to purchase improved farms. With little capital save their physical strength, they are credited with great reliability in meeting their financial obligations. The agent of one large land company in the Upper Peninsula informs the writer that he has endorsed promissory notes on behalf of many Finnish clients of his, aggregating some \$30,000 in amount, and never lost a dollar in any transaction.

Bearing in mind the conditions under which the Finn lives in the Old World and the tenacity with which he retains his habits, one is not surprised to find transferred to American soil practices from eastern Europe. Thus one sees in northern Michigan instances of those curious combinations of house

and barn with some question as to which portions are occupied by man and which by beasts, although the impression should not be created that Finns commonly live in this manner. They are likely sedulously to exclude the outer air from their dwellings, and cases of tuberculosis are especially frequent among them. Adjoining the farm-house is probably the bath-house, where the bather steams himself thoroughly by throwing water on heated stones in the center of the floor, and perhaps terminates the process by a roll in the snow outside. His live-stock is as well housed as himself, and, although his thrift may cause him to shear his sheep at least twice in the year, involving a winter as well as a summer clip, he seeks to make amends by withholding the shorn brute from all contact with the outer air, a procedure which is said often to result in serious respiratory difficulties, but one which he is loath to abandon. The wool so derived is frequently carded and spun at home and knit into mittens and socks. There still is considerable demand for the old-fashioned spinning-wheel, thought to be a relic of a well-nigh forgotten art practiced by our grandmothers, but still in use in many localities of northern Michigan. The Finn, like the German, is musical, but what he regards as music the American commonly frankly spurns, because the native American is prone to misunderstand Finnish art as well as Finnish character. Finnish music seems usually to run in the minor key as if consonant with the normal minor mood of the race. The annual "saengarfests" held at various





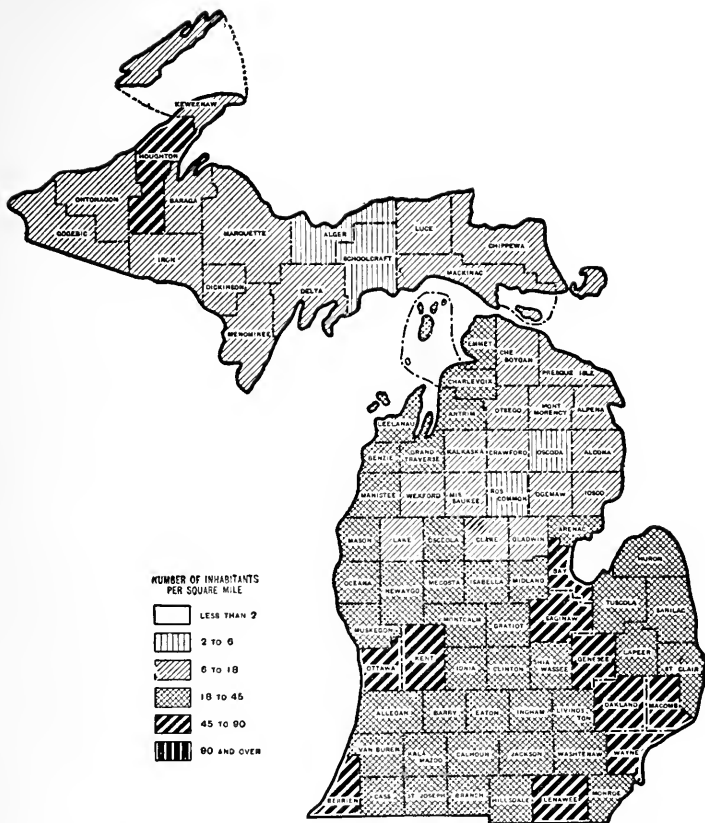


FIG. 6.—Density of rural population of Michigan by counties (1920).

points in the Lake Superior region where Finns congregate for the purpose, merit more attention than they have received.

Testimony is not lacking from authorities as to the capacity of the Finn for assimilation into American life. They point to the supreme test of assimilability, the frequent inter-marriages between those of Finnish and of native American stock. The Finnish farmer is the most teachable of any national element and his capacity for coöperation is notable. If a Finnish farmer loses a horse or a cow, it has been observed, his neighbors make up a contribution that compensates the loss of the animal. They are mutually very helpful in time of trouble. Coöperative business enterprises are common among them. At the little Finnish settlement at Rock in Delta County, there has been conducted a coöperative store, flour-mill, creamery, insurance society, and pure-bred bull association. This case is not unique by any means.

It is striking that more than one-fourth of the Finns in the United States—numbering more than 200,000 when classified by their mother tongue—dwelt in Michigan in 1910, and presumably do so still. At that time an excess of 11,000 persons in Houghton County were born in Finland, with large numbers in Marquette, Gogebic and the other counties adjoining Lake Superior, a much smaller proportion in the southern counties of the Upper Peninsula and a very trifling but widely scattered Finnish population in the Lower Peninsula. While

it cannot be stated definitely what proportion of the Upper Peninsula Finns are in agriculture, the number is large and is increasing, for the Finn has a very strong inclination to the land and towards forest industries, and testimony is general that he is forging ahead of other racial stocks in the agriculture of the northern peninsula.

The Scandinavian element in the State has not been as large as in Minnesota or Illinois, for example. The census of 1910 showed that in Michigan there were 16,454 inhabitants who spoke Danish as their mother tongue, 17,891 speaking Norwegian, 64,391 speaking Swedish. How this Scandinavian population distributes itself between town and country cannot be stated definitely. There are both urban and rural communities having a large Scandinavian element. They are proportionally numerous both in the city of Marquette and in some townships of Marquette County. As farmers they seem to be universally regarded with much favor. Their farmsteads are commonly neat and well maintained. They are in a high degree literate and are of a deeply religious character. A Swede will not willingly labor on Midsummer Day, the day of St. John the Baptist, which is for him a religious holiday. A wedding is not an occasion for hilarity: it is a solemn religious event, observed with prayer and pastoral dissertation. Topographical and climatic conditions undoubtedly directed Scandinavian migration towards the northern boundary of the United States. In these respects the Upper Peninsula is said greatly to

resemble Sweden, where also mining is an important pursuit. At present, however, there are few Swedish miners, agriculture and urban callings having drawn most Scandinavians out of the mines, except in Gogebic County. They are a very readily assimilated racial stock and, unlike their neighbors the Finns, are soon lost in the general mass of Americans. It should be noted, however, that among the number of those in Michigan who speak Swedish as their mother tongue, there are numbers (how many cannot be stated) of Swedish-speaking Finns, who, in the opinion of some observers, possess in a high degree the tendency to go to extremes in belief and conduct that is associated with the Finnish type.

The Bohemian population of Michigan has never been large, and numbered only 10,130 according to the census by mother tongue of 1910. In recent years, however, it has become a much more important factor in the rural districts of some parts of the State. It was attracted thither by the introduction of the cultivation of the sugar-beet and thus is a particularly important element in the population of the territory adjacent to Saginaw Bay. In southern Gratiot and Saginaw counties, these Czechs are steadily taking over farms formerly possessed by more familiar American types. T. P. Steadman of Elsie writes as follows in regard to these newcomers who have fallen under his observation: "As a general thing, they are honest and reliable financially. They are good workers and usually law-abiding, although they sometimes fight among themselves.

They are good farmers and are quite quick to take up American methods. Their standard of living is, of course, much below that of the native-born American, although the second generation mark a distinct improvement in that particular. During the war they were law-abiding and patriotic. They bought liberty bonds quite freely and are holding them quite as well at the present time as the native-born Americans. They seem to be little concerned as to political matters, local or general. In this they are distinctly different from German communities which I have known. They patronize savings banks quite freely and rely greatly upon the banker whom they have learned to trust." Steadman is of the opinion that one-fourth of the farms in the vicinity of Bannister and Ashley, Gratiot County, have come into the possession of Bohemians. They are very well adapted for developing the rougher lands of the State. Their Slavic congeners, the Croatians, Slovenians and Poles, are also settling in small communities in upper Michigan.

The negro population of Michigan is relatively sparse, particularly in the rural districts. The total in 1910 was only 17,115, being six-tenths of one per cent of the whole population. More than one-third of this number belonged to the urban county of Wayne, and only 4,959 were represented as rural. Outside of Wayne County, only Washtenaw and Cass counties had a negro population exceeding one thousand, while some of the counties of the northern sections of the Lower Peninsula were almost wholly

without this element. The populous counties of Houghton, Marquette, and Gogebic on the south shore of Lake Superior, had respectively sixty-one, eighty-three and six negro inhabitants, indicating that mining does not attract colored folk. Nor did such dominantly rural counties as Clinton and Gratiot, with thirty-eight and ninety-two negroes numbered in their census, indicate that agriculture is a popular vocation for negroes in this State. Even the populous county of Saginaw contained only 343 negroes. In the rural county of Cass the situation is peculiar and interesting. Here the 1910 census showed a negro population of 1,444. Booker T. Washington has described the negro community in Cass County after a brief visit to it in 1902.<sup>1</sup> He ascertained that it was composed of the descendants of escaped slaves who sought refuge among the Quakers of that section about 1840 and thereafter, to whom also came numbers of manumitted slaves and free negroes. They engaged in agriculture. They became a well-established, intelligent, law-abiding community. In Calvin township, the negroes became the larger part of the population and a considerable element in Porter and some other townships. In the quality of their agriculture, he found they compared very favorably with their white neighbors and presented a marked contrast to most southern communities of negroes with which he was familiar. Their standing and relationship with the whites he describes as excellent. They have good land, good buildings,

<sup>1</sup> The *Outlook*, LXXIII, 292.

modern equipment, schools, churches, bank credit and hold office quite without distinction of race. They are situated in the southernmost tier of counties, close to the boundary of Indiana, in one of the oldest and best-developed agricultural counties of Michigan.

The impression one receives from a study of the settlement of Michigan, as of other American states, is primarily of a group of communities whose members are associated together by a common origin, by religious affiliations, or by a common language and national relationship. Besides the large racial elements already noted, there are in rural Michigan communities formerly Belgian, Lithuanian, Polish, Croatian, Russian, English and Scottish in nationality. With the non-English-speaking stocks here represented, the problem of assimilating them into common American life has not been solved. Studies conducted by Gilbert Brown of the Department of Psychology in the Northern State Normal School indicate how completely isolated, socially and intellectually, many of these rural enclaves have remained to the present time. For the purposes of this investigation Brown employed the rural census blank used by the College of Agriculture of the University of Wisconsin. The collation of the information so obtained brought out such facts as the following: In one community of ten families including seventy-eight persons, of whom thirty-three were born in Finland, two in Sweden, and forty-three in the United States (all the parents being born in

Europe), the Finnish language was spoken in nine homes and Swedish in one. The language of the newspapers read in these homes corresponds to the foregoing classification. Only a "cheap grade of farm journal" formed the magazine-reading in six homes, while no magazines were taken in four homes. All these people had church affiliations, but this was with a foreign-language church. No societies were represented in these homes, but in all cases there was membership in the Grange. The only community events attended by these people were represented by two school socials during the period under review. There were four children of school age not in attendance. All fathers in this community, except one, could speak English, but none could read or write it. All mothers in the community, except one, cannot speak English, and none can read or write it. This is undoubtedly but one of many instances. Brown believes that there are at least seventy-five such communities in the Upper Peninsula, which is doubtless a conservative estimate; and the Lower Peninsula has its quota. One agent of a colonization company, who has looked over the situation in Michigan with a view to a systematic attempt at establishing farmers on the less developed lands of the northern part, emphatically objected to this segregation by national groups of new settlers in rural districts. He believes it feasible so to organize a scheme of colonization that nationally non-related individuals will be associated together, and by this very situation will be much more quickly merged in the common life of the



State. Perhaps this is true, but surely the presence of people in the same locality, kindred in speech, religious connection, economic and social status, has encouraged and comforted the members of the group in their new and strange situation and rendered them less ready to leave their rural homes for urban life. Either way has its advantages and disadvantages, which it is not the purpose of this book to discuss in detail. Here the problem is only recognized as it exists.

The question as to what contributions have been made to agricultural practice in Michigan by the several European stocks is not readily answered. While the existence of some procedure within a certain group may suggest its foreign antecedence, only very careful investigation can determine the facts beyond question. The writer's observations have suggested a number of rural customs unfamiliar at least in the older more thoroughly Americanized sections of the State: For example, the practice observed among Finnish and Swedish farmers of exposing hay and grain in the fields on long narrow racks or about stakes, to facilitate drying and curing. L. M. Geismar, an Alsatian by birth, introduced among the farmers of the copper country the Alsatian practice of sheep-raising, whereby capitalists in town provide the means for acquiring small flocks of sheep, which are turned over to small farmers for care and maintenance on an agreed basis of compensation and division of the returns. That Finnish farmers shear their sheep twice or more each year and not infre-

quently spin their own yarn and work it up into mittens and socks is understood to be derived from a custom of old Finland. Those who have partaken of a meal at the table of a Finnish or a German-American farmer are at once confronted with dishes and flavors to which the Yankee palate is unaccustomed. Equally odd appeared the wooden shoes of the Hollanders of west Michigan and the two-wheeled cart that sometimes still moves upon our country road. In settlements of newcomers from Europe, these roads are frequently private ways with bars up at intervals, although in appearance they are public thoroughfares of inferior construction. There are undoubtedly many strange customs of this order in rural Michigan awaiting study and description as opportunity presents itself.

For statistics of population, see Appendices C, D and E, and also Figs. 3-6.

## CHAPTER V

### AGRICULTURAL INDUSTRIES, PLANTS AND CROPS OF MICHIGAN

THE statistician of the Michigan Coöperative Crop Reporting Service states that the average value of the tame hay crop of Michigan for the past fifteen years is \$44,514,000; of corn, \$41,540,000; of oats, \$31,760,000; of wheat, \$19,429,000; of potatoes, \$18,334,000; and of beans, \$17,184,000 (six-year average). Charts prepared by the same agency indicate that corn is one of the three leading crops in all counties of the Lower Peninsula except Presque Isle and Alpena in the northeastern section; while it appears in this class only in Luce and Menominee counties in the Upper Peninsula. Similarly oats is the leading crop in Presque Isle, Alpena, Oscoda, Alcona, Ogemaw, Iosco, Sanilac, and St. Clair in the southern peninsula; and in all counties of the Upper Peninsula save Luce, Menominee and Keweenaw. Potatoes are shown to occupy a position not lower than third in all counties of the Upper Peninsula, the northwestern counties of the southern peninsula, together with Lapeer and Oakland towards the southeast. For statistics of farm crops, see Appendix F.

## HAY

The marshes and prairies provided native grasses that have served as forage both for the pioneer and for farmers of the present day. Even now one frequently observes in regions peopled by Finns cocks of marsh hay gathered with much persistency even miles from home. With the removal of the forests, the cut-over country also provided great stretches of grass-land for pasture, if not for a native hay crop. In the Lake Superior country, clover is now growing in places in great profusion in a wild condition. In the cultivated sections, clover and timothy hay have for years been the standard, but more recently alfalfa has steadily progressed as a favorite source of hay and is grown as far north as the Lake Superior region. It cannot as yet be regarded as the dominant hay crop of the State. Statistics regarding alfalfa in Michigan are not available. In 1920, hay maintained its position as the State's most valuable crop, its value being placed by the Bureau of Crop Estimates at \$38,064,000. This represents a yield of 3,149,000 tons, which was 150,000 tons less than the sixteen-year average. The average yield was 1.2 tons to the acre.<sup>1</sup>

While definite information regarding the quantity of hay of different types grown in the State is not available, the United States Monthly Crop Report for January, 1919, gives the percentages of the vari-

<sup>1</sup>"Mich. Crop Rept.," Lansing, Jan., 1921, 7.

ous kinds of hay produced in Michigan, as follows: Clover, 27; timothy, 26; clover and timothy mixed, 35; alfalfa, 6; millet, 2; other tame grasses, 1; grains cut green, 1; wild hay, 2. There has undoubtedly been an increased yield of alfalfa in the interval and, in the opinion of the statistician of the Bureau of Crop Estimates, it may now amount to 8 or 10 per cent. Chippewa County in the eastern Upper Peninsula has for years been a leading commercial producer of hay, and its yield in 1921 was 52,210 tons. The largest producers of hay, however, are such well-developed agricultural counties in the Lower Peninsula as Gratiot, Sanilac, and St. Clair, each yielding more than 100,000 tons. One occasionally, also, finds farmers who have grown millet, vetch, sweet clover and other forage crops not regularly at home in Michigan. Some efforts to grow such imported species as lupine, sarradella, spurry-grass have sporadically been undertaken.

#### GRAIN CROPS

Wheat was the most important money crop in Michigan for very many years. Indeed, even when its cash return was trifling and did not cover the cost of production, habit and the belief that this crop was a prerequisite to successful seeding of hay caused farmers annually to set aside a portion of their tilled land for wheat. It has been the staple crop chiefly of the southern section, and the Thirteenth Census showed few counties whose wheat production

ran into six figures outside of the four southerly tiers, where alone was a county yield of at least one-half million bushels. Here the clay and clay-loam soils were favorable to its growth, and the climate was considered to be so, although the freezings and thawings, light snowfalls and occasional icing of the land surface, were in reality frequently detrimental to the growing crop. Winter wheat was commonly grown, although spring wheat was sometimes planted in the pioneer period. In the Upper Peninsula, as might be expected, it has been more common to plant spring wheat, although the abundant winter snows have demonstrably been favorable to winter wheat, when the crop has been sown sufficiently early, usually in August, to gain a good start before winter has set in. In the pioneer days, wheat was often planted year after year on the same field without rotation, a practice which brought its inevitable result of depleted soil and diminished product to the acre. At first yields ran from thirty to forty bushels to the acre, but in the eighth decade they had fallen off to half this quantity or less, attributed to non-rotation, non-fertilization, greater severity of the winters and the increase of insect pests; so that wheat, which was at one time regarded as the surest of all cereal crops, suffered seasons of quite complete failure in the late nineties, and farmers began to consider whether it was desirable to plant it at all.<sup>1</sup> Production has by no means ceased, and the yield for the State in 1920 was 13,795,000 bushels of winter wheat and 480,000

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1876, 390.



Plate. IV. Harvesting an alfalfa field in southwestern Michigan.





of spring wheat. In the pioneer era, wheat was planted on the newly cleared field among the stumps on the unplowed ground which was lightly dragged in preparation for receiving the seed. The crop has never been cultivated, as in some parts of Europe, except in a few instances for experimental purposes, although a special wheat-cultivator is said to have been invented in Oakland County.<sup>1</sup>

Standardization of types of wheat was not secured for years and many varieties were grown, such as Reed Chaff, Bald, Mediterranean, Club, Soules, White Flint, Red Amber, Tappahannock, Blue Stem, Boughton, Lancaster, while the Diehl and Treadwell were considered especially choice sorts.<sup>2</sup> In 1877, the Fultz wheat was referred to as a new variety, the seed for which was introduced by the United States Department of Agriculture. It is described as having white chaff and stiff straw, growing to medium height, and as the earliest variety then grown. It was a red wheat, with a berry bright, plump and hard, and was said to be the heaviest kind then known, one farmer reporting a bushel that weighed sixty-five pounds. It was reported to be well adapted to heavy rich soil.<sup>3</sup> The Gold Medal resembled the Fultz, but was a white wheat of fine quality. The Clawson, introduced from New York after the Civil War, became a favorite variety. It is described as a red chaff, bald wheat, hardy, a strong grower, standing

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1889, 449.

<sup>2</sup> *Ibid.*, 1877, 141.

<sup>3</sup> *Ibid.*, 141.

up well, of soft straw, not apt to rust, with long heads, bowing down, filled with a large, white, plump berry, surpassing in beauty all other kinds while standing in the field ready for the reaper. The most recent variety of wheat to win favor among Michigan farmers is that known as Red Rock, reported to have had its origin from an individual kernel selected from a white Plymouth Rock wheat, and which was planted at the Experiment Station of the Michigan Agricultural College in the autumn of 1908. This is a bearded red wheat having also a red chaff. The qualities claimed for Red Rock wheat are exceptional winter hardiness, high yield, extra stiff straw, and those characteristics that yield a bread far above that usually produced from Michigan-grown wheat.<sup>1</sup> This wheat is reported to have withstood ice conditions during the winter better than other varieties, to have righted itself well after lodging, to be unusually rich in protein content, and to outweigh the official standard bushel of sixty pounds. It has been grown in the Upper Peninsula with very satisfactory results.

Climatic conditions in the southern portion of the Lower Peninsula are favorable to the growing of corn; but to the northward the season is normally too short and the temperature too low for the successful maturing of the grain, although at intervals fully ripened corn is secured as far north as Lake Superior and corn for forage is commonly produced throughout the State. The light sandy soil fre-

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1917, 659.

quently occurring in some of the northern counties is likewise unfavorable to corn culture. The firm quality of the soil and moderate height of the stalk does not require the deep planting characteristic of the prairie states, and Michigan corn is sown in hills by a corn-planter, the hills being placed equidistant to permit cultivation in either direction without alternating the reach of the cultivator, if grain rather than forage is sought. Corn was grown by the aboriginal inhabitants of Michigan, who, as one pioneer describes it, planted the seed not in rows but haphazardly, the grain being softer and whiter than that brought by the whites. To preserve corn, the Indians are stated to have smoked it and then buried it in the earth. To prepare it as food, the squaws pounded the kernels in a mortar made by burning a bowl in the end of a log or in hollowed blocks of stone. It was eaten in the form of soup or cooked with venison or other meat.<sup>1</sup> This is the true Indian corn, by which designation it is commonly referred to by the early settlers rather than "maize," by which it is known to Europeans. The immigrant whites also relied on corn for food for man and beast, and sometimes made extremely long journeys to obtain a few bushels of seed for sowing among the stumps or girdled trees or after the first breaking of the virgin soil. A chain dragged back and forth across the field was a primitive corn-marker before the advent of the three or four legged home-made

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 662.

device that even yet functions in that capacity. Some farmers insisted the seed must be in the ground by the fifth of May, while May tenth came to have almost the force of a Biblical injunction, although good crops were secured from June plantings. The number of kernels to be placed in each hill was reduced to a poetic formula :

“One for the blackbird, one for the crow ;  
One for the cut-worm and three to grow.”

Frost had to be reckoned with in the pioneer era, even more than now, for the heavy timber impeded the free movement of the atmosphere and the ground deep with humus might be damp and cold. If corn was good for folks, it was also well liked by “friends in feathers and fur,” and it required constant vigilance to save its tender shoots from the deer and its grain in the ground or the shock from the pigeon and the wild turkey, the squirrel and the raccoon. What escaped these claimants to the first fruits was ground in a hand-mill, a half-bushel in an evening, says one narrator ; or even a large coffee-mill might be pressed into service. In the pioneer period, more concern was manifest in corn as human food than as provender for live-stock, at a time when pigs ran freely in the woods and were nourished by its acorns and beech-nuts.

Corn has continued to be an important element among Michigan field crops. In 1904, the yield was

37,000,000 bushels produced on one and one-quarter million acres, and its value was \$19,235,000.<sup>1</sup> The average yield for that year was given as 28.6 bushels to the acre, while for the decade, 1895-1904, it was 32.13 bushels. Among the corn-producing states, only Iowa exceeded Michigan's product to the acre, as reported by the State Board of Agriculture.<sup>2</sup> An additional value to the Michigan corn crop accrued from the general use of the stalks as fodder and for industrial purposes. The Michigan Corn Improvement Association was organized in 1904 with the object of promoting the production of more and better corn in this State. An annual exhibition of prize corn was planned in connection with the farmers' "round-up" at the Michigan Agricultural College, cash prizes being offered for the best exhibits. At that time many varieties of corn were grown in the State with little attention to purity of type. A list of varieties in 1906 included Hathaway, Pride of the North, Hackberry, Mortgage-lifter, Huron Dent, Reid's Yellow, Leaming, Shenandoah Valley, Minnesota King, and Golden Ideal, which were said to be grown in Michigan in "fairly pure form."<sup>3</sup> Other varieties of that year included White Dent and White Cap Yellow Dent, of which several good types were said to exist in the State. The Giant Cuban was grown as ensilage corn. The dent corns also included Calice, Red, Strawberry and California Calice; while

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1906, 293.

<sup>2</sup> *Ibid.*, 1906, 293.

<sup>3</sup> *Ibid.*, 295.

among the flint corns, there were reported Smut-nose, King Philip, Yellow, and White.<sup>1</sup>

The census of 1910 showed a production of 52,906,842 bushels of corn. The counties yielding more than 1,000,000 bushels were Allegan, Barry, Berrien, Branch, Calhoun, Cass, Eaton, Gratiot, Hillsdale, Ingham, Ionia, Jackson, Kalamazoo, Kent, Lenawee, Livingston, Macomb, Monroe, Oakland, Saginaw, St. Joseph, Shiawassee, Tuscola, Van Buren, Washtenaw and Wayne. The premier corn county was Lenawee with a yield of 3,053,197 bushels. It will be observed that these are all southern and the oldest agricultural counties in the State. By 1920 the yield had advanced to 65,000,000 bushels, at the rate of 40 bushels an acre. In that year 34 per cent of the State's acreage went into ensilage, the average yield being 7.8 tons to the acre. The quality of the crop in 1920 was rated at 92 per cent, 15 per cent better than the ten-year average.<sup>2</sup>

Wheat and corn among the grains figure largest in the calculations of Michigan farmers, but all standard species grown in northern latitudes should be produced on the farms of the State, most of them on any farm in any season. In 1920, 9,702,000 bushels of rye were grown on 660,000 acres. By this date a hardy prolific variety of rye, known as "Rosen," and established by the Michigan Agricultural College, was rapidly making its way into popular favor. "Rosen rye," writes F. A. Spragg, plant-

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1906, 295.

<sup>2</sup>"Crop Rept. for Mich.," Lansing, Nov., 1920.

breeder at the Michigan Agricultural College, and J. W. Nicolson, then extension specialist, "is a stiff-strawed, large-headed variety, which when pure ordinarily has four full rows of grain on over 99 per cent of its heads." Rosen rye, these writers explain, "was selected and improved from an envelope of Russian rye furnished in 1909 by Mr. Rosen, a student from Russia at the Michigan Agricultural College." The rye, after satisfactory tests at the College, was distributed as seed to farmers throughout the State and has maintained its high reputation.<sup>1</sup> The Finnish farmers of Houghton County are stated by the agricultural agent to have grown a similar type of rye for years. Although the average yield to the acre in 1920 was given at 14.7 bushels, the Rosen variety has produced from 45 to 60 bushels.

Barley has never been a popular grain crop in Michigan, having a production of only 6,240,000 bushels in 1920, grown on 240,000 acres. The fifteen-year average is 25.2 bushels to the acre. Most of this is spring planted; but the Michigan Agricultural College, using selections derived from the United States Department of Agriculture, has developed a type of winter barley adapted to the climate of the State. This was distributed to growers through the Michigan Crop Improvement Association. Yields exceeding fifty bushels to the acre have been attained.<sup>2</sup> The most widely grown variety of barley in Michi-

<sup>1</sup> Spragg and Nicolson: "Rosen Rye," Mich. Agr. Coll. Ext. Div., Bull. No. 9 July, 1917.

<sup>2</sup> *Michigan Farmer*, CLV, 167.

gan, according to J. F. Cox, is the common six-row type, with the Wisconsin Pedigree as the highest yielding strain. He describes this as "a bearded type well adapted to Michigan." A black barbless type of barley has also been introduced, described as an excellent yielder and drought-resisting.<sup>1</sup>

The climate of Michigan is regarded as especially favorable for the growing of oats, both in respect to moisture and length of season, with relative freedom, especially in the northern sections, from prolonged hot dry periods. The clays and clay-loams are well adapted to this crop. Its relation to other crops, clover, timothy, alfalfa, and sweet clover, also favorite forage crops of the State, also encourages the production of oats. The average yield, 1905-1919, was 32.1 bushels to the acre. The tendency to raise oats is increasing. The southeastern counties of the State lead in oat production northward to the "Thumb" district.<sup>2</sup> In 1920, 56,430,000 bushels of oats were produced on 1,425,000 acres, a yield that averaged 39.6 bushels an acre.

Fields of buckwheat are encountered on many Michigan farms, although they are usually small. In 1920 this grain recorded an output of 609,000 bushels from 42,000 acres, which was 4.4 per cent of the United States crop.

Not all farmers attempt to raise clover seed, and the yield in 1920 all told was reported at 120,000

<sup>1</sup> *Michigan Farmer*, CLIV, 451.

<sup>2</sup> Mich. Agr. Coll. Bull.: Cox: "Oats in Michigan," 1920, 3.



bushels on 80,000 acres. In the Lake Superior country, clover seed is represented as difficult to secure in good condition because rain is likely to occur in the harvest time. It is grown in marketable quantities in Ontonagon County.

#### VEGETABLES

Michigan produced nearly 29,000,000 bushels of potatoes in 1919, and 35,700,000 in 1920, which was 8.3 per cent of the United States crop. They are of predominant importance in certain portions of the State, particularly in the central counties of the northern Lower Peninsula and in Marquette, Menominee, Delta and Houghton counties in the Upper Peninsula. Thus, in 1919, the counties producing more than 1,000,000 bushels in the southern peninsula were Mecosta, Montcalm, Osceola, together with Oakland in the southeastern section; while in that year Houghton County led the Upper Peninsula with a yield of 650,000 bushels, followed by Menominee, Delta, and Marquette counties. Montcalm's product of 2,381,730 bushels led the State. With potatoes, as with other products of the soil, the tendency has been to eliminate many varieties in favor of a few types of approved quality. The report of the Michigan Board of Agriculture for 1868 lists fifty-five varieties of potatoes with the yield of each as determined experimentally. In this list the now long-forgotten Chenery topped the production record with 352 bushels to the acre. The average yield in 1920 was

111 bushels an acre, but in the newer sections of the State much larger yields have been recorded. Yields of 400 bushels to the acre in the Upper Peninsula have been maintained for several years in succession, and 500 to 600 bushels have been reported. In 1920, a farmer near Marquette gathered sixty-five potatoes from one hill, more than fifty of marketable size. The cool moist climate of this area and of the neighboring region of the southern peninsula is favorable to this crop. J. Wade Weston enumerates the varieties of potato best adapted to this territory as the Irish Cobbler, Early Ohio, and Triumph, for early kinds, and Green Mountain, Rural, and Russet Burbank for late types.

Michigan pioneers soon discovered the potentialities of the potato crop. Thus a pioneer farmer of the Grand Traverse region planted potatoes among the logs on the virgin soil by merely gashing the earth with his ax, placing the seed in the opening and re-covering the hole with turf. These primitive methods of culture produced results far above expectations and demonstrated the capacity of the north country for potato production.<sup>1</sup> The total output of the State in 1882 is reported to have been 11,078,796 bushels on 113,745 acres. The price for potatoes in that year ranged from 63 cents in April to 47 cents in October.<sup>2</sup> The production varied little from this quantity during that decade. The price ranged well below \$1 a bushel, dropping to 15 cents

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," 38, 304.

<sup>2</sup> "Rept. Mich. Bd. Agr.," 1892, 401.

in 1888, but the average for the ten-year term was about 50 cents.

To improve the quality of the crop, there exists the Michigan Potato Producers Association, which, starting as a series of county organizations chiefly for educational purposes, was reorganized in 1920, primarily for the purpose of inspection and certification of seed potatoes, with attention to exhibits, education and legislation in relation to the industry. In 1920, the Association reported the inspection of 269 acres of seed potatoes, of which 192 acres passed inspection and were certified. Approximately 25,000 bushels of certified seed potatoes were for sale in Michigan in that year. In this work of inspection and certification, the Association coöperates with the Michigan Agricultural College, which provides the inspectors. Two field and one bin inspections are made. The standard for certification adopted by the Association requires that a field must not show at the first inspection more than 10 per cent of black scurf, wilt, blackleg, leaf-roll, curly dwarf, spindling sprout, mosaic or hills weak from other causes, or more than 15 per cent of all diseases combined. At the second inspection a field is disqualified if it shows more than 4 per cent of any one, or more than 8 per cent of all combined of the diseases named above. Fields are disqualified if they show more than 10 per cent of varietal mixture at the first inspection, and more than 1 per cent at the second. Fields infected with late blight or tip-burn, or infested with leaf-hoppers, Colorado beetles or with

other pests to such an extent as to make identification difficult are disqualified. To pass the bin inspection, potatoes must show freedom from scab, black-scurf and late blight, not have over 10 per cent of light or 2 per cent deep infection of wilt, and be free from other diseases and from frost-injury. Potatoes in the bin must show not over 1 per cent of varietal mixture and must conform to varietal type, be uniform, symmetrical, smooth, and practically free from serious cuts, fork punctures, bruises and other mechanical blemishes. There are also limitations on weight. Potatoes are sold in clean bags holding one hundred pounds and bearing the certification tag of the Association. For the purpose of introducing certified seed potatoes into new localities and of determining results from the use of such seed, the Association furnishes certified seed to growers for such demonstrations, and it publishes lists of growers of certified seed, which, in 1920, bore thirty-seven names, of whom eight were in the Upper Peninsula.<sup>1</sup>

Michigan beans, grown in the southern counties, have an established reputation and have been a highly favored money crop. The output in 1910 was 5,282,511 bushels, chiefly from the counties of Clinton, Eaton, Genesee, Gratiot, Huron, Ingham, Ionia, Isabella, Kent, Lapeer, Livingston, Macomb, Midland, Montcalm, Saginaw, Sanilac, Shiawassee and Tuscola, each of which produced more than 100,000 bushels. There is a tendency for the counties impor-

<sup>1</sup> From statement and pamphlets furnished by the Secretary of the Mich. Potato Producers Assoc.

tant in the bean crop to coincide with those producing largely of corn, but the two lists also show interesting differences, indicating a somewhat more northerly trend of bean production, although the crop is not regarded as a safe venture in the northern counties. However, on the Lake Michigan shore of the Upper Peninsula, excellent yields of beans have been secured year after year. A hardy rust-proof type was developed at the experiment station at Chatham and, when sown in the northern latitude, has given very satisfactory results. Anywhere in the State the bean crop is attended with much uncertainty, and this, together with unsatisfactory market conditions, has somewhat discouraged bean culture, so that in 1920 the production fell off from the 1910 figures to 3,575,000 bushels, grown on 275,000 acres and hence averaging a product of 13.5 bushels an acre. In 1921, by a coöperative arrangement between the Farm Bureau and the United States Department of Agriculture, a laboratory was established at Saginaw for the study of bean diseases with a view to their eradication.

Peas as stock feed and for canning are grown in both peninsulas and are occasionally met with as an important local crop.

The abundance of rich muck lands and the comparatively cool, moist summers of Michigan are favorable to the growing of celery.<sup>1</sup> The industry has developed largely in the territory about Kalamazoo, Muskegon, Decatur, Grand Haven, Vriesland

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1913, p. 323.

and Hudsonville; while the celery grown on the Taquamenon Swamp near Newberry in the Upper Peninsula, though not large in amount, is very highly prized because of its flavor and crispness. Celery is also grown in truck-gardens about such large market towns as Detroit, Grand Rapids, Bay City and many other cities of the southern peninsula. The Bureau of Crop Estimates of the United States Department of Agriculture gives statistics of the commercial acreage and production of celery in Michigan as follows: 2,935 acres with a yield of 168 crates producing 2,465 cars of celery. By counties the acreage ran thus in 1919:

<i>Counties</i>	<i>Acres</i>
Allegan .....	150
Bay .....	25
Berrien .....	35
Cass .....	40
Kalamazoo .....	790
Kent .....	400
Lenawee .....	140
Muskegon .....	144
Ottawa .....	730
Van Buren .....	200
Washtenaw .....	30
	<hr/>
Total .....	2,684

These statistics are undoubtedly not complete, since they represent the acreage for Luce County in

the Upper Peninsula as zero, while other reliable sources of information indicate a shipment of 100 dozen stalks six days of each week from October 1 to January 1. The acreage is small, but is said to be readily increasable with favorable labor conditions.

Michigan celery is grown on the heavy well-drained muck-lands of which the soil is very deep, 20 to 30 feet, with a subsoil of hard stiff clay. Three or four feet of good top soil are said to be sufficient for the growing of celery, provided it is well-drained and strong. Black ash and elm muck-lands are best for celery production. The marketing begins about July 1 and continues until midwinter. The Kalamazoo, Grand Haven and Muskegon districts grow early celery, starting their marketing about July 1, continuing until October. The Grand Haven and Muskegon crops are shipped across the lake to Chicago, while the Kalamazoo product is sold largely in other cities throughout the United States. De-catur, Vriesland, Hudsonville and other smaller sections where the crop is grown more extensively begin shipping later and aim to dispose of it before freezing weather.

In 1920, Michigan ranked fifth among the states producing sugar-beet seed. The output that year was 515,000 out of a total of 6,770,000 pounds. The states exceeding Michigan were Idaho, Montana and California. The average yield to the acre in Michigan was 765 pounds, which falls considerably short of California's yield of 1,200, but not much below that of Idaho, placed at 800 pounds. While the

growing of sugar-beet seed in Michigan is at present confined to the southern peninsula, its growth in the Upper Peninsula is advocated, as the heavy snowfall permits the seed-producing beets to be left in the ground during the winter, without lifting and re-planting them in the spring in readiness for the second year's growth in which the seed is obtained. Frost seldom penetrates the snow covering in the northern sections of the State and vegetables are not likely to suffer injury from freezing. There are other problems, however, connected with the growing of sugar-beet seed that have as yet not been solved. The United States Bureau of Markets reports an average yield of sugar-beet seed in Michigan for 1919 of only 430 pounds, and in 1920 of 715 pounds. In 1919 Saginaw County produced the largest quantity of sugar-beet seed, the reported output being 105,000 pounds, followed by Lenawee County with 43,500 pounds, Montcalm with 35,000, Gratiot with 34,000, Isabella with 32,000, Clare with 30,000, Huron with 18,000, Tuscola with 10,000, and Bay County with 9,000 pounds.

#### FRUITS

The profusion of fruit-growing in the vicinity of the Detroit River, which aroused the admiration of Cadillac, also attracted the favorable comment of the Jesuit Father, Nau, who, in a letter descriptive of his field of labor, under date of October 2, 1735, speaks of "this stretch of country" as "the finest in



Canada. There is scarcely any winter, and all kinds of fruit grow there as well as they do in France.”<sup>1</sup> Many years later another observer recounts how, along the River Raisin, “everywhere, in the wild-wood and in the glade, on the river’s edge, and as far away under the over-arching trees as the eye could see was a wealth of grape-vines. Everywhere hung clusters of rich, purple fruit; everywhere, with a wild luxuriance that far surpassed the stories their fathers had told of the vineyards of sunny France.” And it is related how at one point a man walked for eighty rods on grape-vines without touching the ground. These wild vines, in the hard cold season of 1875, are stated to have been the only grapes that matured sufficiently for the requirements of the local vintage, although by that time cultivated varieties had been introduced.<sup>2</sup>

When American settlers began to enter the Michigan territory after the War of 1812, they found a varied assortment of native fruits already established there. Some of these are strictly indigenous, such as the wild plum, wild crab-apple, wild cherry, and many varieties of berries, such as the wild strawberry, black, white and red raspberry, blue-berry, huckleberry (high-bush and low-bush). The salmon-berry, variously styled also the white-flowered raspberry, and, in the Lake Superior country, the thimble-berry, produced its attractive white flowers on its broad-leaved stem, and then its delicate pale red

<sup>1</sup> “Jesuit Relations,” LXVIII, 283.

<sup>2</sup> “Rept. Mich. Bd. Agr.,” 1875, 81.

fruit, in the region north from Houghton Lake in the southern peninsula and throughout the northern peninsula and on Isle Royale; and it remains a popular element in the wild fruit resources of the north-country even now. Enormous quantities of these wild berries are still consumed locally and exported. In both peninsulas, also, the tiny delicious winter-green was a favorite for gathering in the early spring, both for the diminutive red berry and the leaves. It must have been the French voyageurs, the missionaries, or some Johnny Appleseed who established the apple in Michigan, but it is reported in many widely separated sections of the territory and the State by the pioneers: along the Detroit River, in Huron, Eaton, St. Joseph, Shiawassee, Lenawee, on Scales' Prairie in Barry County, in the Saginaw Valley and in the vicinity of Escanaba in the Upper Peninsula. Along the Detroit River, in the Grand Traverse region and elsewhere appeared the pear, whose introduction is credited to the French of the early eighteenth century.

Nurseries were established in the southeastern settlements even before Michigan became a state, and in the first decade of statehood. Through their agency improved varieties of fruit were introduced. Among the varieties of apples thus brought into Michigan at the outset of its history are the Baldwin, Bellefleur, Tart Bough, Canada Red, Snow, Rhode Island Greening, Fall Pippin, Summer Pippin, Green Newton Pippin, Porter, Rambo, Golden Russet, Talman's Sweet, Green Sweet, Esopus Spitzenburg,

Swaar, and Twenty-ounce apple.<sup>1</sup> Varieties of pears included the Bartlett, Buffum, White Doyenne, Flemish Beauty, Seckel, and Stevens' Genesee.<sup>1</sup> Of peaches, there were the Early Anne, Sweetwater, Royal Kensington, Prince's Red, Rareripe, Orange, Pound, Barnard, Early York, Malta, and Red-Cheek Melcoton.<sup>1</sup> Efforts to grow apricots and nectarines failed through unfavorable climatic conditions. Among the cherries, the Amber Heart, Black Heart, Black Tartarian, May Duke, Ox Heart, Carnation, and White Tartarian; and among the plums, Coe's Golden Drop, Duane's Purple, Green Gage, Bleckers Gage, Hulings Superb, Smith's Orleans, Washington and Yellow Gage, are noted. J. C. Holmes, who was both practically and officially connected with this early period of Michigan horticulture, concedes that many varieties of early fruits at first introduced into Michigan proved unsuitable, but others on the lists just recorded are still standard varieties for the State.

Fruit-culture was quite generally distributed throughout the settled portions of the State in the period before the Civil War. There is abundant testimony that the removal of the forests, by exposing the land surface to frigid air currents, made the culture of the less hardy varieties, such as the peach, increasingly difficult and the return much more uncertain in the inland counties, and by the war era

<sup>1</sup>Listed in a paper by J. C. Holmes, read before the Mich. State Pomological Soc., at Bottle Creek, Feb. 25, 1873; "Mich. Pioneer & Hist. Soc. Collections," v. X, p. 73.

the Lake Michigan shore had definitely become the great "fruit-belt" of the State. Commercial peach-growing in Berrien County is dated as far back as 1835 with the first shipment of the fruit from St. Joseph in 1840.<sup>1</sup> Grapes soon appeared in the vicinity of Grand Haven, on the western shore, although the wild variety had grown with the most extraordinary profusion near Lake Erie in the southeastern section of the southern peninsula. While exceptionally severe winters, such as those of 1873 and 1875, which iced the surface of Lake Michigan, were quite disastrous to fruit-trees even in the far western counties, the normal mild winter and cool growth-retarding temperatures of the lake shore country were so advantageous to the fruit-growers that the industry naturally settled itself in that district, and has remained its dominant agricultural interest to the present time. By 1884 a very large fraction of the State's total output of fruit was credited to the three southwestern counties of this region, Allegan, Van Buren and Berrien, which produced one-ninth of the apples, two-thirds of the peaches, and three-fifths of the grapes grown in Michigan, as calculated from the return of the State census of that year.<sup>2</sup>

By 1899, the State production of orchard fruit was reported in the United States census returns as 9,859,862 bushels, and ten years later at 15,220,104 bushels. Among the several species of these fruits,

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1888, 283.

<sup>2</sup> Thirteenth U. S. Census—Abstract. 411.

apples had a yield in 1909, according to the same source, of 12,332,296 bushels, while the yield in 1920 was 16,500,000.<sup>1</sup> Peaches produced 1,686,586 bushels; pears, 666,023 bushels, while in 1920 the yield was 1,100,000; plums, 181,188 bushels; cherries, 338,945 bushels; while quinces, always a low yield in Michigan, recorded 13,484. Grapes, which produced 41,530,369 pounds in 1899, rose to 120,695,997 pounds in the decade following.<sup>2</sup>

The distribution of this production by counties indicates the areas in which the fruit crop bulks largest in the agricultural economy of the State. The counties yielding more than one-half million bushels of orchard fruit in 1909 include Allegan, Berrien, Kent, Oceana, Van Buren and Grand Traverse, arranged in the order of their relative importance. Allegan County in that year had an orchard crop of more than one million bushels. Among central and eastern counties, which rank high in field crops, the fruit counted for relatively less; thus, Genesee County produced only 143,800 bushels of orchard fruit; Lenawee, 254,514, and Hillsdale, 186,917 bushels. That hardy fruits comprised the main crop of these same counties is indicated by Genesee's output of 130,568 bushels of apples; while Lenawee's apple yield was 230,581 bushels, and Hillsdale's, 164,432 bushels. Hardy fruits, like apples, plums and cherries are well distributed throughout the

<sup>1</sup> Thirteenth U. S. Census—Abstract, 411.

<sup>2</sup> U. S. Dept. Agr.: "Monthly Crop Reporter," April, 1921,

State and as far north as the Lake Superior shore in the Upper Peninsula where very abundant yields occur. The north Michigan counties made a very small showing in the fruit returns for the Thirteenth Census, but in the interval, numerous young orchards have been set out in this section and these give promise of very satisfactory yields henceforth. While peaches and grapes make a showing at many points, particularly in the southern peninsula, many miles from the lake shore, these are usually points of good elevation and consequent air drainage. However, they are not unknown even as far as the Lake Superior shore-line, where, at Marquette, a very hardy variety of peach, named from that city, has had quite accidental origin but seems destined to persist and at least to provide good budding stock for a more favorable peach latitude but where climatic conditions still demand exceptional hardiness.

Berries and cherries, both wild and cultivated, are found in many parts of the two peninsulas, but certain sections have emphasized the production of one or another of them. Thus the region of Grand Traverse Bay has been described as the "original home of the North Michigan cherry," while Ontonagon County in the extreme northern portion of the Upper Peninsula and St. Joseph County in the extreme southern part of the Lower Peninsula have been famous in the production of strawberries. There is a large local demand for the output, yet rail shipments from some sections are heavy in the height of the season. In 1909 the aggregate strawberry pro-

duction for Michigan was ascertained by the federal census to be 14,218,768 quarts. Of this total, Berrien County produced more than three million, Van Buren County more than one million, and Wayne County, 1,425,320 quarts. These counties have excellent markets for this fruit close at hand. The raspberry output of the State in the year was 8,381,943 quarts, with Berrien County here leading also with its crop of 2,849,794 quarts, and with Sanilac also a heavy producer. While in the Upper Peninsula the commercial berry crop is small, there is a remarkable in-gathering of the wild red raspberry, blueberry, and "thimble-berry," a portion of which is consumed locally while thousands of crates are sent to Chicago and other southern urban markets during the season. The State's cherry crop in 1909 is represented by 338,945 bushels, with Grand Traverse County's 40,000 bushels leading and with large outputs from Allegan, Benzie, Berrien and Oceana, all on the Lake Michigan shore.

#### NUTS

Among the indigenous forest trees of Michigan were many bearing edible nuts, such as the hickory, oak, butternut, walnut, beech, and the hazel-bush. While nut-growing forms no part of systematic agriculture in the State, the natural output has a place in the domestic economy of the southern peninsula and of the southern counties of the northern peninsula, where, near the Lake Michigan shore, the

butternut grows freely and yields profusely. The Thirteenth Census (1909) gave the output of nuts of all kinds in Michigan at 961,137 pounds. Counties with relatively large outputs were Allegan, Clinton, Ionia, Iosco, Lapeer, Oakland, St. Joseph, and Wayne, all of which exceeded 40,000 pounds. Oakland led with 75,917 pounds, followed by Calhoun with 67,435 pounds. In the Upper Peninsula only Chippewa County made any visible showing with its paltry 100 pounds (possibly beechnuts) although the situation in Delta County adjacent to Big Bay de Nocque would seem to have warranted high expectations in relation to butternuts. The chestnut is not common in Michigan and seems to be at home only in the southeastern counties, and its artificial plantation was undertaken some years ago by the Lake Shore and Michigan Southern Railway along its right-of-way north of Adrian. Sporadic attempts at the introduction of nut-bearing trees have occurred in Michigan, looking to the addition of the filbert, the almond, the pecan and the Persian and Japanese walnuts to the native nut-trees. The results are understood not to have been greatly encouraging.<sup>1</sup> State law has made provisions for the planting of nut-bearing trees along the highways and the legislature of 1919 laid such a duty on the broad shoulders of the State Highway Commissioner.<sup>2</sup> Interest in the commercial growing of nuts has led to the organization of the Northern Nut Growers Association

<sup>1</sup> *Michigan Farmer*, Sept. 25, 1920, 367.

<sup>2</sup> P. A. 36-1919.



(1910) for the purpose of promoting an intelligent interest in nut-culture and of scientifically investigating the problems and the introduction of new varieties. In the membership of this association are several residents of Michigan. The use of nuts in the diet prescribed at the famous Battle Creek Sanitarium has undoubtedly done something to enhance public interest in nut-culture.

SPECIAL CROPS

The wet lands in the southwestern portion of the southern peninsula have been quite extensively used for the growing of mint. In 1919 the assistant truck crop specialist of the United States Department of Agriculture estimated the production of peppermint and spearmint in Michigan by counties as follows:

Peppermint:		Spearmint:	
County	Aeres	County	Aeres
Allegan .....	300	Allegan .....	550
Berrien .....	395	Berrien .....	290
Cass .....	520	Cass .....	50
Gratiot .....	50	St. Joseph .....	80
Muskegon .....	30	Van Buren .....	750
St. Joseph .....	550		
Van Buren .....	625	Total .....	1720
	<hr/>		
Total .....	2470		

The major portion of the commercial mint crop in the country is grown in this section of Michigan and in northern Indiana, and, according to the expert just mentioned, the high tide of production

was reached in 1914, when the two states yielded some 600,000 pounds of mint. Then the production fell off until 1919, when the output was 225,000 pounds. Mint, when harvested, has its essential oil removed by distillation. Mint is said to produce normally 30 pounds to the acre, but yields are said to vary from 10 to 80 pounds. The mint is cut with a scythe and, after the oil is extracted, the straw is used as a stock food.<sup>1</sup>

The commercial growing of mint in Michigan is said to date from the year 1836. In 1847 the price of peppermint oil has been given at \$1.25 a pound, while in 1919 prices are reported to have varied from \$3.50 to \$6.60 a pound. In the record production year of 1914, mint oil sold at about \$1 a pound, according to the expert of the Department of Agriculture. The industry seems to have suffered occasionally from over-production and from monopoly, and as far back as 1888 the competition of Japanese oil was taken notice of, although in 1886 St. Joseph County, Michigan, was credited with a production of 70,000 pounds of peppermint oil, one-fifth of the world's output.<sup>2</sup> The oil is used for confectioners' and medicinal purposes. In 1920, the experimental growing of peppermint in the Upper Peninsula was undertaken by the Land Commissioner of the Duluth, South Shore and Atlantic Railroad, with apparently satisfactory results. In this instance,

<sup>1</sup> On mint-culture in Mich., see Rept. State Bd. Agr., 1888, 452.

<sup>2</sup> *Ibid.*, 454.

the plot was located in a portion of the Seney Swamp east of Marquette; but it has been claimed that mint will do well on dry lands, if the soil is sufficiently rich. Since South Bend, Indiana, is at the center of the mint-growing territory of Indiana and Michigan, the mint-growers in that area have been organized for their mutual advantage, with official headquarters in that city.<sup>1</sup>

In 1909, the value of ginseng produced in the State was, according to the Thirteenth Census, \$13,794.

Of late the culture of goldenseal has become of commercial concern in the Upper Peninsula, where one grower estimates the yield to the acre in the quadrennium at \$20,000 to \$25,000.

#### CROPS FOR MUCK-LANDS

In Michigan agriculture, muck and sandy lands present special difficulties. It is recognized that muck-land farming presents peculiar problems: of drainage, of fertilization, of discovering crops suited to such lands. As stated by Ezra Levin, of the State Department of Agriculture, who has an established reputation as an expert in this department of agriculture, "there are two types of muck-farming in Michigan: extensive and intensive." Extensive muck-land agriculture "is concerned with celery,

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," v. 18, 515. See also Van Fleet: "The Cultivation of Peppermint and Spearmint," U. S. Dept. Agr., Bull. 604, 1917; Heakel: "Peppermint," U. S. Dept. Agr., Bull. 90, 1905.

onions, cabbage and lettuce. Less than one-half of one per cent of the total area of muck and peat lands in Michigan is given over to intensive farming. Not very much more than that is being extensively farmed.<sup>2</sup> Levin believes that "the development of swampy lands in Michigan will come through extensive farming." The problem, then, is to bring about a safe system of agriculture for these swamp lands. He proceeds to point out that two factors in relation to muck-lands must constantly be kept in mind: frost and the quality of the soil. The crop rotation for such lands "has to do with cattle—either dairy or beef cattle—as a pivot, alsike and timothy or white sweet-clover hay, corn or sunflower form silage, and sugar beets—the sugar beets and hay as cash crops."<sup>1</sup>

Hay, Levin holds, constitutes an excellent cash crop for muck-lands, since it removes nitrogenous elements of which the soil already possesses an excess supply.<sup>2</sup> He points out, however, the value of green-manure. While small grains are regarded by Levin as subject to special risks as muck-land crops, the order of preference among them he gives as follows: oats, spring barley, rye, winter barley and wheat. Levin further recommends for grain culture on muck-lands: 1. "Heavy seeding, at least one and a half times the amount of seed that the highland farmers use in the vicinity; 2. Applying acid phosphate or potash, or both; 3. Thoroughly

<sup>1</sup> Letter of Oct. 25, 1920.

<sup>2</sup> *Journal of the Amer. Peat Soc.*, No. 3, July, 1920, 297.

rolling the seed-bed.”<sup>1</sup> He further states that “buckwheat and millet are considered important muck crops in subduing the sod. It cannot be said that those are profitable as a regular part in the rotation.” Levin is also quite sure that sugar-beet culture offers the best prospect of success in muck-farming. It must be understood, however, that Levin’s conclusions are not universally accepted.

#### CROP IMPROVEMENT PROGRESS

One of the most striking features of Michigan agriculture has been the gradual elimination of a great number of mongrel varieties of grain and the progressive standardization of types to a few varieties of approved quality and character. In 1918, J. F. Cox, of the Michigan Agricultural College, recommends among the red varieties of wheat suitable for bread-making, the Red Rock, or, in lieu of that, Egyptian, Shepherd’s Perfection, Mediterranean, and Red Wave, among such excellent types as are available. Among the white wheats adapted for pastry flour and breakfast foods, he mentions Plymouth Rock, White Rock, Dawson’s Golden Chaff, and American Banner as leading varieties.<sup>2</sup>

The Michigan Agricultural College is stated to have begun the distribution of pedigreed grains from its breeding plats in 1909.<sup>3</sup> Several of the varieties

<sup>1</sup> *Journal of the Amer. Peat Soc.*, No. 3, July, 1920, 298.

<sup>2</sup> “Rept. Mich. Bd. Agr.” 1918, 652.

<sup>3</sup> MS. article by A. L. Bibbins, Secretary, Mich. Crop Improvement Assoc., 1920.

of wheat just noted were among the first released by the College. To systematize this work of grain improvement through coöperation with the Michigan Agricultural College, a number of farmers, in 1911, organized "The Michigan Experiment Association." "The plan generally followed," says Bibbins, secretary of the Crop Improvement Association, "was to allow any member of the Association to obtain from the station plat an amount of grain varying according to the supply, from one peck to one bushel. The member was then required to sow this seed beside his own variety and report his results to the secretary of the Association." The Association recognized the impossibility of securing a single type of any grain adapted to all portions of a state so varied in conditions of soil and climate as Michigan; but the type adapted to particular conditions might be ascertained. Thus, as Bibbins states, it was determined that the Worthy oat is suited to rich heavy soil, and this is said at present to be the most extensively grown variety in Michigan. Coincidentally, it was ascertained that the Alexander oat is apparently best adapted to sandy loam types of soil. Similarly Rosen rye was first distributed by the College through the members of this Association. It had been the function of the Michigan Experiment Association to determine experimentally suitable varieties of grain. To develop its work among the farmers of the State and carry out a more extensive scheme of crop improvement, a reorganization was effected in 1917, under the designation of "The

Michigan Crop Improvement Association." "This organization," writes its secretary, "includes in its activities the testing out of improved varieties and methods in coöperation with not only the farm crops department (of the Michigan Agricultural College), but also with other departments closely related with successful crop production, such as plant pathology, bacteriology, etc." The Association does not confine its attention to varieties of grain developed at the College, however, but is concerned with types originated on the farms of the State and elsewhere. Agents of the Association make inspections of such grain just before harvest and then after the seed is in storage. Ninety-nine per cent of purity, practical freedom from noxious weeds and disease, conformity to a prescribed standard of germination, color and weight a bushel are required for approval by the Association. After inspection, the Association publishes a list of farmers having approved seed for sale. Marketing of pure seeds is now also effected through the Michigan State Farm Bureau, through coöperation with the Michigan Crop Improvement Association. Through various agencies of publicity, the county agricultural agents, the grain exhibit in connection with farmers' week at the Michigan Agricultural College and otherwise, the character and advantages of improved types of grain are brought home to the agricultural population. While farmers are traditionally conservative, such demonstrations are not lost. Thus, the sowing of the initial one bushel of Rosen rye in Jackson County in 1912 ex-

tended among the farmers of the State until in 1918 it was estimated by the Crop Improvement Association that 84 per cent of the rye in Michigan was of the pure-bred variety. The Michigan Crop Improvement Association now (Jan. 4, 1921) has five hundred members, twenty of whom reside in the Upper Peninsula.

During the period from 1910 to 1920, the plant-breeder, F. A. Spragg, of the Michigan Agricultural College, is credited with contributing to Michigan agriculture such new plant varieties as Worthy oats, Alexander oats, Rosen rye, Red Rock wheat, American Banner wheat, Michigan Two-row barley, Michigan Black Barbless barley, and Robust beans.<sup>1</sup> The new white sweet clover was also introduced into the State in this period. Corn variety tests were undertaken to establish local standardization of the grain. It is also claimed that wheat variety tests conducted throughout the State in recent years have established the outstanding excellence of Red Rock and Egyptian of the red wheats, and the American Banner of the white wheat. Variety tests for oats have shown, it is asserted, the Worthy, Wolverine, College Success and College Wonder to be "outstanding." In southern Michigan, Cox enumerates the Johnson, the Strube in the Saginaw Valley, and the White Bonanza, New Victory and Swedish Select as excellent types over a wide territory. Among the six-row barleys, Wisconsin Pedigree is placed in the lead, while of the two-row types, the Michigan Two-row

<sup>1</sup> J. F. Cox in *The Michigan Farmer*, Feb. 5, 1921.



is the best producer. The Michigan Black Barbless barley is said to out-yield other kinds in adverse years and yields high in favorable seasons. Eight years of experience with Rosen rye left its supremacy unchallenged. Tests were also conducted in relation to soybeans to determine the types best adapted to Michigan. Bean tests have placed the improved Robust variety in the lead as a hardy disease-resistant type. Northwestern varieties of alfalfa were tried out and it was demonstrated that the Grimm, Cossack and Baltic were of outstanding excellence for Michigan.

Evidence accumulates that Michigan farmers are increasingly particular regarding the quality of the seed they plant. April 29, 1921, the Michigan State Farm Bureau reported that, during the preceding winter, fifty thousand Michigan farmers had bought seed through their seed department. The department stated that it had put out three million pounds of seed of "known origin, adaptability, purity and percent of germination." It claimed to have increased the registered Grimm alfalfa acreage of the State by 500 per cent, and it handled 750,000 pounds of Michigan-grown clover seed and retained it for Michigan users, it reported. As evidence of the increasing diversity in field crops, it was then stated that the department was handling sweet clover and vetch, for which there was reported a good demand, and millet and Sudan-grass were also on their list. Twelve carloads of "Huban" (annual white sweet clover) were reported to have been sown in the

season of 1920, and it was anticipated that there would be 1,000 acres planted in the season of 1921. It was claimed that this new crop would revolutionize crop rotation and the productive power of the soil.<sup>1</sup>

<sup>1</sup> *Mich. State Farm Bur. News Serv.*, April, 29, 1921, 2.

## CHAPTER VI

### ANIMAL INDUSTRIES OF MICHIGAN

BLOIS' Gazetteer of 1838 estimated the number of neat cattle in Michigan at 149,350. Of horses the number was 23,430; of sheep, 37,806; of hogs, 181,825. The total amounts to 392,411.

A glimpse of the place of live-stock in Michigan agriculture in the middle of the last century is obtained from a survey, the results of which are published in the collections of the Michigan Pioneer and Historical Society for 1887. Of Shiawassee County, it is said that "raising stock has become quite a business. Besides the cattle slaughtered at home, the amount sold and taken out of the county for each of the years 1852 and 1853 was not less than \$10,000. Almost every farmer has a flock of sheep, and wool-growing has become an important business, the amount sold in 1853 exceeding \$10,000. Nearly every farmer raises or makes his surplus amount of butter and pork."<sup>1</sup> The township of Napoleon, Jackson County, with a population of 301, produced "80,000 pounds of wool, 800 barrels of pork, and 700 barrels of beef."<sup>2</sup> Wayland Township, Allegan

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XII, 388.

<sup>2</sup>*Ibid.*, 396.

County, with its population of 331, produced "1,350 pounds of pork, 247 pounds of wool sold, 3,825 pounds of butter made."<sup>1</sup> From Ann Arbor came the report that "we raised and disposed of in the year of 1853 in our county 1,000 head of fat cattle, 2,000 hogs fatted, 1,000 store hogs, 10,000 sheep-pelts, and 200,000 pounds of wool."<sup>2</sup> For statistics of live-stock see Appendix G.

One of the most striking evidences of the advance registered in Michigan agriculture has been the replacement of mongrel live-stock by pure-bred types of a few standard varieties. Thus in the census of 1920, 1,293 farms reported 2,779 head of pure-bred horses, including 478 Belgian, 45 French Draft, 14 Hackney, 1,636 Percherons, 59 Shire, 205 standard bred, 123 Clydesdale, and 219 of other types. The same census showed 62,800 pure-bred beef breeds of cattle, and 46,533 head of dairy breeds. Of the beef breeds, there were enumerated 1,519 Aberdeen-Angus, 1,825 Hereford, 1,067 Polled Durham, 11,712 Shorthorns, and 144 of other types. Of the dairy breeds, 291 were Ayrshire, 429 Brown Swiss, 3,369 Guernsey, 32,702 Holstein-Friesian, 8,296 Jersey, 1,446 all other breeds. The total number of pure-bred sheep reported from 2,639 farms were 21,342, comprising 24 Cheviot, 72 Dorset Horn, 1,910 Hampshire Down, 100 Leicester, 268 Lincoln, 4,998 Merino,

<sup>1</sup> *Ibid.*, 400.

<sup>2</sup> "Thirteenth Census of the U. S. Abstract with Supplement for Mich.," 1910, 336.

2,800 Oxford, 2,267 Rambouillet, 7,942 Shropshire, 42 Suffolk, 919 other breeds. The swine numbered 33,527, reported from 7,656 farms. Of these the Berkshire breed had 1,618, the Chester-White, 7,869, the Duroc-Jersey, 12,842, the Hampshire, 1,023, the Poland-China, 8,739, the Spotted Poland-China, 249, the Tamworth, 135, the Yorkshire, 376, and all others, 676. Statistics of pure-bred live-stock are given in Appendix II.

The Michigan Improved Livestock Breeders and Feeders Association was organized in 1890, and its membership fluctuates from 200 to 300, although its annual meetings at East Lansing generally bring out twice or thrice these numbers. The object of the Association is declared in its constitution, "to promote the interests of breeders of the various breeds of improved livestock in Michigan," and "any person interested in improved breeds of livestock may become a member of this association by paying one dollar into the treasury." The annual dues are one dollar. The secretary states that, when this Association was established, there was not sufficient interest in particular breeds of live-stock to organize separate societies for them individually. In the interim, however, separate organizations have been created for horses, sheep, swine and cattle, and various varieties of each species, although they are affiliated with the general parent organization. At their annual conference held at the Michigan Agricultural College during the winter, discussions take

place relating to problems connected with improving live-stock, protection from disease, market conditions, and the like.

#### SHEEP

The number of sheep in Michigan in 1878 is given at 1,670,790, producing 8,666,467 pounds of wool, an average of 5.19 pounds a head. By 1884 the number had increased to 2,453,897, yielding 13,827,542 pounds of wool. Thence the number declined and reached 1,260,295 in 1897-8, producing 8,207,594 pounds of wool. In the latter year, however, the amount of wool to a head of sheep was 6.51 pounds, indicating, with the similarly increased output of the year immediately preceding, an improvement of the wool-producing types of sheep in the period.<sup>1</sup> In the years just given, the counties showing the largest number of sheep in the order named were Washtenaw, Eaton, Jackson, Calhoun, Lenawee, Ingham, Branch, Livingston, Oakland and Hillsdale.<sup>2</sup> Washtenaw's quota was then 79,059, while Hillsdale possessed 46,519 sheep, representing the extremes of the ten counties mentioned. Not only did Washtenaw County excel in the number of sheep, its yield of wool to a head (7.79) was in excess of the State's average. Several counties showed a still larger average product but the total number of sheep was small. It will be noted that the counties excelling in the number of sheep owned were all

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1900, 202.

<sup>2</sup>*Ibid.*, 204.

southern, the oldest agriculturally of the State, where sheep-raising had long been a well-established business. The ten counties enumerated had nearly one-half the sheep and wool output of Michigan.

The severe drought that afflicted the range country east of the Rocky Mountains in Montana and adjacent territory in the summer and autumn of 1919 forced large shipments of cattle and sheep into more favored regions. The cut-over country south of Lake Superior, well supplied with succulent grasses and brush, received large consignments of animals. The United States Department of Agriculture and the Upper Peninsula Development Bureau promoted this migration, and very considerable numbers of sheep found their way into the northern peninsula of Michigan. The movement was continued in 1920, but with the return of more favorable conditions in the seasons of 1920 and 1921, the tide fell off. Its recession, however, left the northern counties of the State much better stocked with sheep than had formerly been the case, and the ten million acres or more of cut-over lands of Michigan were being seriously considered as a new range for the live-stock industry.<sup>1</sup>

In addition to this large-scale sheep ranching in the northern range country, there has been developing a small-scale intensive sheep business participated in by farmers, chiefly of Finnish nationality and of limited means, financed by townsmen on a profit-sharing basis.

Of the breeds of sheep represented in Michigan

<sup>1</sup>"Yearbook," U. S. Dept. Agr., 1919, 401.

during this period, the Oxford Downs are said to have been imported in about the year 1882. It is stated by one breeder of this type that up to 1887, "there were less than half a dozen flocks of pure-bred Oxfords in Michigan."<sup>1</sup> The popularity of the breed seems to have increased. The breeders, centering in Genesee County, organized an association, and by 1899, the estimated number of pure-bred Oxfords in the State is placed at 2,500.<sup>2</sup> The lowest average yield of wool to a head up to that date is given at 8.5 pounds. One flock is credited with an average of 11.5 pounds a head, while this record had been exceeded in some instances, it is claimed. Other breeds of sheep in the State during the period under review included the American, French and Delaine Merinos, Shropshire, Hampshire, Southdown, Cotswold, Lincoln, Leicester and Horned Dorset. In popularity the Shropshire is reported as leading, and although at that time the Merinos are said to have composed the chief flocks of the State, they were giving place to the Shropshire breed.<sup>3</sup>

Michigan had 2,224,000 head of sheep on January 1, 1920, valued at \$11.80 a head, with an aggregate farm value of \$26,243,000. In 1919, these sheep produced 9,554,000 pounds of wool, weighing on an average 7.4 pounds. The total number of fleeces was 1,291,000.<sup>4</sup> Flocks of sheep on Michigan farms

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1899, 398.

<sup>2</sup> *Ibid.*, 400.

<sup>3</sup> *Ibid.*, 1892, 365.

<sup>4</sup> "Yearbook," U. S. Dept. Agr., 1919, 669-672. The returns of the Fourteenth U. S. Census show that there were



normally are small, probably averaging 25 to 30 head. In 1920 a very bad situation in relation to the wool market reacted adversely on the sheep industry of the State. The Bureau of Crop Estimates, however, found that the number of lambs at the close of the year had increased as a result of slow marketing, so that the net loss of sheep stood at only 4 per cent, and the total number of head was found to be 2,135,000 in February, 1921. The estimated valuation of 14,000,000 was not much over half that of the preceding year.

Classified with reference to breeds, the Cheviots numbered 1.1 per cent of the aggregate; the Cotswold, 2; Oxford Downs, 6.9; Rambouillet, 6; Shropshires, 46.8; Southdowns, 2.8; Tunis, .1; others, 4; Nondescript, 4.1 per cent.<sup>1</sup>

With increasing stringency, the statutes of the State seek to protect sheep and other live-stock against the depredation of dogs. Dogs are required to be licensed and wear a tag, and they may be killed on view when attacking live-stock or trespassing in rural districts on private property. The proceeds of the dog tax are primarily for assignment, on order of a city council or township board, to the owners of sheep killed by dogs. Since sheep suffer also from the depredations of wolves and coyotes, a large bounty of \$35 (until 1921) was provided for their destruction in Michigan (Jan. 1, 1920) 1,209,191 sheep on hand on farms, and that 7,835,558 pounds of wool were produced in 1919. Of mohair, 1,617 pounds were produced in Michigan in 1919.

<sup>1</sup>"Mich. Crop Rept.," Bur. Crop Estimates, May, 1920, 6.

tion, which, however, did not prove very effective. It has been necessary in certain districts to call in the systematized efforts of the United States Biological Survey to reinforce whatever may be done by the State Game, Fish and Forest Fire Commissioner's department in ridding the State of these noxious animals in the interest of the sheep industry. The problem of these destructive pests is admittedly difficult. According to the expert investigations of the United States Biological Survey, coyotes made their way into Michigan some ten years ago and are now thought to number one thousand individuals. Since they enter mainly from Wisconsin and Minnesota, the task of dealing with them is at least a tri-state problem. They have penetrated nearly to the Straits of Mackinac (January, 1921) and are likely to cross the Straits over the ice and become at home in the southern peninsula as well. Timber wolves have entered the State from Canada over the ice of Lake Superior and were in 1921 considered to number some five hundred individuals. Both wolves and coyotes have caused considerable damage to sheep and to a less extent to other domestic animals, as well as to deer and other wild life. It was recommended that the present ineffective bounty on predacious animals be abolished and that local wardens, or deputized hunters, operating under the immediate direction of the regular force of district wardens of the State Game, Fish and Forest Fire Commissioner's department, should be regularly employed to destroy the varmints, and that the op-

erations of this force should be supervised by an expert of the United States Biological Survey. It was so ordered in 1921. It is believed that this procedure would well-nigh rid the State of these predatory animals which otherwise are likely greatly to discourage the sheep industry in the Upper Peninsula.<sup>1</sup>

#### HORSES AND MULES

Horses were introduced into Michigan by the early French, "hardy, strong, of quiet disposition, some of them quite speedy." An amalgamation of this type with the breeds introduced by the American settlers is said to have taken place. The horses introduced by the eastern immigrants are described as of moderate size, being fifteen to sixteen hands high and weighing 1,000 to 1,200 pounds. English thoroughbred stallions crossed with native mares improved the strain, contributing the carriage and driving horses of later days. About 1854 the Morgan and Blackhawk horses were introduced from New England, it is stated. Hamiltonian and other trotting blood was similarly brought in. During this period also draught horse breeds, mainly of English blood, entered the State. Then came Percherons from France. Next came Clydesdales and English types. In 1892 the Percheron type is said to have been rather more popular than the Clydesdale and

<sup>1</sup>U. S. Bur. Biol. Survey: "Special Rept.—Michigan Investigations—Predatory Animal Control," 1920-1921; J. S. Ligon, Predatory Animal Inspector.

English shire animals. By this date also other types, Suffolk Punch, and Belgians, were in evidence. The Belgians have made excellent records here and are found in large numbers on the well-known "Prairie Farm" in the Saginaw valley.<sup>1</sup> Cleveland Bays and French coach horses were also represented in Michigan. It was averred that "the common horse has seen its best days. Electricity has killed him, and henceforth he will not pay his breeder unless the American public can be induced to follow Paris fashion to eat him." The intervening thirty years since the foregoing was written have hardly vindicated the prophecy. In 1892, Michigan numbered 530,294 horses, valued at \$40,659,672, averaging \$76.67 each.<sup>2</sup>

The Yearbook of the United States Department of Agriculture for 1919 informs us that, on January 1, 1920, there were 640,000 horses in Michigan, whose farm value was \$60,800,000, at an average price a head of \$95. To this may be added 4,000 mules, at an average price of \$99 a head, with an aggregate farm value of \$396,000.<sup>3</sup> The increasing use of automobiles and tractors is displacing horses and mules, and the Bureau of Crop Estimates finds the number of colts and young horses less in 1920 than in former years. The decline in the total number of horses in that year is 4 per cent, equivalent to 26,000 head. The average price a head in 1920

<sup>1</sup> *Michigan Farmer*, CLIII, 806.

<sup>2</sup> "Rept. Mich. Bd. Agr.," 1892, 373, 375.

<sup>3</sup> "Yearbook," U. S. Dept. Agr., 654.

is estimated at \$93, which is also a decline of \$2 for the year.

## SWINE

The statistics of the United States Department of Agriculture show that on January 1, 1920, there were in Michigan 1,450,000 swine. Their average price a head was \$22, and their aggregate farm value \$31,900,000.<sup>1</sup> In the case of swine as of other animals, the year 1920 registered a decline in numbers, but of only 1 per cent, due to a retardation of marketing caused by adverse market conditions. The indicated number of swine in the State on January 31, 1921, was, therefore, 1,435,000 head, valued at \$20,520,500, a loss of more than \$11,000,000 during the year.

The relative number of the several important breeds of swine in Michigan were distributed by the Bureau of Crop Estimates as follows: Berkshire, 8.4 per cent; Cheshire, 1.2; Chester-White, 24; Duroc-Jersey, 29.4; Hampshire, .9; Poland-China, 25.7; Tamworth, .2; Razorback, .2; others, 4.6; non-descript, 4.7 per cent.<sup>2</sup>

Returns to the Secretary of State's office in 1892 showed the total number of swine in Michigan to be 301,812. These were distributed widely throughout the State, each farmer maintaining a few animals. The most popular breeds were then stated to be the Poland-China and Berkshire. However, other breeds,

<sup>1</sup> "Yearbook," U. S. Dept. Agr., 1919, 676.

<sup>2</sup> "Mich. Crop. Rept.," May, 1920, 6.

now little heard of, were found in Michigan in the middle period. Thus the Essex hog, described as "a small boned black hog with generally an erect ear, and distinguished by the softness of the skin and fineness of the hair, with fine-grained and delicious meat," is said to have been introduced into Michigan about 1868.<sup>1</sup> Somewhat later appeared the Duroc-Jersey, or "Jersey Red," which experiments at the Michigan Agricultural College in the late eighties seem to demonstrate as a superior breed, and which has become a favorite in the State.<sup>2</sup>

#### CATTLE

Again, in 1892, a general review of live-stock conditions in the State was presented in the Report of the Michigan Board of Agriculture for 1892. It was recognized that "cattle-growing has not been conducted on so extensive a scale in this state as in some of the western states, but all farmers grow more or less cattle. Nearly all milk their cows and manufacture the milk into butter, or contribute to cheese-factories, and grow the calves on skim milk."<sup>3</sup> The writer further explains the breed of cattle most in demand "up to a very late date had been that which included cows that were fairly good milkers, and that would produce calves that would grow into good beef cattle. For a few years past more atten-

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1892, 381.

<sup>2</sup> *Ibid.*, 384.

<sup>3</sup> *Ibid.*, 357.

tion has been given to dairy breeds and now many farms are stocked with this class of cattle exclusively. Nearly all the improved breeds of cattle have been introduced and kept in the state, although some breeds have so far made little showing. In many sections of the state there are large feeders of cattle which consume the coarse products of the farm, as well as purchased grain, at a fair profit, and leave a large quantity of manure. The number of cattle in the state at last report was 643,452."<sup>1</sup>

The number of milch cows in Michigan, January 1, 1920, was 873,000, at an average price a head of \$96, with a farm value of \$83,808,000. To this are to be added 773,000 head of other cattle, having an average price a head of \$42.80, and a farm value of \$33,084,000.<sup>2</sup> The Bureau of Crop Estimates in its report on live-stock for 1920 notes a 2 per cent decline in the number of milch cows during that year, which is equivalent to 17,000 head. The decline in numbers and of price, put at \$26 a head, is attributed to the lessening in demand for dairy products. The decline in the numbers of cattle other than milch cows was found to be 6 per cent, while a loss of 34 per cent in price was announced.

Of the total number of cattle in Michigan, the Bureau of Crop Estimates (May 1920) reported that Aberdeen-Angus amounted to 1.7 per cent; Ayrshire, .5; Brown Swiss, .6; Devon, .1; Dutch Belted, .1; Galloway, .7; Guernsey, 6.1; Hereford, 4.1;

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1892, 357.

<sup>2</sup>"Yearbook," U. S. Dept. Agr., 1919, 659.

Holstein, 40; Jersey, 11.1; Polled Durham, 1.4; Red Polled, 1.7; Shorthorn (Durham), 23.9; others, 1.8; nondescript, 6.2. This illustrates the very evident preference of Michigan farmers for the Holsteins.<sup>1</sup>

#### POULTRY

The Census of 1910 reported that Michigan had 9,967,039 fowls of all kinds. Their value amounted to \$5,610,958. The number of chickens and Guinea fowls was 9,724,713, and of turkeys, ducks and geese, 202,778.

#### BEEES AND HONEY

The United States Census indicates the production of honey on farms in Michigan in 1909 to have been 2,507,810 pounds. As these statistics are understood not to have been obtained from beekeepers within cities and villages, where also considerable quantities of honey are produced, they must be regarded as inadequate. The same source of information reports a production of 28,524 pounds of wax in 1909. The value of both honey and wax was placed at \$296,742. The latest available information regarding honey production in Michigan is from the State Apiary Inspector, who estimated (February 1921) that the output of extracted honey is 8,000,000 pounds; of comb honey 2,000,000 pounds;

<sup>1</sup> "Mich. Crop Rept.," Lansing, May, 1920, 6.



and of bees' wax 500,000 pounds. The beekeeping industry is well distributed throughout the southern peninsula but chiefly in the "Thumb" section and has made a good beginning in the northern region, where conditions have been found very favorable, owing to the large amount of wild vegetation which yields subsistence for the little workers.<sup>1</sup>

The beekeepers of Michigan are organized in a State association which is interested in their social and educational affairs. There are thirty-five county societies, while the marketing of their product is in charge of the Michigan Honey Producers Exchange. The home market is excellent but is said to be inadequately supplied. In the view of the State Apiary Inspector (1921), beekeeping is now passing into the hands of specialists, the general farmer having relinquished the business very largely. There are reported to be from 8,000 to 10,000 beekeepers in the State. (An estimate of the Michigan State Farm Bureau puts the number of beekeepers in Michigan at 15,000, possessing 150,000 colonies of bees.)

Michigan possesses several kinds of native and cultivated plants well suited to the bee industry, including the clovers, white and yellow, alsike, and the white sweet clover; while in the northern counties, the raspberry, milkweed and firewood are the chief

<sup>1</sup> See *Michigan Farmer*, Aug. 13, 1921, pages 9-137. Cf. Chap. IX. Among the plants suitable to bees in the northern cut-over area, the State Apiary Inspector notes alsike and white clover, wild red raspberry, blackberry, fire-weed, basswood, boneset and aster.

sources of honey. There are also goldenrod, Spanish needle, asters and boneset; also buckwheat and basswood, producing honey of a definite and much prized flavor, and the dandelion and fruit blossoms.<sup>1</sup>

<sup>1</sup> *Michigan Farmer*, Mar. 12, 1921, 3.

## CHAPTER VII

### TRANSPORTATION AND MARKETING

IN the annals of the pioneers of Michigan, an ever-recurring note is the remoteness of the settler's market, the difficulty of getting there and the reaction of this situation on prices and production. Obviously, roads when they existed were bad, exceptionally so in a country of swamps, bogs and marshes. The rivers were useful, but, although early territorial and state statutes dignified most of them by the designation "navigable," it made considerable difference what vessels sought to navigate them and how far one ventured up their tortuous channels. Daniel Ball endeavored to transport flour regularly from Owosso to the mouth of the Saginaw by water, but was not long in relinquishing the attempt. The Grand, Saginaw, Huron, St. Joseph and Kalamazoo served well the first inhabitants of the State, when roads were fathomless in mud and the rail head was at Pontiac, Ann Arbor and Hillsdale. The Upper Peninsula streams were little used save for logging operations, since most of them were short and rapid, particularly on the Lake Superior side of the divide. In south Michigan, before the middle of the last century, the patient slow-moving oxen commonly

took wheat and corn to the mill and returned with flour and meal and sundry articles of family use from the country store or even from Detroit or Grand Rapids.

“When winter came and the sleighing was good,” relates Edward W. Barber, a pioneer of Vermontville, Eaton County, “father yoked the oxen, hitched them to a rough sled, drove to Marshall, twenty-eight miles distant, purchased a load of wheat at forty-four cents a bushel, had it ground and was home again in four days.” This illustrates the market facilities of pioneer Michigan. “It was some years before a mail reached us once a week unless the river was high,” says R. C. Kedzie of his Lenawee home of the second quarter of the last century. “We were twenty-five miles from a mill, store, post-office, doctor, minister and civilization in general and particular. Our roads were merely trails through the woods marked by blazed trees, and our only bridge over the river was a canoe.” In going to mill, “the bags of wheat were carried over the river in the canoe, the horses were unharnessed and made to swim the stream, the harness piece by piece was ferried over, then all parts put together again, the grain loaded up and the driver could then go to Monroe to get his grist ground.”<sup>1</sup> When Captain Scott of Clinton County went to Ann Arbor for seed-wheat in 1834, he traveled with an ox team. “Not having bags to put the wheat in, it was put loose in the wagon-box. On the way home, the wagon got mired cross-

<sup>1</sup>“Mich. Pioneer & Hist. Soc. Collections,” XXIX, 529.

ing the swamp, and we had to spread down our blankets and carry the wheat in pails and put it on the blankets, and when we got the wagon out, load up again." <sup>1</sup> The father of L. D. Watkins of Manchester, that same year, required six days to transport his family and effects the fifty-nine miles to "Fairview Farm." <sup>2</sup>

For the convenience of the first travelers, woodsmen and farmers, a remarkable network of paths interlaced through the forests and prairies, wrought by the feet of the deer, the Indians and their ponies. Some of these well-marked routes bore special designations, as the Canada trail down the Huron Valley to the Ontario shore of the Detroit River, the "Neshingwak" between Detroit and Saginaw, while other foot-ways ran to the Grand River Valley, between the Grand River and the Kalamazoo, even to far away Mackinac, joining lake with lake, stream with stream, camp-site with camp-site. The pioneer soon learned their utility, and, if he paused to note the beauty of the physical environment through which they passed on the line of least resistance, he also was glad that he could so readily advance through a wilderness that, without these primitive thoroughfares, would have greatly restricted his movements and have retarded the penetration by the whites of the inner reaches of the country.

However, the old trails were narrow and unsuited for wagons and sleighs. The settler must almost at

<sup>1</sup> *Ibid.*, XVII, 412.

<sup>2</sup> *Ibid.*, XXII, 262.

once become a builder of roads. The national government led the way in this work, for reasons of its own, primarily of a military character, and constructed roads from Detroit to Chicago (early in the second quarter of the last century), from Detroit to Fort Gratiot at the mouth of Lake Huron, to Saginaw Bay and into the Grand River Valley. These national thoroughfares have left a considerable impression on the pioneer literature of the State. "When the four-or-six-horse stage-coaches" entered Saline on the Chicago Road, "with a grand flourish of whip and tin horn blowing and prancing horses, nearly every person in town would be at the tavern—all business at a standstill—to see, as a great event, with almost as much of a curiosity as a menagerie, who had come or who were going and the horses changed."<sup>1</sup>

Perhaps the deepest impression of all was implanted by the horrible roads that joined Detroit with its hinterland, through a welter of mud and marshes, until a plank-way relieved the unhappy situation in which travelers had formerly commonly found themselves in traversing this section of the State. Occasionally the stage departed from the established route altogether and sought a more passable way over the forest floor among giant trees whose enormous tops had spaced the trunks at ample distances from each other. "The roads were almost always poor and often terrible," writes W. J. Beal. "People frequently went on foot from place to place or rode in lumber

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXV, 394.

wagons, sometimes over a road of poles on stringers a quarter of a mile long without dirt or gravel on top. This was corduroy road, long to be remembered by anyone who has ever ridden over such a thing in a wagon without springs.”<sup>1</sup>

These difficult conditions in respect to transportation reacted adversely on market conditions and the price of the products of the pioneer farms. In early Eaton County, meat sold at four cents a pound and eggs at three cents a dozen. An Ottawa County reminiscencer quotes the local price of wheat as fifty to sixty cents a bushel, of pork as \$2.50 to \$3 a hundredweight, and of flour as \$2.50 to \$3 a barrel. In his home town the price of horses was \$30, of cows, \$8, of oxen, \$30. This reacted on land values, which here ran at \$4 an acre in addition to the government price of \$1.25. The assessed valuation of four townships in this county is stated to have been \$19,081.<sup>2</sup> At Vermontville, potatoes are said to have sold for a shilling a bushel in 1839. Since whatever was produced before the advent of the railroad must be consumed in the locality, there was likely to be a surplus that must be disposed of at prices which now seem absurdly low. It was otherwise in the northern peninsula where much of the population was engaged in mining and lumbering, and required large importations of food-stuffs and manufactured articles to satisfy the local requirements. Beef came hither on the hoof on shipboard,

<sup>1</sup> *Ibid.*, XXXII, 246.

<sup>2</sup> “Mich. Pioneer & Hist. Soc. Collections,” IX, 264.

and hay was transported from Detroit to the copper country in the period following the Civil War.

To ameliorate transportation conditions was the great desire of the settlers. The territorial council chartered companies for the purpose of improving the navigation of certain rivers by removing obstruction and straightening the water-courses. Other companies undertook the construction of plank-roads, or turnpikes. The territorial and state governments established highways between such important points as Pontiac, Ann Arbor and Adrian; Monroe and Ypsilanti; Mount Clemens, Saginaw and Sault Ste. Marie; Niles, Kalamazoo and Saginaw, Marshall and Grand Rapids, Coldwater and Berrien. Blois' Gazetteer of Michigan for 1838 describes forty-two mail routes in the State, indicating that there was weekly mail service between Detroit and Lapeer, Detroit and Utica, Detroit and Howell, Maumee and Jonesville, Ypsilanti and Plymouth, Saline and Grass Lake, Jonesville and Marshall, Coldwater and St. Joseph, Ann Arbor and Pontiac, Ann Arbor and Ionia, Marshall and Coldwater, Marshall and Centerville, Pontiac and Ionia, Mount Clemens and Lapeer, Adrian and Jonesville, Adrian and Defiance, Ohio; Michigan City, Indiana and Grand Haven; Battle Creek and Eaton, Kalamazoo and Saugatuck, Ionia and Saginaw. Thrice in the week, it appears, the mail passed between Toledo and Adrian.<sup>1</sup> Mitchell's Tourist Map of 1835 describes three principal

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 594.



stage routes in Michigan. Of these one ran from Detroit through Ypsilanti, Saline, Tecumseh, Jonesville, Coldwater, Niles, La Porte and Michigan City to Chicago. The schedule called for a stage over this route three times each week. A second stage line joined Detroit with Monroe, Toledo and Lower Sandusky, also with a thrice-a-week stage. Twice in the week the stage ran from Monroe through Adrian to Tecumseh. The same map indicates steamboat lines on the adjoining Great Lakes between Buffalo, Detroit, Fort Gratiot, and Chicago. The steamers touched at the coast villages, and ascended or connected with steamers that ascended the larger rivers, such as the Grand and the St. Joseph. Blois gives the registered tonnage for vessels on Lake Erie in 1836 at 24,045, represented by 45 steamboats of an aggregate tonnage of 9,016, and 211 other craft. The steamer *Illinois* of 755 tons, built in 1838 at Detroit, is credited with the maximum capacity for her day.<sup>1</sup>

It thus appears that, at about the time Michigan gained statehood, immigrants and merchandise could pass between Michigan and the Atlantic seaboard by a route which involved on the westward journey a short steamer run up the Hudson to Albany, a canal passage of three or four days between Albany and Buffalo, a ride of forty hours by steamer from Buffalo to Detroit, and thence a stage or wagon journey into the interior.

If the facilities for reaching the inner portions

<sup>1</sup> *Ibid.*, 595.

of the State were arduous and inadequate, the railroad quickly suggested a remedy for the delays and losses which the frontiersmen suffered because of these conditions. The first charter granted to a railroad in Michigan was that of the Detroit and Pontiac Railroad under date of July 31, 1830. Up to 1837 nineteen other railroad companies were chartered with an aggregate capital of \$10,000,000. If charters could have built railroads, a contemporary suggestion that the horse would soon become a superfluous animal might readily have become a reality. The actual work of railroad-building did not follow immediately on the grant of charters.

Article XII, section 3, of the Michigan Constitution of 1835, under which the first State government was organized, declared that "Internal improvement shall be encouraged by the government of this state; and it shall be the duty of the legislature, as soon as may be, to make provision by law for ascertaining the proper objects of improvement in relation to roads, canals and navigable waters."<sup>1</sup> This section was the constitutional expression of an ardent popular desire. Governor Mason in his message of January 2, 1837, definitely brought the subject to the fore. He declared that Michigan was "amply competent to construct her own internal improvements." He would have the State undertake the construction of a trans-state canal between the lakes to the east and west of the southern portion of Michigan; and he suggested that the headwaters of several streams

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 597.



Plate V. Digging potatoes in the Upper Peninsula.



having their rise near the center-line of the State might readily be given canal connections and hence establish additional trans-state waterways. Indeed, the sanguine temperament and exuberant imagination of the youthful governor, reflecting well the temper of his fellow citizens, hardly placed bounds to any conception of internal development that might be brought forward at the moment. The legislature acted promptly. "The subject of internal improvement," declared its committee which took the matter under advisement, "is one which is occupying the intelligence of the age." Internal improvement was "the great lever which is opening the sealed-up fountains of national wealth and civilization." Michigan seated "by nature in the very lap of wealth and power" should not be laggard in seizing her opportunity. She was not laggard. Under the direction of a State Commission of Internal Improvement, the construction of three railroads was undertaken: the Northern, joining the St. Clair and Grand River; the Central, joining Detroit with the mouth of the St. Joseph River; and the Southern, connecting Lake Erie with southern Lake Michigan. Private enterprise had already established a railroad between Maumee Bay and Adrian, which served the needs of passengers and freight in that direction, and had instituted construction on the central line west from Detroit. The Commission on Internal Improvement eagerly pressed its own projects until financial difficulties forced the cessation of work and finally the sale of the publicly owned railroads that it

had extended to Kalamazoo and to Hillsdale but could not continue beyond these points. The sale to private corporations was effected in 1846, and six years later, private enterprise had extended the central and southern lines to Chicago, thus for the first time given an eastern rail connection with Lake Erie and the east. The Michigan Southern Railroad consolidated with the old Erie and Kalamazoo—the first railroad opened in Michigan,—and with the line joining Detroit and Toledo, the beginnings of Michigan's present railway system were definitely secured. Within three years after the Michigan Central and the Michigan Southern railroads reached Chicago in 1852, they were linked up with the New York Central and the Erie railroads of New York State by lines to the northward and the southward of Lake Erie, thus giving southern Michigan an eastern market and rail connection with the eastern seaboard.

The establishment of all-rail transportation between Chicago and the ocean, by its saving of time and money, stimulated immigration into the Northwest. This and reduced freight charges increased the aggregate of production, then chiefly agricultural, in this region. Ringwalt, quoting Henry C. Carey, ascertains the cost of traveling from New York to Chicago in 1838 to have been \$74.50. The Committee on Internal Improvement of the Michigan Legislature stated (1837) that the rate for passengers by stage in Michigan was six to eight cents a mile, and for merchandise between Detroit and Marshall

\$2 a hundredweight. In 1854 the cost of carrying freight by wagon was estimated to be fifteen cents a ton-mile.<sup>1</sup> It was the steam railway that wrought a fundamental change in the situation of Michigan agriculture as related to transportation and markets.

Clearly an inhabitant of Jackson County, for example, could not have prospered unless he could dispose of his surplus wheat and live-stock beyond the bounds of his own neighborhood. Detroit was his best market, as it had at least water transportation to the seaboard. However, to get to Detroit with a load of grain or live-stock was costly, until, in the forties, steam wrought a fundamental change. Ringwalt, quoting Williams' "Traveller's and Tourist's Guide," gives the passenger fare from Boston to Chicago in 1851 as \$23. The fare from Boston to Detroit was \$16. From New York to Chicago, according to Carey, the fare was \$17. A railway convention held in Cleveland agreed on passenger fares between New York and certain western cities for the year 1855. In this agreement were included the New York Central, the New York and Erie, the Pennsylvania, and the Baltimore and Ohio railroads. By this agreement, fares like the following were established: Between New York and Sandusky, \$14.65; New York and Cleveland, \$13; New York and Detroit, \$15; New York and Chicago, \$22; New York and Toledo, \$16.<sup>2</sup>

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 603.

<sup>2</sup>*Ibid.*, 604; quoting "The Michigan Commercial Register and Citizen's Almanac for 1855," 41.

Doggett's "Railroad Guide," as quoted by Ringwalt, gives the freight rates in Michigan for 1848 at \$0.0844 a ton-mile for first-class freight. For second-class freight the rate was \$0.0650. The Michigan Central Railroad in 1848 charged \$6.04 to carry a ton of wheat from Detroit to Kalamazoo. For a ton of merchandise, the charge was \$11.64. The price for ten barrels of flour was \$6. In 1850, this same railroad charged \$4.40 to transport a person the same distance of 146 miles. Doggett's "Railroad Guide" for 1848, according to Ringwalt, reports the average passenger fare for the 241 miles of Michigan railways at 3 cents a mile. These are significant facts in relation to the settlement and development of the Northwest.

Time is also an important factor. Quoting Williams' "Traveller's and Tourist's Guide," Ringwalt gives the time required for a journey from Boston to Detroit in 1851 as forty-three hours, and from Boston to Chicago as fifty-four hours. The Michigan Central and the Michigan Southern railroads had then not been completed, nor were their eastern connections established. After their completion, Roberts, in his "Sketches of the City of Detroit" (1855), writes that the establishment of the direct line to St. Louis, Missouri, via the Michigan Central and the Joliet and Northern Indiana railroads, made it possible to set down passengers in St. Louis forty-eight hours out from New York.<sup>1</sup>

Statistics of the commerce of Detroit in 1854 con-

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," XXXVIII, 605.



tained in "Sketches of the City of Detroit." make the shipments from that city by way of the Great Lakes and the Canada Great Western Railway (now the Grand Trunk), to include 337,000 barrels of flour, 897,000 bushels of wheat, 587,000 bushels of corn, 228,000 bushels of oats, 2,000,000 pounds of wool and a very large quantity of other commodities.<sup>1</sup> In 1854, the Michigan Central Railroad is reported to have carried through Detroit 451,689 passengers. The influence of this railroad on the development of the interior of southern Michigan is legitimately inferred. The author of the "Sketches" tells us that the population of that section of the State tributary to the Michigan Central was, in 1855, 216,852; that the number of acres of improved land was 844,309; and the products of this district in 1854 included 3,137,875 bushels of wheat, 3,450,946 bushels of corn; 943,330 bushels of other grains; 1,078,244 bushels of potatoes; 86,760,889 feet of lumber. There are said then to have been 298 sawmills and 93 flour-mills in this section.

The State and the railroads grew together. Between 1840 and 1845 Michigan increased by 90,000 in population; 95,000 were added in the next five years, 110,000 in the next five years, and nearly a quarter of a million between 1855 and 1860.

The present railway system of Michigan had its inception in these two great trunk lines begun under public auspices and completed by private enterprise. The decade following their completion in 1852 saw

<sup>1</sup> *Ibid.*, 606.

the establishment of another trans-state route, the old Detroit, Grand Haven and Milwaukee Railroad, which reached Grand Rapids in 1857 and Grand Haven on Lake Michigan in the following year. The main line of the Grand Trunk was formed out of several elements, the easternmost of which date from the eighth decade of the last century, at the close of which this line reached Chicago. The first constituent line of the Pere Marquette was opened from Saginaw to Flint in 1863, and the system, which now has its ramifications throughout a large portion of the southern peninsula, was gradually built up out of some fifty different entities, through numerous reorganizations and financial performances that left the company with a dubious record.<sup>1</sup> These units with their connections and feeders are the main elements in the railway system of the Lower Peninsula. The development of mining and lumbering in the Upper Peninsula led to railway extensions in that direction, consummated in the ninth decade of the last century, with the construction of the Michigan Central to the Straits of Mackinac (1881), and the Grand Rapids and Indiana (now a part of the Pennsylvania system) a year later where a connection was established with the Detroit, Mackinac and Marquette line (now a part of the Duluth, South Shore and Atlantic Railroad). The Ann Arbor Railroad reached out towards northern Michigan by a route deflected somewhat more toward the north-

<sup>1</sup>Ivey: "The Pere Marquette Railroad Company," Lansing, 1919.

west, joining Toledo, Ohio, with Frankfort on the Lake Michigan shore in 1889. All these railroads which had their terminus on the Lake Michigan shore have established car ferries, thus opening up through routes with railways in the Upper Peninsula of Michigan, Wisconsin and Illinois.

In the Upper Peninsula railroad construction had its inception in the short line connecting the lake port of Marquette with the iron mines about Negaunee and Ishpeming, which was opened in 1857. Out of this as a nucleus has developed the present Duluth, South Shore and Atlantic system, which represents a series of consolidations such as are characteristic of the larger Michigan railway companies. One element in this "South Shore" system reached L'Anse on Keweenaw Bay in 1872, while another was projected easterly to the Straits in 1881. Eleven years later the gap between L'Anse and the copper country on the Keweenaw Peninsula was filled in, connecting with the local lines there already established. Then the line extended easterly to Sault Ste. Marie, and westwardly to Duluth. Meanwhile, one element in the line of the Chicago and Northwestern had joined the Marquette iron range with water transportation by way of Lake Michigan, when Negaunee and Escanaba were connected in 1864; and a direct route to Chicago was established when the gap between Escanaba and Green Bay, Wisconsin, was filled in in 1872. Later the Northwestern Line reached out to the towns of the Menominee and Gogebie iron ranges in the southwestern portion of

the Upper Peninsula, while the Chicago, Milwaukee and St. Paul entered the same territory and reached into the copper country through its connection with the Copper Range Railroad and the South Shore. The "Soo Line" Railroad was constructed east and west through the southern portion of the Upper Peninsula, and eventually this line and the "South Shore" fell under the control of the Canadian Pacific. These railways, with their branches, and numerous short independent lines built by lumbering and mining companies for their own local requirements, provide the railway system of the northern peninsula of Michigan.

By 1850 Michigan had 350 miles of railroad, which, according to Romanzo Adams, was five times the mileage of Ohio. Steadily year by year, the remoter portions of the State were brought into relation with this railway network, until in 1918 the total railway mileage was 9,035, of which 6,762 miles were in the Lower and 2,273 in the Upper Peninsula.<sup>1</sup>

In 1886 came the electric street railway, first introduced into Michigan, it is claimed, on the streets of Port Huron in that year. Four years later the era of the inter-urban railway was inaugurated with the establishment of the line from Ypsilanti to Ann Arbor. At first the motive power was the "Porter enclosed steam motor," changed to electric traction in 1896.<sup>2</sup> This new service, according to Junius E.

<sup>1</sup>"Rept. Mich. Railroad Commission." 1918. 78.

<sup>2</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXV, 261.

Beal, was much appreciated by the farmers, as well as by town-dwellers along the line, and the rate afforded them of seventeen rides for one dollar brought patronage that was a surprise to the promoters of this pioneer enterprise. This line was extended to Detroit on the east and to Jackson on the west and in a few years much of the southern territory of Michigan was made accessible to electric inter-urban railways. The northern part of the State in both peninsulas, where population is less dense, is not so fully provided with electric railways, but short lines were constructed in the Upper Peninsula nearly as early as in the Lower, and while there are no long trunk-lines in this region, the mining ranges are supplied. The total trackage in 1918 was 1,747 miles for the State. To forestall possible electric competition, the Ann Arbor railroad installed motor-cars on its steam line in May, 1911. Several individual combination passenger and baggage cars, each having its own motive equipment, using at first gasoline and then kerosene as fuel, were put into operation, and since they make stops at cross-roads as well as municipalities, gave a service much appreciated by the rural population along the line. Rising costs have of late discouraged the company and there has been talk of its discontinuance.

The Constitution of Michigan permits municipalities to furnish electric power to consumers without their boundaries to an amount not exceeding 25 per cent of that granted within the municipal limits.

To what extent farmers have availed themselves of the opportunity afforded to obtain electric power for farm use is not apparent, although there are instances of their having done so, for example, at Marquette and Iron River. The Consumers Power Company, the largest private electric power corporation in the State, serving a wide territory in the southern peninsula, reports considerable rural service where power lines have been extended from cities and villages into the rural districts adjoining them. Rural consumers are also served from certain transmission lines where the voltage does not exceed 10,000 volts. This company also has consumers at many resorts in the Lower Peninsula. For rural extension the regular city rate is charged by this company, except for resort business, where there is a minimum charge of \$12 a year, which is deposited before the current is turned on and which permits consumers to receive current at the regular city rate. Both for public and private lines, the problem of rural service is of high overhead cost in relation to the amount of power furnished. It seems necessary to arrange with consumers for the construction of the transmission lines into their territory, with a surcharge to cover depreciation and taxes on the extension.

If Michigan were an "Old World" country, her products would be going forward to market by water, quite as much as by rail; but, while the State possesses a magnificent system of water communications adjacent to her borders, little effort has been made to develop internal avenues of transportation

by water. When the State was in its infancy, bright dreams were entertained of such an inland canal system linking up her river systems and affording a ready means of trans-state shipments by water. An abortive effort was made to join the Saginaw and Grand River basins in this way, the evidences of which are still said to be traceable in the vicinity of Bad River, Saginaw County; and a much more ambitious plan of canalization was undertaken, intended to unite Lake St. Clair with the mouth of the Kalamazoo River. At the same time companies were established for the purpose of improving river navigation, and the State made similar efforts on public account. From time to time, agitation has been instituted to interest the people of the State in this or that internal waterway project, and the subject occasionally is brought forward even now. The physical conditions are most favorable on the Saginaw-Grand River route, and in former times advantage was sometimes taken of the spring freshets which submerged the low country of the region and thus made possible the movement of logs between the two water-courses. Farmers along the shores of the Great Lakes and on the larger islands still send forward a portion of their produce to market by boat, as in the case of Manitou and Beaver Islands of Lake Michigan, and the settlements on the "Garden" Peninsula and on Huron Bay in the Upper Peninsula, adjacent to Lake Michigan and Lake Superior respectively.

The opening of the Erie Canal in 1825 afforded

Michigan a direct and relatively cheap means of transportation to the seaboard. The traffic carried on the Erie Canal in 1837 amounted to 667,151 tons. By 1845 it reached 1,038,700 tons. It reached 2,159,334 tons in 1852, and continued above this mark for several years, and exceeded 3,000,000 tons in most years of the last three decades of the century. Then a decline set in, until an upward turn manifested itself as late as 1920.<sup>1</sup> Meanwhile the St. Mary's Ship Canal had been opened in 1855, and this waterway became of vital importance to the economic progress of the northern peninsula. Wisecres had opined that its traffic would never warrant the cost of its construction, but it manifested its usefulness from the outset and, by a steadily increasing tonnage, developed a traffic which, in 1916, aggregated almost 92,000,000 short tons. As late as 1920, its tonnage of freight amounted to 79,282,496. A better conception of the significance of these figures can be obtained when it is noted that the 1920 traffic of the Panama Canal was 9,374,499 tons. In 1919 the Suez Canal passed 16,013,802 tons of freight. This indicates that the Michigan waterway exceeds threefold the combined commerce of the two world-renowned waterways.

This enormous water-borne commerce of the Great Lakes is promoted by exceptional docking facilities for bulk commodities, such as ore and grain, a type of vessel specially designed for their economical

<sup>1</sup>"Rept. of Superintendent of Public Works, New York," Albany, 1919, 462.



handling, and by remarkably low freight rates. In 1920, the rate on iron ore from the head of Lake Superior to points on Lake Erie was \$1.10 a ton, and on copper \$.35 a hundredweight; while the rates on grain from Lake Superior and Lake Michigan points to the eastern lake terminals prevailed between three and four cents, with occasional descents below, and ascents above these points according to fluctuations in the demand for cargo space.<sup>1</sup>

Not only has the extension of the facilities of the United States post-office to the rural portions of the State greatly alleviated the isolation and monotony of rural life, but it has also materially affected rural market conditions. On December 21, 1920, the post-office department reported 1,800 rural mail routes in operation in Michigan. Their mileage was 49,545. There were also 147 star routes, aggregating 1,565 miles in length. During the fiscal year of 1920, the rural mail routes in Michigan carried approximately 5,121,780 pieces of parcel mail, weighing an approximate aggregate of 18,765,876 pounds. It is manifest that the service put at the disposition of the farming population by the post-office has been availed of to a very considerable extent. There was a time when outlying communities received their letters and papers by a weekly carrier on foot, sledge or horseback, a service in which the Indian had frequently an important part, as he made the long difficult journey from Detroit to the Straits of

<sup>1</sup>"Annual Rept. of the Lake Carriers' Assoc., 1920," Detroit, 1920, 214, 217.

Mackinac, or reached the mining settlements on the Lake Superior shore from some point in Wisconsin, in the season when the lakes were closed to shipping. Then it was that postal rates ran at twenty-five cents a letter and the receiver paid, if his available supply of cash met the postal requirements.

The telephone system of Michigan, which has greatly quickened communication throughout the two peninsulas and between country and town, in 1917 possessed 1,072,651 miles of wire, and utilized 43,128 instruments, which gives a ratio of one telephone to 140 persons. In the ratio of telephones to population, Michigan was less well served than her neighbors, Ohio, 1 to 162, Indiana 1 to 162, and Illinois 1 to 172. In 1917, 603,254,645 messages and talks occurred over the lines of the Bell system, while 296,575,452 messages and talks took place on the "independent" lines of the State, the total thus amounting to 899,830,097 telephone communications. This very strikingly indicates the place telephone transmission has acquired in modern life. How much of this service belongs to the strictly rural districts can scarcely be determined, but the census returns for 1920 indicate that 97,874 farms in Michigan reported telephones and that these represented 49.8 per cent of all farms in the State. The census report for 1917 indicates that the systems and lines having an annual income of less than \$5,000, which were 1,298 in number, employed 46,941 miles of wire and 53,928 telephones, and that the number of messages and talks over these lines was 57,840,250. The total

investment in these lesser lines was then \$1,511,373, and their gross receipts, exclusive of the assessment of mutual companies, was \$277,744.<sup>1</sup> The major portion of these smaller companies was doubtless assignable to the rural districts. The rural population has greatly appreciated the many advantages accruing to them from telephone service, so much so that occasionally they have independently promoted their own neighborhood systems without reference to the larger systems under corporate control. A farmer living on such a rural neighborhood telephone line near Flint, explained its construction by the less cost and less delay in its installation. In this instance the farmers bought the poles, wire and equipment and furnished the labor themselves. The cost is given for each of them as \$15 cash in addition to labor. The line connected with the Bell system at Flint, the annual cost for the connection a party being \$8.00 a year, later raised to \$12.00.

The general market situation may be regarded as favorable. Both peninsulas are in easy reach of the great Chicago stock and grain market, while other live-stock markets exist in Detroit, Toledo, Cleveland, Buffalo, Indianapolis, Cincinnati, Pittsburgh and lesser places, all very accessible by rail or water to the producers of Michigan. The home market is extensive, for the State has lumbering, manufacturing, mining and marine industries that call largely for food supplies. More than half the population of the State are city dwellers and hence consumers of

<sup>1</sup> U. S. Census of Electrical Industries, 1917,—Telephones.

farm products. In 1909, according to the Report of the State Board of Agriculture for 1914, the manufacturing industry of Michigan employed 271,071 persons, who received in salaries and wages \$153,838,000. Similarly, the lumber industry then had 35,627 wage earners, and the mining industry 42,133 employees. On June 30, 1912, the officers and employees of the steam railroads numbered 45,252, receiving salaries and wages of \$32,635,516. In 1913, according to this report, the electric railroads employed 9,195 persons who received \$6,510,297.<sup>1</sup>

City dwellers are consumers of farm products, and the census of 1920 showed that Michigan contained fourteen cities with a population ranging from 10,000 to 25,000, and fourteen cities whose population exceeded 25,000. The greatest urban market was that of Detroit, whose population had increased 113.3 per cent in the decade and numbered 993,678. Next in rank was Grand Rapids with 137,634, and Flint with 91,599.

Several Michigan cities have established municipal markets which enable farmers to dispose of their products directly to urban consumers. Such a market is maintained by the city of Flint, which was established November 6, 1920. Since the first of the year 1921, the Market Master reports, all available space has been utilized by farmers, demonstrating their interest in this facility for disposing of their products. There are accommodations for 125 wagons. During the winter the market was opened

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1914, 475.

on Wednesdays and Saturdays, but with the coming of spring a daily service was instituted. Sales are restricted to actual producers, except in the case of products not locally grown. Thus some baked goods have been sold by non-producers. Producers are free to establish prices without restriction. Sales to middlemen, although favored, had not taken place to any extent up to May, 1921. The effect of the city market was manifested, it is reported, in the reduced prices charged by retail stores on market days. Meat sales ranged from three and four tons to eight and ten tons each market day from November 1 to April 1, when they terminated because of the approach of warm weather. The Market Master reports that farmers realized on their sales from 100 to 200 per cent in advance of returns under other conditions. Thus one farmer, after disposing of 100 hogs in the municipal market, estimated his "benefit" at \$1,000. Another farmer reported returns on the sale of seventeen hogs at \$135 above current shippers' quotations. Beef, selling at \$96 on the market, was worth only \$35 to local butchers, it was stated. Favorable market prices attracted large numbers of buyers daily. Regulations enforced at the Flint municipal market relate to sanitation and inspection of weights and measures, as well as to quality and wholesomeness of products. Identification of the vendors with addresses is required. Vendors make formal applications for stall space at the market, paying a rental charge for the accommodation. A daily market report is issued. That for April 30, 1921, relates how

“the first offering of asparagus appeared today and sold quickly. Supplies of eggs, green onions, rhubarb and potatoes were heaviest, with butter, apples, and poultry coming next. Demand was heaviest for eggs, asparagus, rhubarb and poultry. Potatoes were not wanted, and other vegetables were almost entirely lacking. Apples of very ordinary quality sold well, the supply being light. One farmer was selling tomato and lettuce plants for transplanting, also home-grown radish-seed and grass-seed. Dahlia bulbs were also offered. . . . Butter was slightly weaker, most sales made at 50.” Then follow price quotations for commodities sold on the market. This market reporter is posted in the market and is mailed to some fifty local producers.<sup>1</sup>

The Detroit Board of Commerce adverts to the opinion of transportation experts that Detroit ranks ninth among the transportation centers of the United States, although ranking fourth in population and third as an industrial center; and it believes that this situation demonstrates “the desperate need of the Michigan metropolis for better means of ingress and egress, for materials and passengers.”<sup>2</sup> The Board puts the number of industries in Detroit’s industrial district at 3,600, of which 1,411 have private railway sidings, having a combined capacity of 17,184 cars. The city is served by fifteen railroads,

<sup>1</sup> For a description of the farmers’ market in Ann Arbor, see *The Michigan Farmer*, Aug. 27, 1921, p. 3-175; Burd: “The Value of a Farmers’ Curb Market.”

<sup>2</sup> *Detroit and World Trade*, Detroit, 1920, 35.

of which ten are classified as major systems, including the Michigan Central, New York Central, Pere Marquette, Wabash, Grand Trunk, Detroit, Toledo and Ironton, the Detroit and Toledo Shore Line, Pennsylvania, Canadian Pacific, and the Detroit United Railway. The line last named is an electric system with wide ramifications. The Canadian Pacific has only passenger service into the city, while the Detroit and Toledo Shore Line provides only freight service. There are five terminal railways to assist the local distribution of freight. The railroads which enter the city have twenty-eight freight-houses and sixty-two sets of team tracks, with a combined capacity of 2,989 cars. These are the terminal and shipping facilities available to shippers not possessed of private trackage.<sup>1</sup>

Four lines of lake steamers make Detroit their home port or port of call. These lines are designated the Great Lakes Transit Company, the Detroit and Cleveland Navigation Company, the White Star Line, and the Ashley and Dustin Line. These lines operated thirty-seven vessels in 1920, whose total freight capacity was 122,500 tons.

The distribution of freight by motor truck, both inter-city and intra-city, is said to be dominated by the Detroit Transportation Association, of 400 to 500 members, operating 2,000 motor and 500 team trucks, whose aggregate capacity is 7,000 tons.<sup>2</sup> It is estimated that about half of the mileage of im-

<sup>1</sup> *Ibid.*, 37.

<sup>2</sup> *Ibid.*, 40.

proved highways in Michigan is comprised in those entering Detroit, and these roads connect the city with the other large population centers throughout the southern portion of the peninsula.

It is apparent that Detroit's transportation facilities, as here described, have great significance for Michigan agriculture. The Detroit Board of Commerce reports an aggregate freight tonnage entering the city by rail in 1918 at 32,706,774,169 pounds; by electric railways at 184,796,000; by steamships at 378,582,000; while the highway tonnage by trucks is estimated in 1918 at 87,640,000 pounds. It does not appear what proportion of this inbound tonnage is attributable to the products of Michigan farms.

#### MARKETING ASSOCIATIONS AND REGULATIONS

The development of Michigan's transportation as indicated in the foregoing pages suggests that this first condition of a market for farm products has been fairly adequately solved. Latterly the farmers' chief problem has been one of selling their output at a remunerative price, and to this end various agencies have been called into service. The statutes of the State forbid monopolistic arrangements for the purpose of enhancing prices. However, saving of consumption costs has been effected through coöperative purchasing, and better sale prices have been sought through sales associations, such as those established by grape-growers and potato-growers, and



through the agency of the newly created Michigan State Farm Bureau.

The Michigan legislature of 1915 authorized the State Board of Agriculture, which also has control of the Michigan Agricultural College, to appoint a State director of markets. It was the duty of this official to investigate the production and marketing of farm products, and he was given compulsory powers in the securing of the necessary evidence. The director was also to assist in the organization of coöperative and other associations for improving the relations among producers and consumers, and afford them such services under adequate rules and regulations as relate to standardizing, grading, packing, handling, storage and sale of products within the state of Michigan, not contrary to law, and enforce such rules and regulations by actions or proceedings in any court of competent jurisdiction. This official should also give information to Michigan producers regarding market conditions elsewhere in the Union, and he should provide auction markets for the disposal of farm products. Through bulletins he was to give information to producers and consumers in order to facilitate mutual business connections. It was expected, also, that he would investigate and report to the Public Utilities Commission delays and inadequate service in relation to the transportation of food supplies. Similarly, he was to keep the attorney-general informed regarding combinations to restrain trade and fix the prices of food-

stuffs. He might assist in the prevention of waste of perishable food-stuffs.

This act seems comprehensive enough to effect real reforms in the marketing of farm products. In reality it amounted to very little. The official appointed to the position had little faith in the efficacy of the measure, and confined his attention very largely to the formation of coöperative selling agencies among certain groups of farmers, deprecating any effort at assisting in direct marketing between producer and consumer, chiefly on the ground that 85 per cent of farm products, as he stated, was not susceptible of such market operations, since they involved manufacturing and other intermediate treatment. The act had not provided an appropriation for the maintenance of this department and eventually the position was allowed to become vacant and to remain so. Through a coöperative agreement between the extension department of the Michigan Agricultural College and the United States Bureau of Markets, some features of the work comprised in the act of 1915 were continued. In a small way the standardization and certification of farm products was undertaken, but more particularly the institution of selling organizations among farmers along the lines of such products as potatoes, grain, livestock and fruit was fostered after the establishment of the Michigan State Farm Bureau, in association with this organization.

The grapes in the southwestern counties of Michigan are marketed by small local associations on a

F.O.B. basis. There is a tendency towards their federation, thus eliminating competition among them. These local associations are usually stock companies which own their own offices and market the grapes of their members commonly on a basis of a daily pool of varieties. Most of them are said to handle other fruits as well and to buy baskets, twine, spray material, posts, hay and feed for their members. Few of the individual associations actually sell the grapes, according to the report by the United States Department of Agriculture, Bureau of Markets, but confine their activities to inspection and loading, keeping accurate accounts of the amounts of each variety delivered daily. The usual practice is to give each member 75 or 80 per cent of the estimated market value of each day's hauling and to pro-rate the surplus among the members when the books are balanced at the close of the season. The returns to stockholders depend, it is stated, on the particular arrangement entered into by each association.<sup>1</sup> Grape-juice factories in this region, in Van Buren County, buy on a standard contract that guarantees to the grower the daily market price on bulk stock with a fixed minimum. At Benton Harbor and St. Joseph an active street market has been developed, in which farmers dispose of their product from the wagon to the highest bidder. If the owner thinks that he can secure a higher price for his grapes by an express or freight shipment to

<sup>1</sup>U. S. Dept. Agr., Bull. 861: "Marketing Eastern Grapes," Washington, Sept. 13, 1920, 40.

an outside market, he refuses the bids and passes on to the railway station. This method of marketing Michigan grapes contrasts with the sales through the local associations, and it is questionable which yields the higher return to the producers, although in the opinion of the investigators already quoted, the returns to those using the associations seem, in the end, to be larger.

Michigan grapes are of excellent quality and are favored in the markets. Table stock is usually put up in four-quart baskets. Baskets are packed in the field directly from the vines. These grapes enter into competition with those from New York, and, since they are said to be packed with less attention to the appearances, sell slightly under the New York product, although quite equal to it in quality. The Concord is the principal market variety. The distribution of the Michigan crop is very extensive: east to Massachusetts and New Jersey, south to Florida and Texas, west to Idaho and Wyoming, and in 1918 shipments are said to have been made to thirty-one states and one hundred sixty-nine cities. The great Chicago market is close at hand with convenient water transportation from the southern Lake Michigan ports. Much of the output goes west and south.<sup>1</sup>

The Michigan Potato Growers Exchange, organized in the summer of 1918, was one of the most ambitious enterprises as yet undertaken in the State. It constituted a central selling and purchasing agency for a large number of local coöperative asso-

<sup>1</sup> *Ibid.*, 40.

ciations of farmers living in the northern counties, the potato belt of the Lower Peninsula, and was extended to the potato territory of the Upper Peninsula. Its name is somewhat misleading, for, although its main reason for existence is the sale of potatoes through a coöperative arrangement, it also handles other bulk farm products, such as hay, beans, grain, apples, and vegetables; and it purchases on account of its members supplies for the farm, including feeds, fuel, poison and implements, amounting in 1920 to nearly \$1,000,000. At the outset, twenty-eight local coöperative organizations were federated under a plan which involved the exclusive handling of certain farm products on a contractual basis of payment for the service rendered, guaranteed with a promissory note, so familiar a feature of present-day coöperative agreements of this character. Similarly, the individual member of each local pays his membership fee of ten dollars and signs a binding contract, likewise made more effective by giving his promissory note, in no case as yet forfeited, as an assurance of good faith and loyalty to the association. Notes and fees afford working capital, the unused surplus of which is returned to members at the end of the year. The by-laws contemplate various associated activities for the central association, such as the grading and standardization of product, collection of information in regard to outside market conditions, adjustment of traffic difficulties and settlement of transportation problems. At the end of the first nine months of its existence, the Michi-

gan Potato Growers Exchange had more than fifty local associations comprised within its organization, and this number had been doubled by the spring of 1920, while in January, 1921, the membership comprised 124 locals, twelve of which are in the Upper Peninsula. To June 30, 1919, the Exchange had handled 2,227 cars of potatoes and other farm produce and the first year's business amounted to approximately \$2,000,000. Sales had been made in more than half the states of the Union and foreign business was in contemplation. The business transacted in the second year amounted to approximately \$5,000,000, 2,158 cars of potatoes being handled, together with 168 cars of apples, 174 of cider apples, 31 of peaches, 12 of onions, 3 of carrots, 18 of wheat, 3 of buckwheat, 1 of corn, 102 of rye, 61 of beans, 2 of peas, 174 of hay, 16 of straw, 1 of posts, 2 of wood, 74 of cherries and 113 cars of cabbage, and also large quantities of fruit, vegetables and other products in less than carload lots. The Exchange operates on a commission basis, amounting to approximately 2.5 per cent, and its operating income comprised, at the end of the fiscal year 1920, \$119,484. Its operating expenses were \$95,716. The reserve thus arising from the operations of the Exchange was placed at the service of the purchasing department.<sup>1</sup>

In the early spring of 1921, a temporary agreement between the Michigan Potato Growers Exchange and the Michigan State Farm Bureau was effected.

<sup>1</sup> Mich. State Farm Bur., *News Service*, March 26, 1921.

By the terms of this agreement, "the highly specialized potato and other commodities marketing machinery of the Potato Growers Exchange" was "made available to the farm bureau locals and to coöperative associations of farm bureau members now affiliated with the elevator exchange, in return for hay and grain sales service from the farm bureau elevator exchange." The two exchanges reciprocally took out memberships and business operations were to be conducted in each exchange as in the case of other members.<sup>1</sup>

To promote favorable market conditions for Michigan fruit, a considerable number of local selling associations has been formed, including the Michigan Fruit Growers Exchange, the Fenville Fruit Exchange, South Haven Fruit Exchange, Benzie Fruit Exchange, Benton Center Fruit Association, Bangor Fruit Growers Exchange, Berrien County Fruit Association, Fremont Coöperative Produce Company, Hart Coöperative Company, Mason County Fruit and Produce Exchange, Milburg Fruit Growers Association, Saugatuck Coöperative Fruit Association, and the Shelby New Era Coöperative Association. The plan of organization of such an association may be illustrated by reference to the South Haven Fruit Exchange.

The South Haven Fruit Exchange was organized in 1914, and in 1920 had approximately 125 members. It is a joint stock company, each member being limited to two shares of stock. It has a pack-

<sup>1</sup> Rept. Mich. Potato Growers' Exchange, 1919-1920, etc.

ing-house and siding with a capacity of fourteen cars and situated adjacent to a vessel dock. The Exchange also operates its own cider and vinegar plant to which low-grade apples are sent. A contract has been entered into with a cannery for the utilization of low-grade peaches. Stock at par is \$100 a share and a new member pays an additional premium of \$50. This premium is for good will, increased value of buildings and equipment, and the like. Partial payments for stock and premium are permitted. Each member signs a crop contract agreeing to deliver at the Exchange peaches, pears, quinces, apples, at "tree-run," which are there sorted, packed and shipped, or made into vinegar as market condition and quality require. Net returns are paid to growers, after cost of handling and 5 per cent selling charges. Profits are returned to growers on basis of fruit delivered to the Exchange. Growers, on delivery of fruit, are provided with a receipt and later a card showing the grading thereof. Finally comes a statement of net returns. Growers may draw money on account as soon as they begin delivering. The Exchange has a storage with a capacity of 5,000 barrels. It handles feeds, fertilizers, spray materials, flour, and whatever can be purchased in quantity to advantage. The Exchange owns 30,000 crates for fruit. The longest distance any member hauls to the Exchange is fourteen miles, the average being three to four miles.<sup>1</sup>

<sup>1</sup> Statement of James Nicol, President of the South Haven Fruit Exchange.



The Michigan Fruit Growers Exchange has its headquarters at Benton Harbor. It has some 1,200 members, and during the year 1920 handled 1,200 cars of fruit.

The constitution of The Michigan Fruit Packers Federation, adopted February 6, 1918, describes the organization as "a coöperative association formed for the purpose of mutual help and without capital stock, and not for pecuniary profit." Its object is stated to be "to promote the mutual interests of the producer and the consumer of fruits by (a) improving the conditions under which Michigan fruits are grown, harvested and marketed. (b) Fostering efforts directed towards the adoption of uniform standards in connection with the handling of fruits from farm to market and particularly as regards grading and packing. (c) Securing the best obtainable conditions and services as regards transportation, storage and refrigeration. (d) Collecting and disseminating timely information as to supply and demand, carlot movements to markets, and prevailing prices in different wholesale markets. (e) Correcting trade evils and abuses, by discouraging all customs and practices not in accordance with sound business principles. (f) Extending and developing markets for Michigan fruits and specifically endeavoring to open new markets. (g) To rent, buy, build, own, sell, mortgage and control real and personal property as may be needed in the business. (h) Striving to increase by judicious advertising or otherwise the demand for the consumption of Michi-

gan fruits and farm products. (i) Furnishing the opportunity for buying coöperatively farm supplies. (j) Providing a basis on which member associations may obtain needed credit. (k) Adjusting grievances and differences between growers and their respective shipping associations, when requested. (l) Coöperating with the state and federal agencies along such lines as may be beneficial to the fruit-growing industry. (m) Cultivating a spirit of coöperation among the members and suggesting means whereby they may be mutually helpful in every legitimate and lawful way. (n) Generally by doing such other things as are necessary with respect to qualities, the cost of production and distribution of fruits and farm products as expressed in returns to the producer."

Any association of growers of fruits and farm products in the State is eligible to membership in the Federation, when it conforms to its principles and regulations. A number of State officials having to do with fruit and marketing are honorary members. The management of the Federation is in the hands of its board of seven directors. Membership dues are \$50. Two classes of contracts between the association and its members cover exclusive selling agreements or information service only. The operating expenses of the association are defrayed by "a percentage charge laid upon returns for produce sold or by a uniform fixed price per package, and upon supplies purchased, the amount of such charge to be fixed by a board of directors." There were, at last

report, fifteen coöperative fruit-growers associations holding membership in the Michigan Fruit Packers Federation.

On November 1, 1917, the United States Department of Agriculture had listed twenty-five coöperative fruit and produce marketing and six coöperative celery shipping associations in Michigan. All were in the southern peninsula and in the vicinity of the Lake Michigan fruit district. December 24, 1920, the Michigan State Farm Bureau estimated that there were three hundred coöperative elevator associations in the State.

The production of milk in Michigan is an increasingly important aspect of rural economy. In 1889, 224,537,488 gallons of milk were produced, and ten years later the output was 309,617,046 gallons, while in 1909 it was 283,387,201 gallons. The recent census of 1919 showed the product to be 337,954,884 gallons. The growth of urban centers has afforded an increasing market for the milk supply of the State. The associated milk producers of Macomb County are reported to furnish approximately 70,000,000 pounds of milk to the Detroit market. It is affiliated with a much larger organization styled the Michigan Milk Producers Association, of some 10,000 members, which sells milk on a contractual basis, the Detroit price being established by a milk commission representing the interests of producers, dealers and consumers. The milk producer who becomes a member of this association agrees to "constitute and appoint the Michigan Milk Producers

Association my agent with full authority to sell all milk produced by me, reserving only such amounts as are required for my family use." The agreement further requires the handling of milk in a cleanly manner in accordance with the rules prescribed by the Detroit Board of Health. Inspection of the cows, stable and equipment by an agent is permitted with a view to the correction of such unsanitary conditions as may be discovered. The association is referee for disputes regarding weight and grading of milk. It receives 1 per cent on gross sales in compensation for its services.

Detroit is, of course, the largest urban milk market in Michigan. In August, 1915, the average daily consumption was estimated to be 47,569 gallons, and of market cream, 5,953 gallons, which was thought to constitute a daily per capita consumption of .63 of a pint of milk and .08 of a pint of cream. In 1921, the City Department of Health put the Detroit consumption of milk at 80,000 gallons. It was estimated that the summer consumption then amounted to 700,000 pints daily, and the winter consumption to 600,000 pints. Detroit's milk supply was, in 1921, furnished by some 7,500 farmers. In 1915, there were 140 distributors of milk in Detroit, who obtained their supply from farmers living at considerable distances from the city and who either delivered their product directly as now, by wagon or truck, steam or electric railway to consumers or dealers in the city, or to collecting stations located in the country, some of which had facilities for pas-

teurizing and cooling the milk before shipment. Some of the larger plants were equipped to manufacture surplus supplies of milk into butter, cheese, condensed milk and casein. The basic price was F.O.B. Detroit, resulting in varying returns to farmers according to cost of delivery to the city market.<sup>1</sup>

For many years it has been the practice of Michigan farmers to dispose of their live-stock for shipment to the Detroit stockyards, which, in 1919, received 128,201 head of cattle, 374,903 of hogs, 314,898 of sheep, and 86,447 calves, while the 1920 statistics are: cattle, 118,755; calves, 99,069; sheep, 296,201; hogs, 430,863. The yards, in West Detroit, are served by the main trunk-line railroads of the State and Ontario, across the Detroit River, and the management takes pride in the facilities offered and the sanitary conditions characteristic of the place. A part of the receipts of live-stock at the yards is taken over by the local packing-plants, of which there were ten in 1919; and they also serve the requirements of stockers and feeders. In addition, a supply of live-stock is consigned direct to packing-plants, not noticed in the figures here given. The Detroit packers, in 1919, are reported to have slaughtered 200,000 cattle, 1,000,000 hogs, 500,000 sheep, and 100,000 calves, aggregating 13,820 tons of meat products valued at \$12,765,000. The market also furnishes stock to the big Chicago plants. The

<sup>1</sup> Clement & Warber: "The Market Milk Business of Detroit in 1915," U. S. Dept. Agr., Bull. No. 639.

Detroit Packing Company, in the process of being established in the winter of 1921, has a reported capacity of some 1,000 hogs, 150 cattle and several hundred head of sheep, lambs and calves daily. In justification for Detroit's position as a packing center, this concern points to statistics which indicate that out of 2,500,000 cattle,  $8\frac{1}{3}$  per cent were shipped to Detroit, while the Detroit packers are reputed to have slaughtered 72,000 more head than were received at the local stockyards. It is believed that uneconomical cross-hauls are revealed by these figures and the fact that only 26 per cent of Michigan-grown hogs reached Detroit, while Detroit packers imported into the State  $62\frac{1}{2}$  per cent of their live hogs. It is proposed to develop the local market for the State's live-stock resources.

On March 20 and 21, 1919, the representatives of some seventy-five live-stock shipping associations met at the Michigan Agricultural College for the purpose of establishing an organization under the title of "Michigan Livestock Exchange." The board of directors there chosen represented Grand Traverse, Cheboygan, Mecosta, Shiawassee, St. Joseph, Lenawee, and Genesee counties. The organization, it was determined, should be financed by a membership fee of ten dollars for each local association and a charge of fifty cents a car for each carload of live-stock shipped by local societies. Coöperation with other associations and exchanges was contemplated in the by-laws. Regarding the live-stock industry of Michigan, it was the declared purpose of the Michi-

gan Livestock Exchange "to so unite this industry that it can bring the great prestige and financial power which the industry represents to bear in the solution of the many problems that are now confronting the live-stock organizations."<sup>1</sup>

The Michigan Livestock Exchange, at its annual meeting early in 1921, went on record as favoring the investigation of the practicability of establishing coöperative commission houses in Detroit "to compete with those privately owned," since it was claimed that 90 per cent of the stock handled by such houses now comes from Michigan coöperative associations. The Exchange also went on record as favoring coöperation with the Livestock Producers Association in its campaign to eradicate tuberculosis as related to live-stock, which was reacting unfavorably on the market price. The Exchange also declared its readiness to affiliate with the Michigan State Farm Bureau in such manner as had already been found feasible by other similar associations of producers, but at the present writing (April, 1921), such an affiliation has not taken place.<sup>2</sup> The Michigan Livestock Exchange was then the selling agency for 105 locals. Each local has a constitution and by-laws in accordance with which the directors and the manager conduct its affairs. The manager assembles requirements for shipping accommodations, and when a carload has been made up, orders the car. The manager is paid on the basis of the number of head of

<sup>1</sup> *Michigan Farmer*, April 5, 1919, 532.

<sup>2</sup> *Ibid.*, Feb. 19, 1921, 222.

live-stock shipped, with additional allowances for special services, such as furnishing bedding, changing partitions in cars, and the like. A protection fund to cover losses to stock is provided, and members are mulcted for the non-performance of shipping agreements. The manager of each local association is in active charge of all shipments, receives payments for stock shipped, and keeps the accounts; while the Michigan Livestock Exchange is the central agency for effecting coöperation among the locals.

In addition to the farm products sold within the State, there is a large export business. The United States Bureau of Markets reports the shipment of farm products to points outside Michigan, in 1920, as follows: Apples, 5,493 carloads; beans, 1,500; cabbage, 298; cantaloupes, 144; celery, 549; cherries, 382; cucumbers, 16; grapes, 4,480; lettuce, 110; mixed deciduous fruits, 15; mixed bunched vegetables, 6; onions, 531; peaches, 2,160; pears, 1,109; plums and prunes, 187; potatoes, 9,025; strawberries, 439; tomatoes, 28; watermelons, 58; carrots, 3; cauliflower, 2.

With the purpose of establishing for agriculture in Michigan the sort of organization that had obtained results for other branches of industry and for labor, the Michigan State Farm Bureau was brought into existence in the autumn of 1919. Its growth was much more rapid than its promoters anticipated, a development enhanced by the economic difficulties in which farmers found themselves in the industrial slackness that ensued after the stimulating



effect of the great war had spent its momentum. At first the offices were at Birmingham, near Detroit; but the large increase in the membership and activities caused the Bureau to be removed to Lansing, and a branch office was (1921) established in the Upper Peninsula at Escanaba.

At its inception the work of the farm bureau, according to its secretary, was threefold in purpose: educational, commercial and legislative. Obviously the commercial element was of chief concern; but the agent of the organization, who carried on a vigorous membership campaign throughout the State, presented forcibly the new idea of state-wide coöperation, thus seeking to break down the characteristic individualism of the farmers: and when the legislature of 1919 convened, the farm bureau had its program of legislation to lay before the law-makers.

The constitution of the State Farm Bureau definitely set forth the aim of the organization. "The purpose of this association," ran the first section, "shall be to encourage, correlate and promote the efforts of the county farm bureaus of Michigan affiliated with it, and their individual members, and to coöperate with other agricultural organizations in advancement and improvement of agricultural interests in Michigan and the nation, educationally, legislatively and economically, by doing primarily and principally for members and not for pecuniary profit, the following, namely: buying and selling merchandise, farm machinery, fertilizer, stock feeds,

live-stock, or any other farm products whatsoever; operating storage warehouses, elevators, creameries or mills; canning, preserving, pickling, evaporating, dehydrating or otherwise converting or manufacturing farm fruits, grains, vegetables or any other kind of farm products whatsoever; securing best results in grading, packing, marketing and advertising of products of members; renting, buying, building, owning, selling and controlling such buildings, equipment and other real and personal property as may be deemed necessary in the conduct of the affairs of this association." All these activities were to be carried on without pecuniary profit to the association and substantially at cost to its members. This was a large undertaking and could not be fully realized.

All members of county farm bureaus organized in accordance with the constitution of the State Farm Bureau were eligible to membership. County farm bureaus were admissible to membership on vote of the executive committee and were allowed a voting representative on the board of delegates and another representative for every five hundred paid-up members in addition to the first five hundred members belonging. These voting representatives were required to be actual farmers and duly authorized by their county farm bureau. County farm bureaus were required to pay dues to the State Farm Bureau of not less than \$500, but with this amount as a minimum their contribution was to be proportional to the number of members. Control over the affairs

of the State Farm Bureau was vested in the board of delegates from the county farm bureaus, proportional to the membership of each as stated above. The board was authorized to adopt "such by-laws, rules and regulations for the conduct of the affairs of this association as shall be deemed advisable." The board of delegates at the annual meeting, held on the first Thursday in February, was directed to choose the executive committee, composed of the president, vice-president and six other farm bureau members. It fell to the executive committee to "execute the policies of this association as determined by the board of delegates," and it was "empowered to manage the affairs of the association, to have charge of the disbursement of funds, to judge qualification of all membership applications, and to appoint and employ such agents as may be necessary for the conduct of its affairs." The president and vice-president were to be chosen at the annual meeting. The secretary and the treasurer were to be appointed by the executive committee. The board of delegates were to choose representatives to the American Farm Bureau Federation. Officials of the association were made ineligible to hold any state or national, public, elective or appointive office. The by-laws provided for various committees with special duties related to the work of the association.

It was of prime importance to bring within the scope of the farm bureau a large proportion of the active farmers of the State. A membership organization was quickly built up and canvassed succes-

sively all, or nearly all, the counties. It was frequently reported that from 85 to 95 per cent of the farmers visited accepted membership. It was found, also, that they based great expectations on their membership in this association. To meet these expectations the establishment of several departments of work quickly ensued and, within ten months the number of employees increased from three to ninety. Departments of marketing, seeds, elevator exchange, traffic, forestry and publicity were formed in quick succession. These worked in coöperation with and under the supervision of the secretary. The interest of the farmer is to buy and to sell at advantage to himself. In the course of the year 1920 the seed department was actively procuring high-grade seed for the members of the bureau. Buyers were sent to the Northwest to procure northern-grown alfalfa adapted to climatic conditions in Michigan. Facilities were afforded for the sale of high-grade Michigan-grown seed, as for example, Rosen rye grown on Manitou Island under a condition of isolation that insured against cross-fertilization. Seed before being distributed to purchasers was cleaned and tested to insure purity and germination. Later in the year, an elevator exchange was created to establish a central sales agency for such coöperative elevator associations in the State as might bind themselves by contract with this department. By the end of January, 1921, some fifty such associations were reported to have accepted the arrangement which made the elevator exchange of the State Farm Bureau the

selling agency for the local associations with a prior, and under certain conditions, an exclusive right of disposing of their grain, beans and hay. Through its wool pool, the State Farm Bureau sought to counteract adverse market conditions for this product and in its warehouses, first at Lansing and Grand Rapids and later at many other points throughout the State, collected and held for a better market price more than 3,000,000 pounds of wool during the first season of 1920. At the beginning of 1921, a forestry department stood ready to dispose of members' fence-posts, stakes, fire-wood and other wood-lot products, and to supply these to members not locally provided with them. A dairy and sugar-beet department were then contemplated. The officers of the organization were manifestly very ambitious of making the sales service all-comprehensive.

The farm bureau members were concerned with securing at low prices many commodities vital in their industry and domestic economy; so in the course of 1920 the reorganized and enlarged purchasing department handled phosphate by the train-load from the South, tile, binder-twine, bags, coal, cement and lime, and many other agricultural necessities. Its dealings were with local coöperative associations and county farm bureaus on a contractual basis. Orders were assembled and forwarded to the Lansing office, which in turn made its purchases in quantity direct from the producers. The traffic department at Grand Rapids assisted in the securing of freight cars for shippers, and sought to bring about adjustments of

rates, over-charges, delays, and other causes of complaints.

Meanwhile, a large force of agents was building up the membership of the organization. Early in 1920, it stood at some 22,000. The announced membership increased until, July 17, 1920, it had reached some 70,000. At September 25, it amounted to 84,358; October 16, 88,000, and at the close of the campaign in the Upper Peninsula (November 13, 1920) 6,462 members belonged to the State Farm Bureau.

The Michigan State Farm Bureau has thus summarized the results of the first year of its operation: "It has successively placed upon a self-supporting basis departments of seed, wool, elevator exchange, and purchasing. Other departments, including traffic, legislation, organization and publicity were developed." The membership campaign, concluded in December, 1920, brought 97,000 ten-dollar-a-year members pledged for three years. The seed department had, it was averred, worked a revolution in the Michigan seed industry, whereby a more economical system of distribution was created; there was a 500 per cent increase in the amount of Grimm alfalfa seed sown; while over 3,000,000 pounds of seed were distributed throughout the State "carrying guarantees that exceeded the guarantees of all state seed concerns and even the requirements of the state law." All of this seed was cleaned, freed of noxious weeds, and, in the case of most alfalfa and all sweet clover, scarified. This business was conducted through 369 coöperative associations located in seventy-nine coun-

ties. In the autumn of 1920, the seed department claims to have bought up one-half of the world's supply of registered Grimm alfalfa, all of which was sown in Michigan. On the other hand, more than 750,000 pounds of Michigan-grown clover seeds were handled by this department. All of it was certified as to origin and history. The Farm Bureau reports the handling of no imported or southern-grown clover seed. Through its bonded warehouse, the department stabilized the seed market, issuing warehouse receipts to growers and allowing pre-payment to one-half the value of the grain handled. It was claimed that a permanent improvement in Michigan agriculture has been effected through the services rendered by the seed department. Success was claimed for the wool pool, which gave buyers an advance of three to twelve cents a pound over the prices offered elsewhere. The pool had handled some 3,500,000 pounds of wool to April 15, 1921, for 15,000 growers. The manufacture of 5,000 blankets from "tags" and "rejects" brought the grower eighteen cents a pound, it was stated, when the market price for such grades was ten cents. The manufacture of suitings from the clothing grades, under the direction of the Farm Bureau, had yielded a return twice that which would have accrued from outside dealers, it was claimed. Similar profits and savings accrued from the operations of the elevator exchange and the purchasing department, it was held. A saving of three to thirteen dollars a ton on purchases of commercial fertilizer was brought about.

The list of other commodities purchased through the Bureau includes tile, harness, tires, cotton-seed meal, oil-meal, feed, coal, building materials, and posts. Great savings resulted from the operations of the traffic department in adjusting claims against the railroads, which secured 4,711 refrigerator cars for the handling of fruit during the season, thus effecting large savings to producers in a falling market and rapid marketing of the crop. Coöperation between the railroads and the shippers is facilitated through this agency. The Bureau takes credit for the unusual amount of agricultural legislation enacted at the 1921 session of the legislature.<sup>1</sup>

In the spring of 1921, the forest products department of the Michigan State Farm Bureau divorced itself, and, under the designation the "Michigan Forest Products Bureau," undertook to continue this specialized service to the farmers of the State. It was planned that this service and inspection should include: timber estimating, land classification, scaling and inspection of timber and lumber, schemes of forest planting and protection, and the listing and sale of forest products and property. As matters stand, on the marketing side, this service involves the disposal of forest products grown chiefly in the northern counties to farmers in the southern counties whose local supply is now inadequate. The Bureau's office remains in Lansing.

In order to obtain the benefits of coöperative sell-

<sup>1</sup> Mich. State Farm Bur., *News Service*, No. 68, May 21, 1921.



ing agreements, it was necessary to devise a plan of organization which would avoid a violation of the statutes of the State prohibiting combinations in restraint of trade and for the purpose of curtailing production and the enhancement of prices otherwise than through the ordinary operations of the market. Such statutes had been enacted by the legislatures of 1899 and 1905, which declared it "unlawful for two or more persons, firms, partnerships, corporations or associations of persons, or any two or more of them, to make or enter into or execute or carry out any contracts, obligations or agreements of any kind or description by which they shall bind or have bound themselves not to sell, dispose of or transport any article or any commodity, or any article of trade, use, merchandise, commerce or consumption below a common standard figure or fixed value, or by which they shall agree in any manner to keep the price of such article, commodity or transportation at a fixed or graduated figure, or by which they shall in any manner establish or settle the price of any article, commodity or transportation between them or themselves and others, so as to directly or indirectly preclude a free and unrestricted competition among themselves, or any purchasers or consumers, in the sale or transportation of any such article or commodity, or by which they shall agree to pool, combine or directly or indirectly unite any interests that they may have connected with the sale or transportation of any such article or commodity, that its price might in any manner be affected. Every such trust as

defined herein is declared to be unlawful, against public policy and void.”<sup>1</sup>

These restrictions have been irksome to farmers as to others who desire to secure better prices through restrictive arrangements and coöperative selling. A gubernatorial candidate, in the primary campaign of 1920, who claimed to represent the agricultural interests, emphasized the need and desire of farmers to enter into agreements for the purpose of enhancing prices. “The state of Michigan,” he said, “should grant to the farmer the right to collective sale of his products or collective buying of necessities that he may require for the farm. . . . If two or more farmers in the neighborhood should meet and agree to ship their potatoes together in a carload lot to some buyer and agree upon a price that they would demand for their potatoes, they could be sent to jail for conspiracy. When the farmer shall be given the right to do this so-called collective bargaining, it will prove a great benefit to both farmers and consumers in this country.” In effect, farmers have found a method of obtaining the advantages of coöperative selling within the law, through the establishment of agencies whereby they deliver their products to a common organization which disposes of them on such terms as it deems best for the producer. Act number 171 of the legislative session of 1903 provides that “any corporation organized under this act, the purpose of which is not primarily or principally for net pecuniary profit, but the objects of which re-

<sup>1</sup> Compiled Laws of 1915, Sec. 15013.

quire the transaction of business and the receipts and payment of moneys in the conduct of its affairs, shall have the right and power to transact such business and receive, collect and disburse such moneys, and acquire, hold and convey such properties as are naturally or properly within the scope of its articles of association." Many associations for the collective purchase and sale of farm products and supplies have been established under this statute.

## CHAPTER VIII

### RURAL MANUFACTURES OF MICHIGAN

For some years subsequent to the Civil War, Michigan farmers concerned themselves to a notable degree in the growing of Chinese sugar-cane or sorghum. The Report of the State Board of Agriculture for 1865 refers to its culture in the State as then of several years duration, and the production of sirup in that year is estimated at 400,000 gallons.<sup>1</sup> The juice was extracted from the cane by a roller press operated by the grower of the crop. One producer reports a product of two hundred gallons to the acre of cane, which sold at seventy-five cents a gallon.<sup>2</sup> The output seems to have been restricted to the southern counties of the Lower Peninsula and to have been greatly stimulated by the sugar scarcity of the war era. It was hoped that sugar could be extracted from the sorghum sirup, and led to legislation in 1881 providing a bounty for sugar production from this source or from beets. R. C. Kedzie related how only one farmer qualified for this bounty by producing 20,235 pounds of sugar from sorghum.<sup>3</sup>

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1865, 17.

<sup>2</sup> *Ibid.*, 1870, 150.

<sup>3</sup> "Mich. Pioneer and Hist. Soc. Collections," XXIX, 202.

With the establishment of the beet-sugar industry, sorghum culture languished. The Thirteenth United States Census reported 416 acres of sorghum in the State in 1909, yielding 2,765 tons of cane, valued at \$18,595. In the period of the great war one occasionally heard of Michigan-grown sorghum as a substitute for sugar in a time of great scarcity, but sorghum culture seems now to have become an abandoned phase of Michigan agriculture. On the basis of census returns, the United States Department of Agriculture records the production of sorghum in Michigan as follows: In the year 1859, 86,953 gallons of sirup; 1869, 94,686 gallons; 1879, 102,500 gallons; 1889, 45,524 gallons; 1899, 24,059 gallons; 1909, 21,350 gallons.<sup>1</sup> These figures are admittedly incomplete, since small quantities of sirup produced were unreported.

The beet-sugar industry in Michigan had its origin in experimental efforts by the Michigan Agricultural College, which demonstrated the adaption of the State for sugar-beet culture. As far back as 1881, the State legislature had provided a bounty of two cents a pound and tax exemption to encourage the creation of a domestic sugar supply. Nature had provided a delicious but inadequate sugar product derived from the sugar maple growing everywhere in both peninsulas. First the Indians and then the white pioneers had exploited this native source of sugar, but it was wholly insufficient to meet the grow-

<sup>1</sup>U. S. Dept. Agr., Farmers Bull. 477: "Sorghum-Sirup Manufacture," Washington, 1912, 1918.

ing requirements. The Michigan Agricultural College imported some 1,760 pounds of sugar-beet seed from Europe in 1890, which was distributed to farmers throughout the Lower Peninsula. The results were highly gratifying. The average product to the acre was nearly fifteen tons, with 13.86 per cent of sugar in the juice, as reported by R. C. Kedzie of the Agricultural College.<sup>1</sup> Even better results were secured from a second experimental demonstration in 1897. By the year 1899, the College had distributed more than 5,000 pounds of beet seed, and seems entitled to claim primacy in the establishment of the beet-sugar industry in Michigan.

Meanwhile the United States Weather Bureau had mapped the area of climatic conditions favorable to the culture of the sugar-beet. It was believed that the sugar-beet could not be grown far from the isotherm of 70 degrees—an opinion since disproved—and that three inches of rain during each month of the growing season with ample sunshine were required. Michigan fell within this area, but it has been demonstrated that the sugar-beet does very well in the northern districts of the State where temperatures average well below the 70 degrees isotherm, and that the greatly enhanced amount of sunshine and twilight resulting from the higher latitude of the region is remarkably favorable to sugar-content. In 1897 the legislature provided a bounty of one cent a pound on sugar produced in Michigan.

The first beet-sugar factory in Michigan was

<sup>1</sup>“Mich. Pioneer & Hist. Soc. Collections,” XXIX, 203.

erected at Bay City by the Michigan Sugar Company in 1898. The United States Sugar Manufacturers Association reported in 1920 sixteen active beet-sugar factories in the State, at Bay City, Blissfield, Holland, St. Louis, Marine City, Menominee, Alma, Caro, Carrolton, Crosswell, Sebawing, Mount Clemens, Lansing, Owosso and West Bay City. Approximately \$22,000,000 are invested in the industry. The output of sugar in the season of 1920 is 165,899 tons. The factories handled in that year 1,243,868 short tons of beets. The farmers received an average price for beets of \$10.08 a ton.<sup>1</sup> Of the beet-sugar factories here enumerated, only one is located in the Upper Peninsula (at Menominee), and it derives more than four-fifths of its beets from Wisconsin. The Upper Peninsula product comes almost entirely from Menominee and Delta counties. The excess of sunshine and twilight are factors favorable to sugar-beet culture in the Upper Peninsula, since it augments the sugar-content; but other conditions seem not to have been equally favorable, and beet culture is a minor industry outside of the Saginaw Valley. Here is a moist climate, a rich clay and clay-loam soil, a water-table close to the surface, and, at the outset, a considerable population of German-Americans disposed to do hard labor incident to the cultivation of sugar-beets. The presence of the raw material, with abundant pure water of the requisite chemical composition, of limestone and of coal in

<sup>1</sup> U. S. Dept. Agr., *Monthly Crop Reporter*, April, 1921, p. 38.

the same territory, favored the erection of beet-sugar factories in the same portion of the State. With the introduction of beet culture came an influx of Bohemians and Hungarians, familiar with beet tillage in the mother lands. From hired help in the beet fields, these national types hitherto strangers to this section of the State have become landed proprietors and are rapidly becoming a significant element in the agricultural population of east-central Michigan. It should be noted, however, that counties in all sections of the Lower Peninsula grow sugar-beets to some extent, from Monroe in the southeast and Berrien in the southwest, to Charlevoix and Cheboygan counties in the north.

The sugar-beet growers in Michigan have for years been dissatisfied with their contracts with the beet-sugar companies, and, through organization, have vigorously sought readjustments in their favor. The Michigan Sugar Beet Association, in 1921, was reported to have 9,000 members, out of the 12,000 sugar-beet growers in thirty-eight counties. The Association prepared a schedule of prices calling for compensation to growers of \$6.45 a ton when sugar was bringing five cents a pound. There was an ascending scale of prices, until a price of \$19.35 was to prevail when sugar was selling at fifteen cents. The sugar companies refused to have anything to do with this schedule of prices and the growers were left free to contract as they might determine.

The manufacture of cheese in the factory dates from the close of the Civil War, and it seems to have



developed rapidly in the southeastern counties of the State.<sup>1</sup> The institution of the factory system is attributed to Jesse L. Williams of Rome, New York, whence it spread westwardly to Michigan. Hitherto cheese-making had been a domestic process characteristic of the period of pioneering, and in consequence the output had been small. By 1867, under the new method, it seemed likely that in a few years the State product would exceed local consumption, and the price was 13.5 to 14 cents a pound.<sup>2</sup> The low price of wool and sheep reacted on the cheese industry in the State, by promoting a transfer of interest to this new department of agriculture, but even so the Board of Agriculture in 1868 estimated that not more than one-eighth of the cheese consumed in Michigan was then produced within its borders. However, the domestic manufacture of cheese was not wholly abandoned, and by 1899, 331,176 pounds were produced on the farms of the State. The factory output in that year was, according to the Twelfth Census of the United States, 10,422,582 pounds. Ten years later the farm production had fallen to 291,176 pounds, while the factory output advanced to 13,382,160 pounds. The schedule of production by counties indicates that the center of gravity of the cheese industry was in the central counties of the southern peninsula in 1909, with St. Clair leading with an output of 72,390 pounds, followed at a distance by Kent, Montcalm and Lapeer,

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1865, 133.

<sup>2</sup> *Ibid.*, 1867, 139.

while only Houghton County in the Upper Peninsula made any showing.

The manufacture of butter in factories was introduced into Michigan apparently even later than that of cheese-making, and was also originated in New York.<sup>1</sup> The Board of Agriculture in several reports issued in the post-bellum era takes considerable pains to explain a new method of butter-making as an incident of cheese production whereby the double advantage of obtaining both products from the same milk was duly set forth. By 1888 the State's one hundred cheese factories were matched, it was announced, by as many creameries.<sup>2</sup> The making of butter on farms has gone forward coincidentally with its production in factories, and in 1899, the farm output was 60,051,998 pounds, while the factory product was only 7,820,712 pounds, as reported in the Twelfth United States Census. In another decade, the farm production had fallen off somewhat and stood at 50,405,426 pounds, and the factory output had advanced to 35,511,760 pounds, indicating a seven-fold increase in the production of creameries during the ten-year period. The Thirteenth United States Census (1910) indicated that the production of butter was then, and remains, widely distributed throughout the two peninsulas, varying primarily with the density of the rural population, with the counties as Berrien, Branch, Calhoun, Eaton, Gene-

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1868, 228.

<sup>2</sup> *Ibid.*, 1888, 388.

see, Hillsdale, Ingham, Kent, Lapeer, Lenawee, Macomb, Montcalm, Oakland, Ottawa, Saginaw, St. Clair, Sanilac and Tuscola exceeding the million-pound rank, Kent taking first place.

The Fourteenth United States Census ascertained that, in the year 1919, Michigan produced 382,822,631 gallons of milk, which represented an increase of 19.3 per cent over the output for 1909. Of the product of 1919, 130,864,366 gallons were sold. Of butter, 25,755,423 pounds were manufactured. The sales of butter amounted to 10,154,869 pounds, which may be compared with sales of 30,010,783 pounds in 1909. Of cream, the 1919 sales were 4,459,626 gallons, compared with 2,485,061 gallons in 1909. In 1919, butter-fat to the amount of 31,647,906 pounds was sold, compared with 18,287,691 pounds in 1909. The most recent estimates available give the number of dairy cows in Michigan as 802,000, distributed on an average of four cows to a farm. In 1920, these cows are considered to have produced 3,492,000,000 pounds of milk, valued at \$104,760,000. The Michigan Food and Drug Department reports for June 30, 1920, 248 creameries in Michigan, 65 cheese factories, 35 condensed milk and powdered milk plants, 258 ice-cream manufacturers, 19 milk skimming stations, 1,016 cream buying stations, 939 milk distributing plants, 98 milk depots, 104 milk stores, and 1,742 milk wagons.<sup>1</sup>

In February, 1920, the Michigan Allied Dairy

<sup>1</sup>*Michigan Farmer*, May 21, 1921, 20.

Association was organized with headquarters in Lansing, for the purpose of fostering and encouraging the dairy industry of Michigan in coöperation with the State Food and Drug Department and the Michigan Agricultural College, "by endeavoring to increase economical production of milk and cream upon the farms of Michigan upon both a quantity and a quality basis; by endeavoring to improve the quality and uniformity of the dairy products of the State; by stimulating consumption of milk and products, and in obtaining the practical and efficient operation of any plant manufacturing and distributing milk and milk products in Michigan; and also in assisting and bringing about a more complete observance of all dairy laws now on the statute books, in the repealing of any that may have become obsolete, or in obtaining new legislation designed to assist in the furtherance of the principles and objects already indicated." Associated in this organization are representatives of the creamery butter manufacturers, ice-cream, condensed and powdered milk, cheese, milk and cream producers, fluid milk distributors, and dairy products equipment and supply dealers, organized under the familiar Act 171 of 1903. The Association has its board of directors and general officers, and employs a salaried secretary to attend to its routine business and is affiliated with the Michigan State Farm Bureau.

In April, 1921, it was announced that, through the efforts of the Michigan Allied Dairy Association, a dairy division of the newly created State Department

of Agriculture was established. The announced duties of this division were "to foster and encourage the development of quality dairy production in Michigan, to enforce existing dairy laws and to bring about needed dairy reform." It was recommended by the Michigan Allied Dairy Association that twenty inspectors be employed, distributed as follows: butter interests, six; cheese interest, one; condensed and powdered milk interests, one; ice-cream interests, two; market milk and production, ten. The dairy association suggested, it was stated, that \$100,000 be appropriated to the maintenance of this division.<sup>1</sup>

Canning on the farms began before factory production and has continued alongside of it, with a steady increase in the output of factory goods. The special United States census on canning and preserving in Michigan reported products of a value of \$8,194,000, in 1914. This came from ninety-one establishments, employing an average number of 2,507 wage earners, and the cost of materials used aggregated \$4,893,000. Michigan's rank among the several states was then eleventh.

Before the interposition of the Government compelled the packers to relinquish enterprises of this character, Armour & Company at their Frankfort plant packed red raspberries and red sour cherries; while at Mattawan, the company's grape-juice factory pressed an average of 2,500 tons annually. At

<sup>1</sup> Michigan State Farm Bur., *News Service*, Lansing, April 23, 1921, 2.

Traverse City a coöperative canning factory conducted by local farmers utilizes low-grade as well as superior grade fruit, particularly cherries.

In 1921, the Michigan Canned Food Company erected a cannery at Owosso for the purpose of canning corn and peas; while another plant at Yale handled peas, and one at Greenville was under construction. It was purposed that this company should have seven factories in operation in Michigan in 1922.

In May, 1921, The National Cannery Association reported, through its director of inspection, eighty-two canning factories in Michigan, whose total pack in 1920 was over 50,000,000 cans, valued at approximately \$10,000,000. Upwards of 40,000 acres were then devoted to canning crops. Seventy per cent of the canning factories in the State were said to be located on the line of the Pere Marquette Railroad between Benton Harbor and Petoskey.

The National Cannery Association maintains an inspection service in Michigan. Members must maintain their plants in accordance with the rules of the national association, involving a sanitary condition, and the use of sound wholesome materials. It is the expressed object of this service, which coöperates with the Michigan Food and Drug Department and the Michigan Cannery Association, "to produce a full can of clean wholesome food, thereby protecting the consumer and ultimately helping the canner and the agricultural interest by creating a greater demand

for can goods." The legislature of 1921 enacted what is described as a "model canning law."

In the pioneer period, when cider vinegar might be out of the question, a domestic supply of beer and vinegar was obtained from maple sap derived from the flow at the close of the season, and which was slightly boiled to establish the desired consistency. With the apple orchard came the cider press and custom cider mills, where apple cider for beverage purposes and for vinegar was produced to an extent which, if undetermined, was, and still is, manifestly very large.

The Indians were the first sugar-makers in Michigan. The source of supply was in both peninsulas, and the product of the aborigines' unaccustomed industry, if not attractive to the white man's palate as it came from the red-man's kettle, was not infrequently the only provision against starvation. It featured rural manufacturing among the whites, as among the Indians, everywhere in the State, and it remains a considerable item in the agricultural output even today. When the sap begins to rise in the tree late in February or early in March, the farmer relieves the tree of a portion of its supply by the process of "tapping," whereby an incision is made in the trunk bark not far above the ground, into which a "spile" is inserted as a conduit to the bucket beside the tree. In the pioneer period, the spile and all accessories were of wood. A trough hollowed from a log of ash or pine received the sap, conveyed

thither in a pair of wooden pails borne suspended from a sort of neck-yoke surmounting the stalwart shoulders of the workers. Boiling in kettles of iron or brass reduced the watery sap of a delicate sweetness to the delicious amber liquid sirup and, ultimately if sufficiently prolonged, to the equally delicious maple sugar, suited to the taste of the most exacting epicure. Primitive methods have yielded to more elaborate processes, in which implements of metal have replaced those of wood. Sugar-making time, coming at a season when other labors of the farmer are less exacting than usual, remains one of the few high spots in the rural calendar. The Thirteenth United States Census listed fifteen counties as contributing to Michigan's output of maple sirup, or 269,093 gallons in 1909, the lead being held by the counties of Eaton (26,696 gallons), Hillsdale (23,041 gallons), Ionia (12,605 gallons), Genesee (10,625 gallons), and Ingham (10,428 gallons). Returns were entered from northern counties, such as Grand Traverse and Crawford in the Lower Peninsula, and from Delta, Iron and Dickinson in the Upper Peninsula. Of maple sugar, the output stood at 293,301 pounds. The same number of counties gave this total, with Eaton again in the leading position with 90,511 pounds.<sup>1</sup> Ten years later the Michigan Coöperative Crop Reporting Service found the production of maple sirup to be 190,200 gallons, the output of 848,000 trees, and the produc-

<sup>1</sup>Thirteenth Census of the U. S., "Abstract with Supplement for Mich.," 660.



tion of maple sugar amounted to 47,100 pounds. That year's product was rated as 96 per cent of a high-grade medium.<sup>1</sup> A generation ago Eugene Davenport of Woodland, Barry County, urged the growing of sugar maples as a profitable investment, and he set forth detailed calculations of outlay and income to the conclusion that his one thousand maple trees yielded a product of \$240 net, or 24 cents a tree, in a season. Trees of twenty years' growth were in the producing class and were annually, without fail, making an income for their owner with a relatively small outlay of labor and capital. The demands for maple wood for flooring, furniture, and wood carbonization furnace requirements have undoubtedly greatly depleted stands of sugar maples, yet the business still has its place in Michigan agriculture. Michigan's output in 1909 was less than that of Vermont, New York, Pennsylvania, New Hampshire, Maryland, and Ohio. It was estimated in 1920 that there were some 1,800 maple sirup producers in the State furnishing 150,000 gallons of sirup.<sup>2</sup>

With a view to rehabilitating the once flourishing maple sirup industry of Michigan there was organized in 1917 the Michigan Maple Syrup Producers Association, for the purpose of establishing standard grades for the product of its members, providing a label indicative of the source and quality of the sirup, and to discipline members violating the rules of the organization. Four years later, this associa-

<sup>1</sup>"Mich. Crop Rept.," May, 1920, 4.

<sup>2</sup>*Michigan Farmer*, March 5, 1921, 296.

tion effected an arrangement with the Michigan State Farm Bureau for the marketing of its sirup through the Bureau's forestry department. It was further contemplated to establish a central cannery and blending plant to handle the output of members. The association emphasized the unusually excellent flavor of maple sirup produced in Michigan in relation to the marketing of the State's product, and of the necessity of reopening and maintaining unimpaired groves of sugar maple trees as a means of perpetuating the industry. In March, 1921, there were some fifty active members of this association under agreement to furnish the selling agency with two thousand gallons of their product. It is required of members that one-third of their product of average grade must be sold through the association. The association recognizes three grades of sirup as marketable through its organization. The membership is largely in the south central counties with the secretaryship at Charlotte, Eaton County, in the heart of the commercial sirup-producing district. As the governing body of the Michigan Maple Syrup Producers Association, the membership elects a board of seven directors, who select the executive officials.

It has been many years since the pioneer women of Michigan of necessity spun and wove the material for their own cloth, and the spinning-wheel is now preserved in museums as a relic. Nevertheless, even now among certain elements in the State, this primitive method of obtaining socks and mittens from

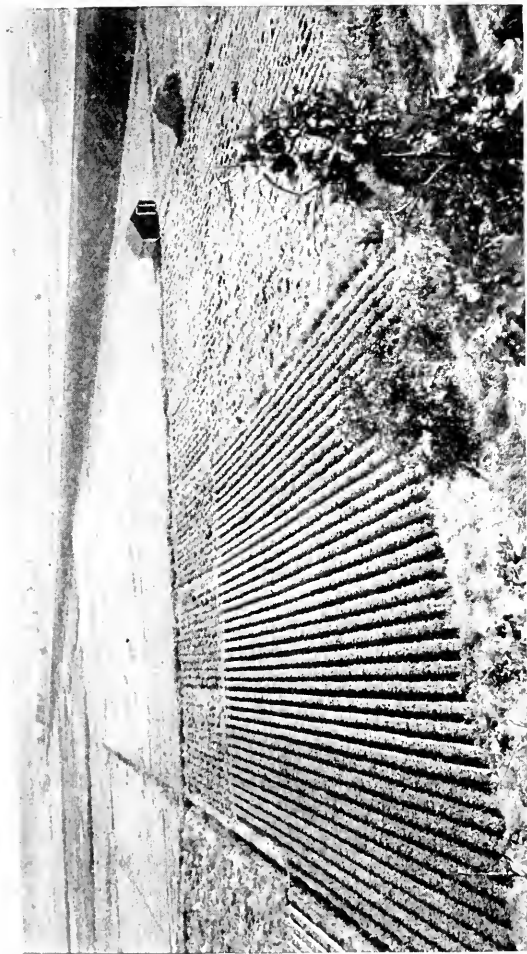


Plate VI. Celery "marsh," Muskegon County.



wool of unquestioned virginity still persists. The practice appears to be common among the Finns and obtains somewhat also among the French inhabitants. Until recently one large Chicago mail-order house supplied spinning-wheels to the trade of the north country, and there is at least one Finnish resident of the copper country who, in 1920, reported a total output of some fifty such machines, mainly distributed in Michigan, but to some extent sold elsewhere, as far east as Massachusetts and as far west as Wisconsin and North Dakota. It is said to be the practice among the Finnish farmers, when requiring mittens or socks, to deprive a member of the small domestic flock of sheep of its woolly coat, and to convert it step by step into these articles of clothing, which do not require a "truth in fabric law" as an insurance of quality.

The production of cloth by the factory process is not an important industry of Michigan. There are several small woolen mills in both peninsulas. The Clinton Woolen Manufacturing Company of Lenawee County has been in operation since 1866, and is engaged chiefly in the manufacture of cloth for uniforms. It reports a consumption of some 1,000,000 pounds of greased wool annually, but imports its raw material largely from western wool centers, since it does not find readily available within the State wool of a grade suitable to its requirements. At Eaton Rapids another concern consumes approximately 2,000,000 pounds of raw wool annually,

mostly home grown. Both concerns have produced virgin woolen fabrics to meet such specific demand as may arise.

The unfavorable wool market of 1920-1921 led the Michigan State Farm Bureau to dispose of a portion of its warehouse stock that had accumulated through the wool pool, by arranging for the conversion of certain grades into blankets and cloth. Thus residents of the State acquired material made from undoubted virgin wool, became accustomed to look to a home market for raw wool, and in so much relieved the local wool market situation.

Even the native Indians had their primitive grist-mill. One of these is described by W. J. Beal. "A long pole or sapling was pinned to a tree, like a well-sweep; a small pole was suspended from the elevated end of the sweep, the lower part of which was pestle-shaped; the top of a stump was hollowed out, to hold the corn. The sweep was then worked up and down by one of the squaws, while another steadied and directed the pestle, which smashed the corn as it came down."<sup>1</sup> The white man had an easier way. At Big Rapids on the Muskegon, at Owosso, at Grand Rapids, at Elsie, at Jonesville, at Lansing, and at very many other points of vantage throughout the State, especially in the southern peninsula, a mill-dam impounded the waters which gave power to the mill. The early mills were of low capacity. Ransom grist-mill on Ransom's Creek in Grand Traverse County had "one run of stones and a capacity

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," XXXII, 237.

of grinding five bushels of grain in an hour.”<sup>1</sup> Hundreds of these little grist-mills do a customs service of great utility to the farmers of the adjacent countryside.

Similar in motive force and capacity were the saw-mills, indispensable for getting out building material where an effort was made to improve on the axe, cross-cut saw and their accessories as a producer of lumber. There was also a saw-mill on Ransom's Creek aforesaid, operated “by one muley saw whose running capacity would cut one thousand feet of lumber in a day.”<sup>1</sup> The father of Edward W. Barber of Eaton County built his mill-dam on the Scipio Creek at first only of earth, which the flood waters soon carried away. Then a mixture of brush produced a substantial barrage which two generations left still intact. Here was erected the mill, “equipped with an old-fashioned wooden water wheel with an upright sash for the saw.”<sup>2</sup> The rural population not only relied on these little home-made saw-mills for the local lumber supply, but they succeeded often in producing a surplus for export down stream to markets both within and without the State. Steam replaced water as motive power in most of the saw-mills, but numerous water-driven grist-mills remain in the southern peninsula, while “midget mills,” frequently gasoline-driven, serve the farming communities in both peninsulas of the State today. In 1904 the flour and grist-mills of Michigan produced

<sup>1</sup>“Mich. Pioneer & Hist. Soc. Collections,” XXXII, 305.

<sup>2</sup>*Ibid.*, XXXI, 197.

3,901,219 barrels of wheat flour, and the census returns for the years 1909 and 1914 did not vary greatly from this quantity, the output for 1914 being 3,056,744 barrels. In 1914, 74,662 barrels of rye flour were manufactured, 15,773,491 pounds of buck-wheat flour; 221,600 pounds of barley meal; 131,646 barrels of corn-meal and corn-flour; 466,510 pounds of hominy and grits; 149,893 tons of bran middlings; 216,760 tons of feed, offal; and 12,755 pounds of breakfast foods.<sup>1</sup>

There has been progressive advancement in Michigan in the kind and quality of the farm implements used. At one time all grain was threshed by the flail or trodden out by horses on the barn floor. There were no reapers, mowers, drills and cultivators. "Grain was separated from the chaff by holding a shovelful in a stiff breeze and sifting it off by shaking the shovel. Wheat was cut with the cradle, which was a great advance upon the sickle that preceded it; and the hand-scythe that had been the only means of reducing the grass. All grain was sown broadcast; and those who were boys fifty years ago and retain a vivid recollection of the horrors of riding a horse to plow corn, will appreciate the advantages of the cultivator."<sup>2</sup> "A hand-mill, such a mill as the slaves used to grind their corn for hoe-cake and hominy," reduced corn to edible proportions—a half

<sup>1</sup>Census of Manufactures, 1914—Michigan: 29.

<sup>2</sup>S. B. McCracken in "Mich. Pioneer & Hist. Soc. Collections," XIV, 610.



bushel in an evening.<sup>1</sup> In preparing the virgin soil for its first crop, "The big A harrow with inch-square teeth, drawn by two yoke of oxen, pulled out the loose grubs and partially leveled the ground."<sup>2</sup> "The land was broken up by the use of a very stout plow and three or four—sometimes as many as seven—yoke of oxen hitched one team ahead of another. This stout plow was almost always a home-made affair constructed of wood, excepting the coulter and the share. . . . I remember to have seen a plow with a wooden mould-board and only one handle," writes W. J. Beal, "Wood's patent was the first plow with a cast-iron mould-board that I remember to have seen or used. I have read of a prejudice among farmers against using an iron plow on the ground that it poisoned the land for crops, but I never heard of this among the farmers of southern Michigan."<sup>3</sup> The forest was searched for a tree whose divided trunk yielded the frame for the farmer's home-made drag. "The selected tree was cut down," says Edward Barber, "the crotch severed from the trunk and the remainder of the top. The oxen hauled it to the house. The limbs were hewed on four sides with an ordinary axe, holes bored through them for the teeth, which were driven by lifting a heavy stone and throwing it with all the force possible upon the square end of the teeth. A clevis was attached to the forward

<sup>1</sup> *Ibid.*, 622.

<sup>2</sup> *Ibid.*, XVIII, 420.

<sup>3</sup> *Ibid.*, XXXII, 242, 243.

end of the improvised drag, the knotty part serving to hold it firmly in place; and with this home-made harrow, the work of getting in wheat went on.”<sup>1</sup>

The garnered grain was threshed with a flail, like a heavy pole ten feet long, broken in two in the middle and fastened together again with a leather string hinge.” The grain was winnowed first “with a hand fan” shaped like the half of a round table “with a box-like side eight inches high running around the rounding edge. The fan was of tightly woven splints for lightness, and it had two handles on the rim. I put on about a peck of wheat at a time, took hold of the handles, put the rounding side against me, then tossed it up and down with a sort of flapping motion, and the wheat falling quicker than the chaff, would lie on the fan and the chaff float on the floor.”<sup>2</sup> In due time appeared mechanical fanning-mills for cleaning the grain, factories for the manufacture of which sprang up at several points in the southern part of the State. Mechanical contrivances for threshing grain and horse-power for operating them appeared prior to the Civil War. One John Leeland of St. Joseph County is said to have (1835) “made for his own use a threshing-machine which was worked by a crank turned by hand-power (two men), and it would thresh about thirty bushels in a day.”<sup>3</sup> A little later a “harvester” was invented by a Kalamazoo farmer. “Phifer’s wheel gang-plow

<sup>1</sup> *Ibid.*, XXXI, 199.

<sup>2</sup> *Ibid.*, XIV, 623.

<sup>3</sup> *Ibid.*, XVIII, 515.

and cultivator," "Allen's weeding-hoe," and "the New Yorker self-raking reaping machine" appeared soon after the Civil War.<sup>1</sup> Forty years ago the necessary implement equipment for a Michigan farm was given by H. Marhoff as follows: One wagon at \$60; one sleigh at \$25; two plows at \$14 each; two harrows at \$12 each; one wheel cultivator at \$30; one gang plow at \$25; one grain-drill at \$80; one mower at \$75; one harvester and binder at \$350; one wheel-rake at \$25; one fanning-mill at \$25; shovels, hoes, forks, and so forth, at \$13.<sup>2</sup> A further auxiliary equipment was recommended, including a horse hay-fork and carrier, hay-tedder, mounted spring-toothed harrow and a land roller. This list is interesting as revealing the stage of development attained by the mechanical aids to agriculture at this period.

There was early manifested a tendency in Michigan for the manufacture of agricultural machinery in small cities. Detroit confines its attention in this direction to the construction of farm tractors, while Grand Rapids possesses only an assembling plant of the International Harvester Company. Nor does this industry feature the wood-using activities of the Upper Peninsula. At Saginaw are a group of factories which produce sugar-beet pullers, serviceable in the surrounding territory: bean-threshers, gasoline engines for farm use, and pump-jacks, while several large machinery firms from without the State distribute from this center. At Jackson, one concern

<sup>1</sup> "Rept. Mich. Bd. Agr.," 1868, 285, 273, 286.

<sup>2</sup> *Ibid.*, 1881-1882, 311.

makes hand agricultural implements, such as forks, hoes and rakes, of which the annual output is reported to run from 150,000 to 160,000 dozen. Another company produces potato-cutters, hand automatic potato-planters, a potato-planter with fertilizer attachment, a fertilizer mixer, a double-cylinder high-pressure sprayer, an elevator potato-digger, a potato-sorter, and short ton truck. Battle Creek has long been known as a manufacturing point for grain threshers. The Nichols and Shepard Company reports an output of 2,000 separators and 400 traction engines annually. The Advance, Rumely Company reports its annual product at 3,000 (oil-pull) tractors, 300 engines, and 750 separators. Port Huron also has an important place in this department of farm machinery construction. The Port Huron Engine and Thresher Company had its beginning at Battle Creek, removing to Port Huron in 1884. Formerly producing a wide variety of machines, in 1920 it reports a more restricted activity, including 188 engines and tractors, and 1,125 grain-threshers and attachments with corn-shellors, portable saw-mills and some types of road-making machinery. The Bryant Engineering Company manufactures machinery for flour-mills, grain elevators, and feed-grinding plants. Two types of machines are turned out; one of these is for the fine grinding of all kinds of grain, while the other is used to prepare ear corn for further grinding. The concern reports the construction of approximately 200 grinders and 50

crushers yearly. The Anker Holth Manufacturing Company manufactures cream-separators. Cadillac makes a smut-removing machine. At Calumet in the Upper Peninsula, there was inaugurated, in 1920, the construction of an "all-service" truck-body, whose "adjustable hinge" permits the transformation of the wagon-box into a platform wagon-bed, or the adjustment of the sides of the body at angles required in various types of farm work.

Before the advent of the automobile, Michigan was a large producer of wagons and carriages. The United States census of manufactures (1914) shows that in 1904 Michigan produced 174,889 carriages, valued at \$7,784,444 and 52,273 wagons, valued at \$2,352,958. Five years later there was a decline of 83,331 in the number of carriages, and of 23,553 in the number of wagons manufactured in the State. By 1914, carriage production had dropped to 25,265 and wagon output to 11,454.

Since the pioneer era, flour and grist-mills have existed at many points, particularly where water-power was available. The university city of Ann Arbor has for more than forty years operated a plant which manufactures agricultural machinery, formerly of many sorts but now exclusively hay-presses. These hay-presses, which enjoy an established reputation, are of several types, adapted to various services, from the baling of alfalfa to sorghum and cane. For some years an annual average of some 650 presses has been turned out by the Ann Arbor Ma-

chine Company, and there is a considerable export business, amounting, in 1919, to about 100 tons, valued at \$75,000.<sup>1</sup>

The manufacture of woven wire fence is in a remarkable degree concentrated in Adrian. This is attributed to the circumstance that J. Wallace Page, founder of the Page Steel and Wire Company, located in Adrian. As has happened in many similar instances, as with the manufacture of paper at Monroe, employees of this concern, having received training and experience through their connection therewith, eventually established themselves in business on their own account. In 1921, there were five companies manufacturing wire fencing in this city, whose aggregate output was estimated at 87,500 tons. Of this amount the Peerless Wire Fence Company produced nearly one-half.<sup>2</sup> Adrian is credited with being the principal manufacturer of woven-wire fencing in the world, and its exports of this commodity in 1919 were 2,149 tons, valued at \$254,336. Exports of wire fencing are sent to South America, north Europe, and Cuba.<sup>3</sup>

Farm machinery is not manufactured in the Upper Peninsula, but the availability of suitable material has led to the manufacture of large quantities of goods closely related to rural requirements. At Escanaba a factory is engaged in the making of butter

<sup>1</sup> Statement by S. C. Case, Ann Arbor Machine Co., and *Detroit and World Trade*, 83.

<sup>2</sup> Statement by The Adrian Wire Fence Co., Inc., April, 1921.

<sup>3</sup> *Detroit and World Trade*, Detroit, 1920, 84.

dishes, of which 391,053,000 are reported to have been produced in 1919. In that year this establishment also turned out 171,262 cases of clothespins, 1,791,000 pie-plates, and 28,832 cases of tooth-picks.

## CHAPTER IX

### RURAL LIVING CONDITIONS

THE first care of the pioneer farmer of Michigan was his home, at least some sort of shelter for the family against the inclemencies of the weather. This he was not left to erect unaided. Willing neighbors and even Indians gathered for the raising. Ample material was at hand in the forest. Skillfully the four corners were carried up, even and perpendicular, and when the roof-trees were in place, a bottle of whiskey and a loud hurrah dedicated this new wilderness abode. "Shakes," or shingles riven from the oak, or a covering of bark of elm or basswood kept out the storm as well as might be, while puncheon floors, also hewn from the logs, shut out the earth beneath. Doors swung on wooden or leathern hinges, while the wooden latch responded to the tug of the latch-string, which seldom was drawn within, for the days of tramps and thieves had not yet arrived. One glazed window was considered very liberal. "At one end of the house was a hugh fire-place five to six feet across, the back consisting of flat stone, the sides or jambs, of curved beams, above which rested a square stick-chimney, the slender sticks piled up



cob-house fashion often on the outside of the house. . . . Stones, or rough and-irons kept large sticks of wood three and four feet long up out of the ashes. Over the fire-place swung a great iron crane, or bar, on which were hung half a dozen, more or less, of S-shaped pot-hooks and short pieces of chain. These hooks the house-wife used supporting kettles, pots, tea-pots and griddles. The crane was swung out, the kettles hung on the hooks, and back again went the crane with pots over the fire.”<sup>1</sup> Here roasted pigs, chickens and spare-ribs suspended before the fire. Baking was done in the brick oven. Johnny-cake baked well on a small board tipped towards the fire, while potatoes roasted in hot ashes. Then came into use baking-tins and tin heat-reflectors. Lastly arrived crude cook-stoves, “costly, clumsy, heavy and inefficient.” From the cross-beams supporting the upper floors hung gun and powder-horn, together with seed-corn, onions and rings cut from the pumpkin and destined for service in delicious pumpkin pies, if the art of the house-wife, under trying circumstances, was equal to the occasion. The house was built without nails and with ample ventilation through the interstices of the logs until these were closed with mud or moss. The Michigan “one-post” bedstead puzzled the eastern correspondent of the settler, according to L. D. Watkins, until they learned that it was built into the corner of the room with only its outer corner supported on the upright post that occasioned its name. A ladder led to the loft

<sup>1</sup>“Mich. Pioneer & Hist. Soc. Collections,” V, 32, 238.

above and perhaps another to the unwallied pit that served as cellar below.

Equally crude was the hand-wrought furniture of the house. First arose the one-post bedstead. "When that was finished," Henry Rawland of Clinton County relates, "my next work was chairs; I split a short log in two, bored four holes in the round side with a two-inch augur, and put in four stout sticks for legs, and set it up, and I had a chair for two people; and then I made another and had enough." For a table they had a chest, while a broom was produced from a pole. "A half a yard from the large end of the pole we sawed into the wood for an inch or so all around; took the bark off and shaved down long slender shavings, or splints, till near the end; lapped them over and tied them down; and we had a broom." The family table was constructed from packing-box boards.<sup>1</sup> Light from within the dwelling came from the open fire or from candles, made by a process of dipping candle-wicking into melted tallow with a sufficient repetition to gain the required diameter. Real progress was achieved with the advent of candle-molds; just before the Civil War kerosene lamps appeared. "About 1858," writes R. C. Kedzie, "I bought my first gallon of kerosene for \$1.50, paying \$3 for a glass lamp and chimney for burning the kerosene. The oil was of an inferior quality as compared with the kerosene of to-day; contained much naphtha; and gave a disagreeable odor in burning."<sup>2</sup>

<sup>1</sup> "Mich. Pioneer & Hist. Soc. Collections," XIX, 621.

<sup>2</sup> *Ibid.*, XXIX, 533.

It was the terrible accidents arising from the highly inflammable quality of this early kerosene that constrained the legislature to provide for the inspection of oil.

The New Englander or New Yorker who brought his family to the Michigan wilds in the era of pioneering, not only gave them a life of primitive simplicity, hardness and toil, but he inflicted on them the unspeakable loneliness of the wilderness home-builder. "Our nearest neighbors were on the west, seven miles," L. D. Watkins writes; "north, four miles; east, four miles; and south, six miles. Thus we were nearly in the center of a wilderness about ten miles in diameter, on which no white man had ever made a mark since the Government survey." "No human tongue can tell the hours of loneliness men and women endured," says the Scotchman, Robert Malcom, pioneer of Oakland County. "It was no unusual sight to see the family—old and young—strike out through the woods to a neighbor's cabin, a distance of two or three miles, simply to find companionship." "We could appreciate, in its full extent, the solitude, the boundlessness, the sublimity of this earliest of earth's offspring—the grand, old, untutored forest," writes Bela Hubbard. "He who has only traversed woodlands where at every few miles he meets a road leading to civilized belongings, knows little of the sense of awe inspired by a forest solitude that has never echoed to the woodman's axe and where every footstep conducts only into regions more mysterious and unknown." To R. C. Kedzie "it was

woods, woods everywhere, trackless, savage, terrifying. They seemed to smother us and we gasped to drink in the open sky. Go out from our house in any direction, it was unbroken forest for long distances; take the trail eastward, and it was five miles to the first house. . . . Go west and it was six miles to the home of Harvey Bliss. . . . Strike out north or south through the lonely woods, and it was twenty or more miles to a white man." This was the common situation to the early settlers as related by themselves, and they were repeated decade after decade from Lenawee to Gogebic County, from the shore of Lake Erie to the shore of Lake Superior.

Nevertheless, life had also its pleasant side for the wilderness farmers of the olden time. A raising, a husking or a logging-bee must have its accompaniment of conviviality, song and story-telling. There were "quilting frolics," hurly-burly and kissing games, with dancing to the fiddled tune of "Zip Coon" and "Money Musk." Apple-parings and corn-huskings gave opportunity for contests of speed, and spelling-matches and debates displayed rustic intellectual prowess. If axmen had their chopping matches, miners had their drill-running contests. Religious meetings, especially revivals and camp-meetings, which last figure less in the early than in the later period of settlement, contributed to the interest in existence, and even funerals were of value in breaking the monotony of a life not so redundant with entertainment as the present age. Such entertainments as had place in early rural life were do-

mestic, for halls and auditoriums belong to a more prosperous period. Just when the "bowery dance" appeared is not in the record, but it afforded a quasi-natural pavilion that had cheapness if not other qualities to commend it.

Intellectual stimulation was derived through the debating society. In a rude structure of logs occurred the weekly meetings of "the Atlas Debating Society," in primitive Oakland County just as Michigan was entering on statehood. Hither came the young men from the farms far and near for those jousts of wit and wisdom that would prepare them for their destined career at the bar, on the bench and in the halls of legislation. Hung from the beams overhead or standing in the corners of the room were the rifles, whose serviceableness was suggested by the howlings of the hungry wolves outside that accompanied the voices of the debaters within. The great fire-place in the foreground gave illumination. It was useless to speculate whether the farmer's Saturday night in town, now spent at the movies and the ice-cream parlor, is as productive of human qualities equally as noble and creative. Circumstances are the masters of men now as then.<sup>1</sup>

Sparse as was the population in its pioneer epoch, it was at intervals decimated by malignant pandemics, that brought dread and pitiful suffering to communities only too inadequately provided with facilities for dealing with these fearful visitations.

<sup>1</sup> Account of Enos Goodrich: "Mich. Pioneer & Hist. Soc. Collections," XI, 263.

It was the cholera in 1832, and the nameless pestilence that struck down men, women and children in Shiawassee County in 1848, and that afflicted Oceana County in 1865. The rank vegetation that moldered on the moist earth was popularly presumed to yield a fever-laden miasma, when disturbed by the plow, and even the sap that exuded from the green logs that formed the walls of the house and which soured and stank in the heat of summer, was considered to have a similar capacity for a baneful influence on the health of the dwellers therein. Even the waters of the streams were deemed poison-bearing and productive of a deadly affluvia on occasion. Two maladies were endemic: the "Michigan rash," which caused merriment as well as annoyance and lacked malignity; and the "shakes," or ague, which was as characteristic a feature of Michigan pioneer existence as candles and stick-chimneys. "We could always tell when the ague was coming on," says A. D. P. Van Buren, "by the premonitory symptoms—the yawnings and stretchings; and if the person understood the complaint, he would look at his finger-nails to see if they were turning blue. No disease foretold its coming by such unerring signs as the 'fever 'n ager.' . . . At first the yawns and the stretchings stole upon you so naturally, that for a time you felt good in giving way to them; but they were soon followed by cold sensations, that crept over your system in streaks, faster and faster, and grew colder and colder as in successful undulations

they coursed down your back, until you felt like 'a harp of a thousand strings,' played on by the icy fingers of old Hiems, who increased the cold chills until his victim shook like an aspen-leaf, and his teeth chattered in his jaws. There you laid shaking in the frigid ague region for an hour or so until you gradually stole back to a temperate zone. Then commenced the warm flashes over your system, which increased with heat as the former did with cold, until you reached the torrid region, where you lay in burning heat, racked with pain in your head and along your back, for an hour or so, when you began by degrees to feel less heat and pain, until your hands grew moist, and you were relieved by a copious perspiration all over your body, and you got to your natural feeling again. Getting back to your normal condition, you felt relieved and happy, and as you went out doors everything about you was pleasant and smiling, and you seemed to be walking in a brighter and happier world. . . . The first question asked a settler, after he had been here a short time, was: 'Have you had the ague yet?' If answered in the negative, the reply would be, 'Well, you will have it; everybody has it before they have been here long.' . . . No one was ever supposed to die with the ague. It was not considered a sickness. 'He ain't sick; he's only got the ager,' was a common expression among the settlers.<sup>1</sup> It was many years before the relation between the mosquito-propagating swamps

<sup>1</sup>"Mich. Pioneer & Hist. Soc. Collections," V, 300.

and marshes and this pandemic was ascertained and that not in Michigan but far away in the tropics of Cuba and Panama.

Public provision in relation to health was not organized for many years. Physicians were few and miles apart. The "beat" of Thomas Phillips of Oceana County extended for fifty miles along the Lake Michigan shore, and was covered on foot, when need was. Patients received much more time for less fee than now. In 1873, under the impetus of the State medical society, came the establishment of the State Board of Health, with an initial appropriation of \$4,000. Coincidentally, the State inspectorship of oils was designed to protect the public against the highly inflammable brands of kerosene then on the market. Shortly the State Board of Health was familiarizing the general public with sanitary principles through the medium of sanitary conventions. No one claims that health and sanitation in rural communities are adequately provided for. On September 15, 1920, the Michigan Department of Health initiated the organization of a bureau of child hygiene and public health nursing, which contemplated carrying out chiefly a rural program, since the cities were conceived to be well equipped to care for their own needs. As planned, work was to start with the schools, through which access to the homes would be secured. District conferences to consider the problems of the rural public health nurse were scheduled.

By 1920 projects for the improvement of rural



health conditions under various auspices were under way in Michigan. The State Department of Health was conducting a traveling clinic, which combined a tuberculosis clinic and one for children. It was the purpose of the latter to discover remediable defects in children and to afford an opportunity for examination for tuberculosis. As a result of these clinics, several county nurses reported that physical defects, such as defective vision, adenoids and enlarged tonsils, have been corrected. The Michigan Anti-Tuberculosis Association, in 1920, conducted a series of clinics in rural districts, in coöperation with the farm bureaus. The report of such a clinic held in Manistee County runs thus: Number of thorough chest examinations, 28; positive tuberculosis, 7; suspicious tuberculosis, 7; negative tuberculosis, 14; examination of school children, including mouth, nose and throat examinations, 82; enlarged glands, 73; decaying teeth, 57; goiters, 36; enlarged tonsils, 58; adenoids, 33; defective hearing, 5; temperature exceeding 99 degrees, 34.

During the first six months of 1920, tuberculosis clinics by the Michigan Anti-Tuberculosis Association were held in eleven counties, when this work was assumed by the State Department of Health. Numbers of counties, including Ingham, Kent, Muskegon, Berrien, Bay and Saginaw, have established their own clinics, and the attendance is said greatly to exceed the facilities. The present plan of work for the local anti-tuberculosis societies which have been organized in various sections involves coöperation

with the State society, use of the local newspaper publicity, the sale of seals to finance the work, education through health talks, clinics, health plays, pageants and movies, distribution of literature, establishment of hot school lunches and the promotion of a constant health crusade. In April, 1921, there were twenty-nine local anti-tuberculosis societies in Michigan, in addition to forty-two tuberculosis committees of clubs and other organizations.

As evidence of the increasing interest in the health of the people, urban and rural, public health nurses are now maintained in many localities throughout the two peninsulas. In April, 1921, they were reported from fifty of the eighty-three counties of the State. The State Department of Health then had listed 266 public health nurses, under various designations, such as county nurse, visiting nurse, industrial nurse, Red Cross public health nurse and school nurse. Of some the field work was country wide; of others, local.

The director of the Bureau of Child Hygiene and Public Health Nursing of the Michigan Department of Health summarizes the work of the bureau as follows: "Sanilac County is planning to have the services of a dentist for two months during the summer months to do work among the rural school children. St. Clair County is equipping a Health Truck for this purpose which goes about over the county during the entire summer. On this truck the local merchants are buying space for their advertisements, which help materially in making the

truck almost self-supporting. Lapeer County has organized a special piece of work in infant welfare, where regular well-baby conferences are held, distributed geographically throughout the county so that all the rural districts of the county are covered. This is being carried on satisfactorily. Requests for our prenatal letters are increasing and during the past two months the Bureau of Child Hygiene has reached, through talks and demonstrations, from eight to ten thousand people, mostly children, because it is in our school children we have hopes for Public Health work."

Rural nursing in Kent County (the second most populous county of the State) was organized in 1915. Dental hygiene was featured and a portable equipment adapted for use in the rural schools was acquired with the financial aid of the Anti-Tuberculosis Society. Eventually (1919) the county board of supervisors assumed responsibility for the dental clinics. A dentist was employed and the county nurse made local arrangements for the clinic. There is a preliminary home visitation to establish a good understanding with the parents.<sup>1</sup>

During the World War, the Michigan Division of the Women's Committee of the Council of National Defense operated an inter-urban car equipped as a traveling child welfare exhibit and a weighing and measuring center. It was transported without charge by the three principal inter-urban companies of the State. This "Children's Year Special" carried a

<sup>1</sup> *Public Health*, Lansing, Feb., 1921, 64.

staff of three to five persons, including the executive secretary of the child welfare department, a physician, two trained nurses and a chart-maker. This project is credited with the warm coöperation of the Michigan Department of Health. Thousands are reported to have visited the car, bringing babies and young children for examination, at the fifty-two places where the "Special" stopped for periods in duration from two to forty-eight hours.<sup>1</sup> "By visiting Special," runs the report, "numbers of people received their first insight into child welfare work. Some towns where little or no child welfare work was in progress decided to immediately undertake something in that line." All committees are reported to have stated that the visiting "Special" greatly stimulated interest in child welfare. The equipment of the car included an exhibit of posters and other publicity material, a display of good and bad toys, a model layette, and a "Don't" table. Here were visible sermons against the use of pacifiers, long-necked nursing bottles, pickles, doughnuts, tea, coffee and sausage as applied to children. Literature of child hygiene was freely distributed.

Numbers of Michigan counties now maintain public health nurses whose ministrations are primarily to the inhabitants of the villages and the country, since the cities are likely to provide for their own needs. The University of Michigan, in the fall term of 1920, inaugurated a course in the training of pub-

<sup>1</sup> Rept. of Caroline Bartlett Crane: Childrens Bureau, Washington.

lic health nurses, of which the first semester's work is theoretical and is carried on at the University, while the second semester provides field work in Detroit. The problem of providing health officials possessed of medical knowledge and experience for the rural sections has long concerned the State Department of Health, which has sought to persuade the legislature to abolish the present system, which allows local officials, chiefly the township supervisors, wholly devoid of medical science, to serve as the health officer, in favor of a system of full-time physicians in every county of the State.

The question is sometimes raised regarding the relative prevalence of insanity and other mental disorders in rural as compared with urban communities. It is recognized that the greater loneliness and monotony attending rural life may intensify a tendency toward psychopathic conditions in certain individuals. As a countervailing influence, the greater prevalence of psychoses arising from alcoholism, syphilis and drug addiction among city dwellers is noted by the superintendents of the State hospitals of Michigan. There is a general agreement among these superintendents that, when proper allowances have been considered, there is no definite evidence of a preponderating amount of insanity in rural, as against urban, districts.

In 1914 a special State commission investigated feeble-mindedness, epilepsy and insanity in Michigan. The investigation brought out that the district with the largest number of admissions of persons to

institutions for this class had a population ranging from 2,000 to 5,000. The lowest number was from strictly rural populations. Of admissions to the State hospitals, cities of 10,000 or over contributed 68.5 per cent of the cases of insanity due to syphilis, and 66.6 per cent of those resulting from alcoholism or drugs. On the other hand, among the cases of mental disorder arising from personal peculiarities rather than environment, 55.4 per cent of epilepsy and feeble-mindedness, and 58.6 per cent of all cases of manic depressive insanity admitted to Michigan State hospitals come from districts having a population of less than 10,000, according to the investigators; while 43.5 per cent of the cases of manic depressive insanity, and 42.17 per cent of cases of epilepsy and feeble-mindedness come from districts of 2,000 or less. It was found that dementia præcox was slightly more prevalent from these smaller districts. Likewise, senile dementia had 41.9 per cent of admissions from districts with less than 2,000 population.<sup>1</sup>

Following the War, the Red Cross undertook work in line with its particular objects, a phase of which is related to rural communities of the State. Thus in Oakland County, work in five departments was planned: public health, social welfare, Junior Red Cross, first aid, and home service. The plan contemplated the division of the county into eight zones composed of groups of school districts. In each zone a health center was designed, with a Red Cross nurse

<sup>1</sup> Feeble-mindedness, etc., in Mich., Lansing, 1915, p. 21.

in residence and where an office would be maintained. A Ford automobile was to be provided each nurse. Traveling clinics were to visit each health center regularly. Under the direction of the American Red Cross, each zone was financed for one year, after the expiration of which period it was hoped that each zone would provide its own funds through a school tax. There was to be a public health nurse and a social welfare worker with county-wide jurisdiction. It was purposed that the home service work should be continued for a considerable period in order to care for the former service men. The Junior Red Cross feature of the plan was not carried out, and it is as yet too early to write definitely regarding the other features of the program. Red Cross work of this general character is reported from Muskegon and other counties.

## CHAPTER X

### AGRICULTURAL SOCIETIES

IF the rural debating society is a thing of the past, it is not thus with the agricultural fair, which also dates back to the early days of Michigan agriculture. The promotion of fairs was an object of the Michigan State Agricultural Society organized under an act of the State legislature of 1849, "for the purpose of promoting the improvement of agriculture and its kindred arts."<sup>1</sup> The society's constitution made provision for a president, for a vice-president in each organized county and for a corresponding secretary in each such county to be affiliated with the State society as well as the local county agricultural society. The State society was to hold an annual fair, and its executive committee was to provide premiums "on such articles, productions and improvements as they may deem best calculated to promote the agricultural and household manufacturing interests of the state, having special reference to the most economical or popular mode of competition in raising the crops or stock or in the fabrication of the articles offered." The county agricultural societies were deemed "auxiliaries" of the State society. The right to establish

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1859.



county, township or district agricultural societies was specifically recognized by the statutes, which should have the power to possess real estate for the furtherance of their objects, and to issue bonds for the purchase of land and the erection of buildings; and a tax levy in aid of such societies was authorized, whose proceeds were to be apportioned by the county boards of supervisors.

These early statutes for the promotion of Michigan agriculture are in effect today, and the county fairs, which were a principal activity of these societies, are still very popular throughout both peninsulas both for the urban and the rural population. At the ninth annual fair of the Berrien County Agricultural Society, held at Niles during three September days of 1859, there were 648 entries, including 72 horses of class A, and 50 horses of class B; 7 of trotting horses; 4 entries of Durham cattle; 15 of Devon cattle; 32 of "natives and grades"; 17 of sheep; 7 of swine; 14 of poultry; 24 of field crops; 72 of vegetables; 32 of fruit; 4 of cooperage; 23 of farming implements; 3 of manufactures of grain; 14 of manufactures of leather; 12 of horseshoes and shoeing; 4 of domestic manufactures; 46 of domestic manufactures—ladies; 17 of needle and shell work; 16 of painting and drawing; 67 of bread, preserves; 5 of flowers and house-plants; 16 of dairy products; 45 of miscellaneous articles.<sup>1</sup> "The third day," says the secretary's report, "the fair opened with a grand exhibition of horses, followed by an exhibition of

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1859, 323.

cattle arranged in classes. At 2 o'clock P. M. an able address was delivered by Hon. Francis W. Shearman of Marshall. Then followed a trial of trotting horses and female equestrianism. . . . The premiums awarded amounted to over \$500 which were all paid in cash." The society owned seven acres of ground within the city limits of Niles "enclosed with a substantial fence," and "handsomely fitted up." In the same year there were 870 entries at the Hillsdale County fair, 952 at the St. Clair County agricultural fair, and the Washtenaw County fair numbered 1,652 entries in that year. Among the exhibits at this fair in 1859 was a pair of oxen weighing 4,000 pounds and a cow "said to give sixty-five pounds of milk a day." The *Ann Arbor Local News* of October 18 notes that "the general interest in wool-growing was manifest in the large and choice assortment of sheep exhibition." The sheep were chiefly of the Spanish Merino, Silesian and South-down breeds, the paper reports. Then there was a floral and a fine art display, in the latter department appearing "E. H. Crane's revolving, self-setting game and rat-trap." The paper observes that rat-catching is surely a "fine art," as pursued by this device which when set would "catch a rat, kill him, throw him away in a box and set itself for another, and so continue to do until it has caught fourteen." In the implement exhibit at this fair, there caught the attention of the assembled farmers "Birdsall and Brokaw's combined Clover-thresher, Huller and Cleaner," which "threshes, hulls and cleans from

four to six bushels per hour, and wastes not a kernel." The agent for the thresher also had on exhibition "Hallock's Combined Cross-cut and Circular Saw-mill, . . . made simple and strong, easy to operate and not liable to get out of order." U. B. Daley of Salem exhibited "a one-horse clover-picker," while Messrs. Dow and Covert were on hand with their "eight-horse power threshing machine," of light draft and run "first by two span, then by a single span, and finally by a single horse." Forsbee's Patent, Cast Iron Cultivator, constructed on the jointed parallelogram principle, costing only ten dollars, had five teeth and a coulter and could be set at various widths. A. D. Hoffman of Belleville had on exhibition "a model of his late patent hand-power cider mill, a new thing," and "one of those ingenious improvements which are objects of interest to every farmer." The machine was built in two sizes, whereby with one "a man can make a barrel of cider in two and a half hours, with the other two barrels in the same time," and a ten-year-old boy could operate either. "The celebrated Buckeye Mower that carried off the first premium of the U. S. Agricultural Society at their trial in Syracuse in 1857, was on exhibition." "Cook's Sugar Evaporator" was another "success" of the fair, which "produced the nicest sirup from the cane in about thirty minutes."

Equally notable was the vegetable exhibit. It contained a specimen of the "California pie-melon," which weighed, it was understood, thirty or forty pounds on occasion, "keeps two years without diffi-

culty and makes a pie difficult to distinguish from apple." There were speeches and band-music, and "it was a goodly sight to see the sturdy yeomanry thus gathered together, and happily nothing occurred to mar the pleasure or dim the splendor of the day," for the eight thousand or more who were in attendance.<sup>1</sup>

This was not the first fair held in Ann Arbor. Twenty years before a "state fair" had been called there for the autumn of 1839, and thither appeared, it is said, only two exhibitors on the grounds which lacked everything but space that a fair requires. After issuing the announcement of the event, the president of the agricultural society had forgotten the appointed date and hence omitted the necessary preparations. About 1870 the State Pomological Society held its first fair on the grounds of the Kent County Agricultural Society.<sup>2</sup>

Today the West Michigan State Fair, held at Grand Rapids, shares interest with the Michigan State Fair at Detroit as the dominant event of the year in Michigan agriculture. Much of the description of either fair today, as well as the local fairs, might be taken from the accounts of similar events seventy years ago, with such modifications and additions as the passage of the years would suggest. Electricity, farm motors, talking machines, social work, governmental activities are represented now as contrasted with the earlier epoch. The Grand

<sup>1</sup>"Rept. Mich. Bd. Agr.," 1859, 585.

<sup>2</sup>*Ibid.*, 1870, 349.

Rapids fair of 1920 "was a regular fair—the big West Michigan show held in Grand Rapids, September 20-24, judged by any standards, crowds, noise, midways, hot-dogs, big pumpkins, fine stock, patchwork quilts, commercial exhibits, small boys under foot and daring aviatrix overhead."<sup>1</sup> Time has seen the elimination of many village fairs, which a generation or more ago had place in rural communities of the State. Even these miniature events had keen interest for the people of the country-side, as some middle-aged folks can still plainly recall. All the family went. The children's shoes must be neatly blackened in a row, the evening before, against the early hour that all must rise and go wagon-wise to the great event in town. There, Taffy, Punch and Judy, and the antics of a clown vied in popular interest with the products of domestic skill and the field and pasture. Counties still have their annual autumnal fairs, even those by the Lake Superior shore, and the agricultural displays at the Houghton or Escanaba fairs in the Upper Peninsula show a remarkable variety and quality of the products of the northern farmsteads.

For the purpose of extending State aid to agricultural fairs in Michigan, the legislature of 1915 established the Michigan Agricultural Fair Commission, on which the State Board of Agriculture, the Michigan State Agricultural Society, the Michigan State Grange, the Ancient Order of Gleaners, the Michigan State Association of Farmers Clubs,

<sup>1</sup> *Michigan Farmer*, Oct. 9, 1920, 440.

and the West Michigan State Fair Association were to have representation. This commission was to determine the financial assistance to be rendered fairs throughout the State and an initial appropriation of \$50,000 was provided to this end, a sum raised to \$75,000 in 1919.

The Michigan State Grange of the Order of Patrons of Husbandry was incorporated by an act of the legislature in 1875. At the same time provision was made for the incorporation of county and subordinate granges, which incorporation is enjoined among local granges by the constitution and by-laws of the order. The State Grange is affiliated with the National Grange, and is in turn affiliated with county and subordinate granges. The work of each grange is ritualistic in accordance with the ritual appropriate for the grade of each in the order. For the granges of each class a corps of officials is provided consisting of a master, overseer, lecturer, secretary, steward and other officers, some of whom receive compensation in accordance with the declared preference of the organic law for low salaries, interest and profits. The declared object of the order as expressed in the preamble of its constitution is "for mutual instruction and protection, to lighten labor by diffusing a knowledge of its aims and purposes, expand the mind by tracing the beautiful laws the Great Creator has established in the Universe, and to enlarge our views of creative wisdom and power." The order takes its position on the principle that "the soil is the source from whence we derive all that

constitutes wealth. . . . The art of agriculture is the parent and precursor of arts, and its products the foundation of all wealth." The Grange exists to promote knowledge of these natural laws that underlie production and to strengthen and encourage its membership through their mutual association. Aside from the social and educational aspect of its work, the Grange in Michigan has promoted coöperative marketing through its local and central organizations, and has also seen established under its aegis several farmers' mutual fire insurance companies, and has directly fostered the organization of a life insurance company, whose insurance in force, December 31, 1920, amounted to \$11,382,405.56. One-half the number of policy holders are farmers. Its annual meetings afford the State Grange an opportunity for formulating and espousing policies with reference to taxation, marketing, education and production in which the farmers of the State are presumed to be especially interested. The State Grange has thus taken favorable action in relation to a State income tax and a tonnage tax for mines, favored acts in aid of agricultural education both locally and at the Michigan Agricultural College, promoted prohibition and women's suffrage and, at one time, a State warehouse for marketing farm products.

By no means all the farmers or all farming communities of the State are affiliated with the Grange. The 638 subordinate granges of Michigan in 1920 had 41,567 members, enrolled as reported by the secretary. Nor is membership uniformly distributed

throughout the two peninsulas. Of the aggregate number, ninety-one granges are located in the Upper Peninsula, with the counties of Delta, Chippewa and Marquette in the lead. The largest Grange memberships are in the counties of Allegan, Branch, Eaton, Kent, Lenawee and Muskegon, each of which has more than one thousand members, Lenawee leading with 3,019 in 1920.

The Grange Mutual Fire Insurance Company of Michigan, Limited, whose secretarial office is at Roscommon, employs the executive committee of the State Grange as the final court of appeal in case of disputes concerning the adjustment of losses. This company was organized in 1913 and reports (April, 1921) nearly six million dollars of insurance in force. The company writes what is designated the "rodded" and the "unrodded" classes of insurance. In 1920 it reported losses of \$13,376.62. Officers are elected and amendments to the by-laws are made by members voting by mail from their own granges. The company operates on the "advance assessment" plan, and in case of loss pays three-fourths of the value, except with live-stock killed by lightning, when full value is allowed.

The Patrons Mutual Fire Insurance Company, whose office is at Lansing, is also closely associated with the Grange, although the latter is not financially responsible for it. The company writes three classes of business: the "rodded" and the "unrodded" on the annual assessment plan, each policy being assessed on the anniversary date; and in the third



class, a policy is written for a term of one, three or five years and the premium is paid in advance. In this class are received all types of property permissible under the Act of 1919, the company confining its membership to the Grange; and, in order that insurance might be continued, it was required that members' dues be paid in the subordinate Grange. The same requirement now obtains for classes 1 and 2. Only members of the company have a vote in its affairs, although formed under the auspices of the Michigan State Grange. In April, 1921, this company reported some \$24,000,000 of insurance in force, and losses were running at the rate of about \$50,000 annually. On December 31, 1920, 8,130 policies were in force.

The Ancient Order of Gleaners has been operating in Michigan for upwards of thirty years, and in 1921 it had eighty thousand members in Michigan, Ohio, Indiana and Illinois. The organization's life insurance department has paid out some seven million dollars in benefits and reported assets in April, 1921, of \$1,347,680. Its Coöperative Mutual Fire Insurance Company, conducted as are other mutual insurance companies, carried risks of twenty-four million dollars. In April, 1921, there were reported 990 local "arbors" in Michigan. The counties having the largest number of members were then Tuscola, Sanilac, Huron, Lapeer, St. Clair, Genesee, Saginaw, Isabella, Montcalm, Gratiot, Oakland, Midland, Livingston, Shiawassee and Mecosta.

The Gleaner Clearing House Association is or-

ganized under the "Coöperative Law" of 1917, for the enactment of which the Order claims the credit. This statute provides that "any number of persons, not less than five, desiring to become incorporated for the purpose of conducting any agricultural, dairy, mercantile, manufacturing or mechanical business in the State of Michigan upon a coöperative plan or in accordance with the principles of co-operation, may associate themselves as a coöperative corporation, company, association, society or exchange, and by complying with the provisions of this act, they and their successors and assigns may become a body politic and incorporate." Section 10 states that "the stock, property, affairs and business of every corporation organized under the provisions of this act shall be managed by a board of not less than five directors, who shall be stockholders, and shall be chosen annually by the stockholders at such time and place as shall be provided by the by-laws of said corporation." The directors choose the president, secretary and treasurer and other officers. The amount of stock held by an individual may be limited by the by-laws of the corporation. The by-laws are required to provide for the payment of dividends (not to exceed 7 per cent), accumulation of reserve fund, and the division of profits on the co-operative plan among members doing business with the corporation; and they may provide for coöperative dividends to non-members. Distribution of profits must be annual or at a shorter interval.

Under this act, the Gleaner's Association owns and

operates twenty-six elevators and buying stations in Michigan, and also two in Ohio. The business is managed and financed from the central office at Grand Rapids. The authorized capital stock is \$1,000,000. On December 31, 1921, the reported value of the land, buildings and merchandise owned by the association was \$467,809.49. The equipment was valued at \$38,991.76. The total capital assets were given as \$506,801.25; and the total current assets as \$497,720.92. This made an aggregate of assets of \$1,004,522.17. During the year the association is reported to have handled about \$6,000,000 worth of farm products. The shares of stock are for ten dollars each and are all owned by farmers. Even the general manager owns only one share. Each stockholder has but one vote regardless of the quantity of stock held.<sup>1</sup>

The Michigan State Association of Farmers Clubs, "believing that the social, moral, intellectual and financial condition of the farmer is advanced by local organization of Farmers' Clubs, and that the organization of other local clubs will be promoted by a central or state association of clubs already in existence," has adopted a constitution which provides for a president, vice-president, secretary, treasurer, and six directors. The annual meeting is held in Lansing at a date determined by the executive committee. Each member club is required to pay to the State Association dues amounting to fifty cents for the family membership thereof, the aggregate of

<sup>1</sup> Statement of Grant Slocum, President, April, 1921.

which must not fall below five dollars a club. The membership roll of the State Association in 1920 names sixty-three local clubs chiefly in the east-central and southeastern counties of the southern peninsula (Clinton and Shiawassee counties leading). The aggregate reported membership of the local clubs amounted to 3,178. It was expected that the State Association would serve as a clearing-house for ideas related to agriculture and would enable the united membership to promote its interests more effectively. A glimpse of the subjects in which the federation is concerned is obtained in the resolutions adopted at its annual meeting of 1920. These include a recommendation of increased State aid for rural schools and the consolidation of rural school districts; approbation of the Michigan State police, particularly for its activity in enforcing the dog-license law, control of automobile traffic on the public highways and the enforcement of the prohibition law, and the general protection of property; and a recommendation that the force be continued and adequately supported; and a similar resolution in regard to the Livestock Sanitary Commission was adopted. Ample legislative appropriations for the Michigan Agricultural College were commended, while the project of a State soil survey was endorsed. Similar action was taken in regard to the State Department of Health and the Anti-Tuberculosis Society. On the other hand, the State's boxing law, which legalizes "the disgraceful, demoralizing and degrading business of boxing," was as-

sailed and its repeal requested of the legislature. In the realm of national affairs, the Great Lakes-St. Lawrence deep waterway was indorsed, an embargo on wool, woolens, sheep products and beans was requested, the "full enforcement" of the national prohibition law was demanded, a tariff was requested, "which shall protect the American farmer on cattle, wheat, beans and milk, in competition with cheap labor in other countries"; and Congress was asked to stiffen the requirements for the admission of immigrants to the United States. The outlawry of the "insidious practice" of speculating in farm products on the board of trade was demanded of Congress.

A statute of 1871 provided that any five or more persons associated together to promote the interests of pomology, horticulture, agriculture and kindred arts and sciences, may incorporate as a local or state organization. The Michigan State Horticultural Society was organized in 1870, whose declared object is "to encourage among the people a greater love for choice fruit products; to awaken a larger interest in Michigan's horticultural possibilities, and to offer practical suggestions along modern cultural and marketing methods." The membership reported in June, 1921, is about 675. Its work is purely educational and aims at relating science to horticulture with a view to "bring the grower and his needs and the scientists with their research work together for the development of the horticultural interests and meet the needs of the growers in solving the problems and raising the standards of the horticultural prod-

ucts in Michigan." Each year two or three meetings are held in different sections of the State in order to cast the influence of the society as far as possible.

Societies for the marketing of agricultural products are discussed in Chapter VII.

## CHAPTER XI

### EDUCATIONAL ENTERPRISES OF MICHIGAN

THE farmer folks who spread over the primeval Michigan wilderness a century ago had regard for education and only primitive means of securing it. The school-house was literally of wood in every particular, each element in its construction hand-made and home-made—the walls of logs cobbled up tier upon tier, the roof of shakes supported on long transverse poles, the floor of puncheons, the desks and benches of slabs, the door swung on wooden hinges and held by a wooden latch that answered to the leathern latch string, oiled paper often in lieu of glass in the windows, wooden beams even in the fire-place and mud-covered sticks in the chimney. There was ample ventilation, if less warmth. A miscellaneous assortment of text-books, outnumbered oftentimes by the users of them, had come with the settlers from their eastern homes. Webster's Spelling Book and Daboll's Arithmetic were certain to have place among them. The teacher's fitness for his task was ascertained by a committee of school inspectors whose qualifications were likewise primitive, and, in addition to his instructional duties, the master must be competent to

thrash his oldest pupils, male and female, to set a good copy, to be his own janitor and to mend the quill pens of his students. The wild life of the adjacent forest, Indians, insects, birds and reptiles, were likely to call occasionally and trouble the routine of the pioneer school. The summer term was less trying to the teacher, since the labor of the older pupils was required on the farm at home. Compensation was according to the standards of the age and circumstances. It often ran as low as eight dollars a month, but boarding round reduced the cost of living to the minimum. The cash income of the school district was derived from the beneficiaries of the school in accordance with a scale of tuition based on a count of heads and the attendance record. The rate-bill presented the amount due from each parent until, in 1869, legislation abolished it in favor of free schooling, nineteen years after the second State constitution had enjoined provision for free education on the legislature.

Almost at the outset of the State's existence, the grant of the sixteenth section of every township, provided by the United States in favor of the State itself rather than each local school district as elsewhere, had established the foundation of the State's present primary school interest fund, later augmented by the proceeds from the grant of the so-called swamp lands already adverted to in a previous chapter. The net cash returns from the sale of these lands have been invested, partly at the rate of 7 per cent interest, partly at 5 per cent, which interest re-



turn alone can be expended, and that only for school purposes, chiefly teachers' salaries. Many rural schools of Michigan, as well as urban, particularly those in poor sparsely peopled regions, have been greatly helped by the State aid arising from this fund, especially since its augmentation by the addition thereto of railroad and other similar taxes has made it amount to several million dollars every year, distributed through the office of the superintendent of public instruction to each school district in proportion to its population of children between the ages of five and nineteen years inclusive.

The early constitution and laws of the State likewise made provision for libraries designed to serve rural as well as urban needs, and financial assistance for them was contained in the provision for the distribution of income derived from fines imposed in the courts for violation of the penal laws. The provision of reading matter through local rural libraries still leaves something to be desired, but the extension of the service of the State Library at Lansing into all parts of the State desiring it, and, in a very few instances, of city libraries into outlying portions of the county, has done something to ameliorate the rural reading facilities. In 1917 the legislature permitted county boards of supervisors to establish libraries or to contract with existing libraries for county service. In that year the supervisors of St. Clair County authorized a contract with the Port Huron Public Library for service to the county. In 1921 this Port Huron Library was thus

receiving two thousand dollars from the county. Six stations were established outside the city to handle books for this service. The total county circulation through these branches from October 1, 1919, to October 1, 1920, is reported to have been 10,543 volumes. A similar arrangement exists in Menominee County between the county and the Spies Public Library of Menominee. There are thirty branch libraries (October, 1920), located in drug and general stores, a cheese factory, a school and ice-cream parlor and a residence. During the first six months, with some branches operating for a shorter period, there was a county circulation of 11,127. As illustrative of the favor shown locally to this service, Stephenson, a hamlet in a well-developed rural neighborhood, received 225 books which gave a circulation for the first three months of 1170, of which 633 were juvenile, and 537 adult reading. By vote of the supervisors, the county undertook to maintain one-half the expense of maintenance of the Spies Public Library, provided the county's share did not exceed \$5,000. County service began in February, 1920. The books are distributed in containers constructed to serve as book-shelves at stations.

The first Michigan schools were district, comprising fractions of townships a few miles square. No effort at relating rural school curriculums to the agricultural environment or requirements was made. Reading, writing, arithmetic and spelling, sometimes grammar and geography, were serviceable to every-

body. The select-school, academy, union school or branch of the State University in town gave opportunity for additional schooling to such as were ambitious for it. As a social center, the pioneer rural school functioned chiefly in spellings-down and debating. The multiplicity of schools in every township divided local resources, both tutorial and material, and obviously impoverished the whole educational effort of rural Michigan. In 1891 and 1909 the legislature outlined and made possible township unit schools, involving the consolidation of existing one-room district schools into larger plants employing instructors with higher training and compensation. The southern rural communities of the State, however, were extremely slow in adopting this new and optional system, which made progress more rapidly in the Upper Peninsula, particularly in the mining and lumbering sections where local conditions were more favorable and where leadership was more definitely in the hands of the most enlightened persons of the community.

There remained lack of proper provision for distinctly agricultural education for rural children, and the establishment of a school at Otter Lake, Houghton County, with positive provision for laboratory and field work for boys and girls below the high-school grade, seems to have inaugurated in 1912 a new era in rural education in Michigan. In 1917 the State legislature was persuaded to extend financial aid to such schools wherever established, and, after the re-enactment of the law in 1919 and 1921 to

correct errors in its drafting, a large number of consolidated rural schools teaching agriculture and domestic science sprang up even more rapidly in the southern peninsula than in the northern. (See Plate VIII.)

The consolidated rural school act in its present form as it came from the session of 1921, enables the county commissioner of schools, acting in behalf of three or more existing school districts or the board of education in township districts to submit the question of consolidating such separate districts and of establishing therein, or in an existing township district, a rural agricultural school. In the school which follows the adoption of such a proposal by the qualified voters, provision is made for instruction in domestic science, manual training and agriculture. Such a school has at least five acres of land and a corps of teachers, engaged for at least nine months of the year, and qualified to give instruction in agriculture, domestic science and manual training. The State aid is \$1,000 a year, and also \$400 for each vehicle employed in the transportation of pupils.

The original school, at Otter Lake, had done much to introduce progressive agricultural methods and to Americanize an isolated rural community of Finnish people. It had demonstrated the value and method of land clearing, promoted the introduction of progressive practices in agriculture (tillage and stock-raising) and served as a community center for persons otherwise wholly without such facilities.

While the two acts for the establishment of township unit districts in the Upper Peninsula and for the whole State respectively had improved rural education through the abandonment of small inadequately supported districts, they lacked the essential and distinctive training in agriculture for the children of the countryside. Thus the adoption of the rural agricultural school under the acts of 1917 and 1919, if generally followed everywhere in rural Michigan, would undoubtedly revolutionize Michigan agriculture and rural life within a generation. As yet, only a fair beginning can be said to have been made.<sup>1</sup>

It is notorious that the quality of rural school instruction is much below that of urban communities. Until recently, normal training was not a prerequisite to the granting of permission to teach in the schools of Michigan, and, up to 1921, only six weeks of such training were required. Untrained teachers were most commonly found in the country schools, where they were extremely young and inexperienced as well. An educational expert of the department of public instruction estimates that 21 per cent of the teachers of the State held third grade (signifying lowest grade) and special certificates in 1920, and that another 24 per cent were holders of second grade certificates. Teachers of this class are more common in the rural than in the village and city schools. It is estimated, on the other hand, that

<sup>1</sup> Mich. Dept. Public Instruction: Consolidated Schools, Lansing, 1919.

200,000 children were then being taught in the 7,280 rural schools where such inexpert instruction was in order. It is estimated that 65 per cent of the one-room rural schools of Michigan maintain instruction during nine months of the year, 21 per cent for eight months, 10 per cent for seven months, and 4 per cent for less than seven months. Forty-nine per cent of such schools is estimated to maintain ventilating systems. Forty-eight per cent was below the department's standard of size. Sixty per cent had two-side cross-lighting, and 25 per cent three- or four-side cross-lighting. Only 34 per cent of the schools had the requisite quantity of natural light—a ratio of window-space to floor-space of one to five being the approved standard. Even schools with the standard quantity of natural light frequently had it improperly distributed. Medical inspection and school nursing were very largely lacking.<sup>1</sup>

On the positive side, it may be stated that the general laws of the State, as related to rural schools, provide for compulsory attendance; county normal training schools for the training of rural school teachers; a uniform and approved course of study; physical education in all schools, with required instruction in districts of more than 3,000 population; fire-drills; the approval of the plans of all school buildings costing over \$300, by the department of public instruction of the State; for ventila-

<sup>1</sup> Rural Education in Mich.: Mich. State Teachers' Assoc., pub. Kalamazoo, Oct., 1920.

tion in the case of all new and replaced heating systems; for the use of school buildings and grounds as community centers and for entertainment; for the instruction of school officials by experts of the State department of public instruction and for the payment of the tuition of rural school pupils desiring to attend high-schools outside the district and for their transportation thereto.

The educational leaders of the State recognize that the fundamental defect in the Michigan rural school situation is the small district, which involves gross inequalities in taxable resources as compared with urban districts, and hence inadequate provision of whatever is essential in a progressive effective school system. There are counties in which the township valuations run as high as nearly \$14,000 for a child of school age resident therein, and others in which such valuations fall as low as \$600. Obviously such a situation involves great divergence in the tax rate and limits the income available for school purposes so that equality of educational opportunity is impossible. The remedy is in a larger school district and hence enlarged unit of taxation. While township school districts are permitted, there is no provision for a county district. Apparently there must be either compulsory consolidation of present small school districts, or a general state tax for the support of schools, in addition to the proceeds of the present primary school interest fund, the latter being distributed among the districts in quotas related to re-

quirements or the character of the school work therein provided.<sup>1</sup>

Under the leadership of the department of public instruction of the State, the legislature of 1921 enacted a series of laws, some of which directly bear on the rural schools. A considerable number of township unit school districts had been organized by special acts of the legislature at a time when local legislation was common and constitutional. All such districts were brought under the general law in 1921. The township unit law was clarified and simplified. The amended consolidated rural school law increased State aid to \$1,000 a school, thus abolishing the distinction between Class A and Class B, while \$400 a vehicle were allowed for the transportation of pupils. School districts were permitted to erect teacherages for the housing of school teachers, a welcomed innovation, especially in sections in which housing conditions are inadequate and unsatisfactory. Districts which lack a high-school are required to pay the tuition of school pupils to a neighboring high-school up to \$60 a year. A minimum term of nine months in all schools of the State is now required by law. School officers are empowered to levy taxes for the special purpose of putting school-houses in safe and sanitary condition. By 1925, all persons undertaking to teach in Michigan must have at least one year of professional training above the four-year high-school course. Private and parochial schools

<sup>1</sup> Mich. State Teachers' Assoc., *Quarterly Review*, Jan., 1921, 11.



are brought under the supervision of the Superintendent of Public Instruction.

In 1919 the legislature created the Athletic Board of Control which was to license and supervise boxing contests in the State. The statute provided that all the earnings of this board should be expended for the promotion, stimulation and supervision of physical education and athletics in the public schools of Michigan. The expenditures were to be distributed by the chairman of the Athletic Board under conditions determined by the Superintendent of Public Instruction. It was purposed that the funds should acerue primarily for the benefit of the rural schools which were quite without facilities for athletic recreation. To ascertain just what the conditions really were, a questionnaire was distributed among the commissioners of schools. From the answers received, it appeared that the first need of the rural schools was for recreational material; secondly, for instruction for teachers in the fundamental principles of play, recreation and physical education; and finally for supervision and leadership in the work. The first requirement was satisfied in part by the purchase of athletic material out of the funds previously referred to. The limited amount of money available would not permit the uniform distribution of athletic material to all the schools of the State, so the board of control wisely determined to make provision first for the small rural schools, next for the small towns, and finally for the cities. Under this plan, balls, bats, and other similar equipment

were provided in very large quantities to very many schools of the two peninsulas, and were greatly appreciated by the beneficiaries. Likewise a few county athletic institutes were held for the improvement of athletic instructions. Up to June, 1921, the Department of Public Instruction, which has charge of the distribution of this athletic material, reported the purchase and distribution of 1,000 dozen fourteen-inch outseam playground balls, 800 dozen regulation indoor bats, 150 dozen regulation basketballs, 500 dozen soccer balls, 75 dozen regular baseballs, 40 to 50 dozen catcher's outfits, 25 dozen tennis rackets, 1,500 sets of boxing gloves, 50 dozen striking bags, and, in addition, small amounts of volleyballs, volley-ball nets, tennis nets, basketball goals, playground slides, giant strides, regulation footballs and the like, in quantities dependent on requests made for these articles by various schools. The policy of the department is stated to be, "not to send material for competitive games, but to send materials which might be used by the masses of the children rather than any select group."

Menominee County has sought to establish the boy scout organization on a county-wide basis, making provision for the boys of the small towns and communities as well as of the cities, and has employed a paid executive to take charge. This work is still in its incipiency, but much is hoped from it.

In 1917 Congress enacted what is known as the "Smith-Hughes Law," whereby the United States coöperates with such states as accept and conform

to the requirements of this act, in aid of vocational education, including agriculture, home economics and the manual arts. Michigan promptly accepted the terms of the Smith-Hughes Law. The legislature of 1919 created the State Board of Control of Vocational Education, which in turn appointed supervisors and adopted a plan of work and procedure. The federal aid is extended only to schools below college grade and on condition that an equivalent expenditure is incurred by State or local administrations. The board alone coöperates with the schools that operate under the law, and, under the Michigan plan, shares equally with the local school districts, the State's moiety of the contribution for such vocational education. In 1920 fifty-nine schools, three in the Upper Peninsula, received federal aid under the Smith-Hughes Law in connection with agricultural education. These were all public high-schools, with the exception of the Menominee County Agricultural School. Pupils are required to be above the age of fourteen years and to have pursued, or to intend to pursue, agriculture as a vocation. There were approximately two thousand such pupils in these schools in 1920, taking work in agriculture. The local school districts provide buildings and equipment. There must be suitable laboratory facilities and outdoor field work, conducted under instructors of approved qualifications. The course of study, covering four years, includes such subjects as plant life, farm carpentry and mechanical drawing, farm crops and soils, horticulture, animal husbandry, farm man-

agement and farm machinery, cement construction and use of the gas engine. The number of schools conforming to the Smith-Hughes Law as applied in Michigan increases annually, and was sixty-five in 1921.

To prepare agricultural teachers and leaders, and to diffuse knowledge of scientific agricultural principles and processes among the farmers of the State, the Michigan Agricultural College was opened in the summer of 1857. In this departure from the then accepted ideas of education, Michigan appears to have taken the lead in this country. The project had been broached at the inception of statehood, and and for many years it was conceived proper to connect agricultural education with the University of Michigan. After its establishment in 1849, the Michigan Agricultural Society had promoted the project for a State school of agriculture, and the State constitution of 1850, in one of its articles, made provision for it. For a time the University maintained a department of agriculture, but in 1855, the legislature by law laid the legal basis for a separate institution and appropriated the State's salt spring lands in aid of the venture. The executive committee of the State Agricultural Society determined the site which was selected in the wilderness three and a half miles east of the capitol at Lansing. Its location without the agricultural zone of the State, as it then was, did not give general satisfaction, but all efforts to remove the institution to Ann Arbor failed. The control of the College at first

rested with the State Board of Education, which also administered the State normal school; but in 1861, a separate board, that of agriculture, was created to have charge of the Agricultural College. The following year (1862) the College became the beneficiary of a grant by the United States of 240,000 acres of land in its aid, under the "Morrill Act," and at the same time had its curriculum somewhat defined, particularly as regards instruction in engineering as well as agriculture, as a condition of receiving this contribution to its resources.

In 1875 the College faculty undertook extension work among the farmers of the State through institutes in which addresses by experts from the staff were supplemented by discussions by the attending farmers themselves. This procedure associated scientific knowledge with practical wisdom, and was designed to promote a good understanding between the Agricultural College and the farmers.<sup>1</sup>

In 1885 the legislature made provision for the publication through bulletins and press notices of information arising as the result "of experiments made in any of the different departments of the agricultural college, and such other information that they may deem of sufficient importance to require it to come to the immediate knowledge of the farmers and horticulturists of the state." Hundreds of bulletins have been issued by the College in accordance with this

<sup>1</sup>On the early history of the Mich. Agr. Coll., see R. C. Kedzie in "Mich. Pioneer & Hist. Soc. Collections," XXIX, 554 and Pres. T. C. Abbot, *Ibid.*, VI, 115.

legislation. In 1889, the legislature accepted the provision of federal aid for the establishment of an experiment station, and ten years later provided for a station in the Upper Peninsula, where conditions of climate in particular made a distinct experiment station desirable. In the same year, the State Board of Agriculture was authorized to "hold institutes and to establish and maintain courses of reading and lectures for the instruction of citizens of this state in the various branches of agriculture, mechanic arts, domestic economy, and the sciences related thereto." Such institutes were required to be held annually in every county where an "institute society" had been organized by residents of the county. In the stress of the Civil War (1863) military training was made a required course at the Michigan Agricultural College, and so remains.

As now organized, the Michigan Agricultural College embraces five divisions of work: Agriculture, including forestry and horticulture, engineering, home economics, veterinary medicine, and science and letters. There are also two experiment stations and the division of extension work. The income of the College is derived from the proceeds of the sale of lands granted by the United States (now approximately \$70,000 per annum), the income from a tax of one-fifth of a mill on taxable property within the State, amounting to about \$550,000 per annum, while the federal government contributes \$30,000 per annum in aid of the experiment stations, which also receive the income from certain fees. There are still

other federal and state appropriations, such as that arising under the Smith-Lever Act accruing to the College.

#### EXTENSION WORK

On May 8, 1914, Congress enacted the Smith-Lever Law, "in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same." It was proposed to establish in connection with the land-grant agricultural colleges extension work for persons not actually in residence at the colleges, which should consist "of giving of instruction in practical demonstrations in agriculture and home economics," whereby information should be imparted through "field demonstrations, publications and otherwise," the work to be carried on by mutual agreement between the secretary of agriculture and the agricultural colleges. A permanent appropriation by the United States was carried in the act, the moneys to be apportioned among the states in proportion to their respective rural populations, conditioned on a similar appropriation being made by the states themselves.

In accordance with this act of Congress, extension work by the Michigan Agricultural College has been maintained in many counties of the State—a work in which the counties, as well as the State and the United States coöperate for financial support. At the head of this extension work is an Extension Di-

rector, located at the Agricultural College, with a corps of state and assistant state leaders. This extension work for the farmers themselves is conducted by the county agricultural agents; that for the boys and girls by the county leaders of boys' and girls' club work. In April, 1921, there were sixty-two county agents, of whom twelve were located in the Upper Peninsula. Of the home demonstration agents there were twelve in as many counties, of whom seven were in the southern peninsula and five in the northern. There were twenty-two leaders of boys' and girls' club work, of whom seven were in the Upper Peninsula and fifteen in the Lower. Of the Lower Peninsula counties, Macomb was credited with two club leaders; while eleven other counties had what is designated "collaborators," all of whom, with the exception of two, were in the southern peninsula. In this department, there was one state leader and four assistant state leaders.

Under the allotment of funds by the United States Department of Agriculture, Michigan was eligible to receive in 1921, \$103,267. The total of funds from all sources, state as well as national, for coöperative agricultural extension work for 1920-1921 was \$352,265, of which \$14,850 was assigned to administration; \$3,000 to the printing and distribution of publications; \$169,721 to county agents; \$38,912 to home economics; \$46,287 to boys' clubs; \$8,500 to animal husbandry; \$7,600 to poultry; \$18,075 to agronomy; \$13,300 to horticulture; \$5,800 to botany and plant pathology; \$4,400 to agricultural engineer-



ing; \$5,200 to farm management; \$14,800 to marketing; and \$1,820 to miscellaneous specialists.<sup>1</sup>

The work under the Smith-Lever Law is carried on by the State in coöperation with such counties as determine, through the action of their board of supervisors, to adopt the scheme as applied to the engagement of a county agent, a home demonstration agent, or a leader of boys' and girls' club work, or some combination of these activities. While in many counties the supervisors have not seen fit to appropriate county funds for such undertakings,—nor would federal and state funds sufficient for such work in all the counties be available,—in a considerable number there has been a positive demonstration of their benefits, and it undoubtedly is a very important cause of rural advancement.

It was demonstrated that the printing and distribution of bulletins by the Agricultural College would not make a very strong impression on a great number of farmers, who suspected, and sometimes derided, the practical agricultural knowledge that emanated from such sources. Personal contact would, it might be presumed, partially remove this attitude of aloofness, and there are indications that the county agricultural agents have, where they have been sufficiently active and tactful, effectively improved agricultural practice. Where this activity has taken the form of directly aiding in the purchase and sale of commodities, it has been resented on the

<sup>1</sup>U. S. Dept. Agr.: "Statistics of Co-operative Extension Work," 1920-1921, 10.

part of middlemen as an unwarranted interference with legitimate business operations, although the farmers have undoubtedly greatly appreciated the profits accruing to them through such coöperation. Primarily, however, the work of the agricultural agents is to suggest and to instruct; to promote care in the selection of seed and live-stock, encourage soil conservation, inform on market conditions, bring expert assistance to bear on such emergencies as may arise, such as epidemics and pests, and, in general, to reinforce experience with knowledge gained through education and expert investigation. Results are not capable of mathematical determination, but without doubt the visible agricultural advance that has taken place in recent years is partially attributable to the agents of the extension service of the College. Whether they have put forth the effort that might be expected of them, may, in some instances, be questioned. Whether or not the work and investigations carried on by the College qualifies its students and graduates to deal with the great variety of problems confronting the Michigan farmer in all portions of the State has been questioned repeatedly. Ultimately, this is a question of administration belonging to the College itself, and is susceptible of correction, when necessary, with a vigorous administration of College affairs.

Usually associated with the county agricultural agent is the home demonstration agent, also operating under the Smith-Lever Law. This service, starting in Erie County, New York, in 1914, has been

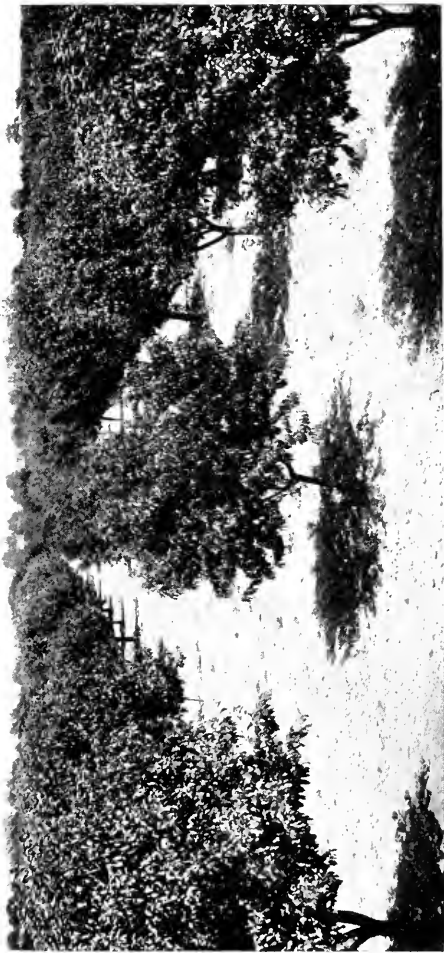


Plate VII. In the peach belt of southwestern Michigan.



extended to Michigan. The purpose underlying the appointment of home demonstration agents is described as "the building up and improvement of the rural home along lines similar to those which are being followed in the development of the farm."<sup>1</sup> The lines of work undertaken by these workers include phases of home management, the production and preservation of food, the planning of meals, the care of children, home care of the sick, making and remodeling clothing, improving home surroundings, while there are many opportunities afforded for community service. The advantages, construction or installation of household, particularly kitchen, equipment and conveniences are exemplified, which, with better arrangements of the room and its furnishings, materially reduce the labor of the housekeeper. Household accounts and budgets are installed through encouragement of the agents. There is instruction to groups of women, often at the school, in new and approved methods of canning fruits and vegetables. At school, also, children are weighed and tested and the consumption of milk is encouraged with striking benefits to the subject. The hot lunch at school is introduced, and there are general nutrition instruction and demonstrations. Home nursing features the work of the home demonstration agent, and in times of epidemic, especially in isolated communities, the "H. D.A." has become a

<sup>1</sup> U. S. Dept. Agr. Bull., Circ. 141, Jan., 1921; Status and Results of Home Demonstration Work—Northern and Western States, 4, 14.

veritable angel of mercy to the distressed and afflicted. Prenatal instruction is not omitted. The salvaging of garments out of castoff clothing and the utilization of food material is explained. The women of the rural district and small towns greatly appreciate the instruction they receive in the art of millinery and dressmaking, the fashioning of patterns and forms, and the adoption of approved styles. There is provision for office consultation and home visitations, involving thousands of miles of travel by automobile and otherwise.

Particularly promising of permanently valuable results is the boys' and girls' club work, for habits and ideas inculcated in youth, at an age when susceptibilities are keenest, are most likely deeply to impress the subject. Boys' and girls' clubs contemplate an organization of five or more young people in a group for the purpose of carrying out some definite project. Such a club is said to be "standard" when it has a local club leader in charge during the year, when it has a local organization with officers and prescribed duties, when there is a definite year's program of work, involving at least six regular meetings, whose record and that of progress of each member is kept by the club secretary, when a local annual exhibit is held or a public demonstration is given by the club demonstration team, when at least 60 per cent of the membership complete the project and file a final report with the state club leader, when a judging team is competitively chosen and an achievement day is held during the year.

Recognition of partial or entire achievement of these conditions is manifested in a club charter and a "national seal of achievement."

A definite program of work for the club, called a "project," may relate to the growing of a field of corn or other crop, the care and marketing of live-stock, such as calves, pigs, poultry, or rabbits, handicraft, domestic arts including garment-making, cooking and canning, the provision of school lunches, care of a garden, and other undertakings simple and definite in character, carefully planned and fully brought to completion, with an historical account of the whole proceeding. Obviously such enterprises closely relate themselves to school and farm work jointly, although they may also be undertaken by urban children, when extensive areas of land are not required. The work is new but has progressed rapidly in Michigan. The statistical exhibit prepared by the State Department of Public Instruction shows that, in 1914, there were 1,960 club members enrolled; a year later, there were 3,460. In 1916, the number was 5,920; 1917, 16,480, showing the influence of the war appeal; and in 1918, 31,000. The most recent figures show a membership of 22,260 in 1127 clubs. The total value of products was \$216,025.35. In 1921 this work was being maintained in twenty counties.

For years the officials of the Michigan State Fair have provided a free sojourn at this exhibition at the Fair's expense, with a view to bringing the boys in contact with this instructive agricultural institu-

tion and for the purpose of special teaching in agriculture. The boys are selected competitively, the examination covering both eighth grade and agricultural subjects. This service is extended to the most distant counties of the State, and, although its cost is high, its benefits are deemed by Fair officials to warrant the outlay.

The annual event at the Michigan Agricultural College, known as "Farmers' Week," attracts large numbers of farmers to the institution to observe exhibits of farm products and processes, and to listen to addresses and discussions of a wide variety of topics related to agriculture. For a few weeks each winter, also, short-courses of instruction are given at the College, especially designed to meet the practical needs of men and women directly from the farm or desiring brief scientific instruction in relation to agricultural and rural problems. These winter short-courses involve studies in agriculture, horticulture, dairying, beekeeping, farm mechanics, farm management and other departments, which should have the result of reducing agricultural knowledge to system and the improvement of methods.

Two of the State's normal schools likewise have undertaken agricultural instruction in somewhat the same manner. Not only do the normal schools give courses for the training of teachers for rural schools, but the Western State Normal School at Kalamazoo annually gathers together farmers and persons interested in rural life and rural social work to hear addresses by some of the country's most distinguished



leaders in agricultural progress, in what is designated "the rural life conference." In addition to training rural teachers, the Central Michigan Normal School at Mt. Pleasant has special meetings of farmers to discuss topics of common interest, as spraying and the wool market situation. There is also a week's course for farmers and, in the summer, a week's training course for boys' and girls' club workers. Farmers' week at this school is featured by exhibits, such as seed testing, soil testing, feeds, and grains. There is a program of addresses by agricultural experts of state and national reputation, with demonstrations and discussions by persons directly connected with agriculture in Isabella County and elsewhere.

In 1912 the legislature authorized county boards of supervisors "to appropriate and raise money by tax to be used for coöperative work with the Michigan Agricultural College in encouraging improved methods of farm management and practical demonstrations and instruction in agriculture." The next year, the legislature authorized county boards of supervisors to create the office of farm commissioner, subject to a referendum to the voters, for the purpose of improving agricultural practices within the county; but this provision of law was rendered practically inoperative by the Smith-Lever Act of the United States. In 1907 legislation had authorized the establishment of county schools of agriculture, manual training and home economics, and such a school has for some years been maintained by Me-

nominee County in the Upper Peninsula. The Menominee County Agricultural School domiciles its pupils and gives instruction in agriculture, including botany, farm crops, soils and soil fertility, horticulture, gardening, insect and orchard practice, animal husbandry, live-stock types and breeds, stock-judging, dairying, poultry, farm management, manual training including farm mechanics, mechanical drawing, carpentry, girls' handieraft, forging, and farm machinery, drainage, domestic economy, including cooking, serving, dietetics, sewing, laundrying, home decoration, household chemistry, home nursing and millinery, together with academic studies. During the winter term, short-courses are offered for the benefit of students who are unable to remain throughout the year, while a three-days' session, or farmers' institute, in the early spring, presents a variety of meetings under the leadership of persons prominent in agricultural practice and instruction. This school purposes to be a sort of agricultural college for the Upper Peninsula. A similar school for a time existed in Chippewa County in the Upper Peninsula, but for reasons related to its location primarily, failed to satisfy its supporters and in the summer of 1921 was discontinued.

An early statute of the State (1849) had provided that, where, in any county "the inhabitants thereof have organized and established or may hereafter organize and establish a society for the encouragement and advancement of agriculture, manufactures and the mechanic arts," and where the society has raised

as much as \$100 for the promotion of its objects, the county board of supervisors is permitted to levy a tax in further aid of the work of such a society, for the purchase of premiums, "the diffusion of valuable agricultural, manufacturing and mechanical knowledge," or otherwise to promote the objects of the society. In many counties of the State, agricultural societies or farm bureaus have been organized and have become the recipients of county financial aid in the promotion of their work. Later (1855), a State statute made provision for the incorporation of such county, town or district agricultural and horticultural societies.

#### AGRICULTURAL JOURNALS

Most Michigan farmers do not attend schools of agriculture, but very many obtain knowledge of improved agricultural processes through the columns of the agricultural papers published within the State and elsewhere. Of Michigan's agricultural press, the oldest periodical is "The Michigan Farmer and Live-stock Journal," whose history is nearly coincidental with that of the State. This paper, in 1843, succeeded "The Western Farmer," founded at Detroit several years previous. Down to 1893, when the paper was taken over by M. J. Lawrence and Brother of Cleveland, Ohio, proprietors of "The Ohio Farmer" (whose firm name became the Lawrence Publishing Company two years later), there were many changes in the ownership, place of publication, and

form of the paper. In its development, also, "The Michigan Farmer" has absorbed several other publications in the field of Michigan agriculture. It has grown in size and influence and now has over 80,000 Michigan farmers as subscribers besides many from without the State.<sup>1</sup>

"The Michigan Business Farmer" was first published as a four-page market letter in 1913. The paper became consolidated with "The Gleaner" and in 1921, following a period of rapid growth, reported more than 60,000 subscribers throughout the State. Like "The Michigan Farmer," it is a weekly publication at the present time. Its place of publication is Mt. Clemens, near Detroit.<sup>2</sup>

"The Michigan Patron" was first published at Adrian, Michigan, in 1901. After various vicissitudes, the paper was taken over by the Michigan State Grange, in 1917, becoming its official organ. The dues of members of the Grange include a payment as subscription to "The Patron," which was then sent to every Grange family in the State. It is a monthly periodical with an issue of 24,000 copies in March, 1921.<sup>3</sup>

In the Upper Peninsula, at Menominee, is published "The Cloverland Magazine," whose origin was in 1903, in the periodical then styled "The Sugar Beet News and Northwestern Farmer." Its present

<sup>1</sup> From a statement by Burt Wermuth, associate editor, April, 1921.

<sup>2</sup> Statement of G. M. Slocum, publisher, March, 1921.

<sup>3</sup> Statement of J. W. Helme, managing editor, March, 1921.

title dates from 1915, after consolidations with other publications had been effected. It now reports a circulation of nearly a third of a million in the territory between Sault Ste. Marie and Minneapolis.<sup>1</sup> It is a monthly magazine, attractively presented, and is devoted heartily to the progress, chiefly agricultural, of the cut-over territory in the Great Lakes country. Its relations with the Upper Peninsula Development Bureau are close and harmonious.

At Sault Ste. Marie is published a weekly edition of the "Evening News" of that city, which, through a coöperative arrangement with the county agent and the Chippewa County Farm Bureau, carries much agricultural news and comment, relevant chiefly to the eastern end of the Upper Peninsula. There are, in addition, a number of "small town" weeklies whose designation and contents indicate the rural appeal of the publication.

#### THE RURAL CHURCH

Among the pioneer farmers of Michigan, religious observances had motives not purely derived from piety, although the isolated situation in the primeval wilderness undoubtedly intensified the meditations of the settlers and turned them more definitely in the direction of things supernal. The camp-meeting brought men and women together, to visit and to be entertained, to sing and to become informed, as well as to give vent to sentiments of devotion and

<sup>1</sup> Statement of R. M. Andrews, editor, May 11, 1921.

spirituality. Demonstrations of the worshipers might take forms that, to the undevout, seemed grotesque and ridiculous, but this did not detract from their appeal to the country folk whose daily life was one of drudgery and severest toil. The circuit-rider, making his round of many miles, on foot, on horseback or by boat, gathered and disseminated the news at a time when newspapers were seldom encountered, and at the same time ministered to the religious life of his scattered flock for a meager recompense save of hardship. His worldly goods were bound up in his saddle-bags and included his Bible, his hymnal and his church discipline with a few clothes and personal belongings. His cash returns might amount to \$100 per annum, but entertainment was free, if rough and meager. Services were held in the homes of the settlers, sometimes in the school-house, the court-house, or a barn. Episcopal visitations were attended with great difficulties and there are records of amusing, if trying, experiences of reverend gentlemen deposited in muddy abysses on the "highways" that should have conveyed them to their expectant flocks in the interior. Even yet there are remote communities in which such pioneer conditions still obtain to a degree. There are still clergymen who eke out a precarious livelihood by farming, or other pursuits that have more reference to the necessities of this life than of the next. There is Rev. William Maltas, a former Methodist circuit-rider, now associated with the Episcopal Church in Chippewa County of the Upper

Peninsula, who mingles farming with his priestly functions, moving from station to station, fourteen in number, early and late and tirelessly, and who is credited with remarkable success with his rural parishioners. He is not an isolated instance of agricultural clergymen of this diocese. There, too, is the Rev. Fr. William Gagneur of the Society of Jesus, whose ministrations, like those of his black-robed predecessors, are chiefly to the red men of his large missionary parish north of the Straits, to which he has given unstinted service for a generation.

From the outset, divers religious communities established themselves within the borders of the territory. Some of these had characteristics especially distinctive. The Moravians, of German origin, settled on the Clinton River late in the eighteenth century, having obtained their lands from the Chippewa Indians. They interpreted the Scriptures most literally, as illustrated by their selection of wife or husband by lot. Mormon missionaries appeared early among the farmer folk of the southern counties, and in the fifth decade of the last century, under the leadership of "King" James Strang, established themselves on Beaver Island of Lake Michigan, where they mingled agriculture with fights with the hostile fishermen of the lake and from whence they were at length forcibly dispersed, some of their descendants still being found on Drummond Island of Lake Huron. More acceptable were the Quakers who early appeared in Calhoun, Jackson, Lenawee, Oakland and Cass counties, sober and industrious

as belonged to their tradition; while their Teutonic congeners, the Mennonites and Dunkards, were also settled within the State. The Mennonites' eight organizations in Michigan in 1916 still reported 509 members, while the branch called "Reformed" added 108 additional members. At "Holy Corners," Kent County, they periodically washed each other's feet in "the bucket of peace" until a narrow conservatism and rural simplicity and piety gave way before the forces of modernity. The Israelite House of David, near Benton Harbor, is a communistic religious society, not restricted to Michigan, which possesses a fine park and zoölogical garden, and lives by agriculture and manufacturing and the income of their tourist business. A portion of their agricultural supplies is derived from High Island, Lake Michigan. The observer notes their unshorn tresses, while their belief in perpetual existence without death for the sinless is a cardinal element in their religious life. They are credited with exceptional thrift and acumen.

It scarcely requires comment that the salaries paid to the ministers of the gospel in Michigan as well as elsewhere are meagre. The census returns of 1916 place the average salary of a minister of the Methodist Episcopal Church in Michigan at \$1,165, which readily suggests that pastors of rural parishes obtain an income considerably short of this figure. Numbers of states make a far worse showing than Michigan and some make a better report. The average of Baptist salaries stood at \$995 in Michigan; while



the Congregationalists did better with their average contribution to the shepherd of the flock of \$1,219. Episcopalian rectors received on an average \$1,517, while Roman Catholic priests performed their holy offices for an average stipend of \$745. The Presbyterian average salary was \$1,503. Even if the parish house and other emoluments are added to the pastoral income, it is evidently quite necessary in the poorly supported rural parishes that clergymen augment the family income by resort to agriculture or other adventitious pursuits. Thus one clergyman in the Upper Peninsula (Rev. Wm. Poyseor) is credited with being one of the largest and most successful producers of maple sirup in the State, as well as a valiant defender of the faith. His tappings run to 2800 trees per annum, and he ships his product to fourteen states.

The Young Men's Christian Association has a county-wide organization in the counties of Gogebic, Houghton and Iron in the Upper Peninsula, and Charlevoix, Antrim, Grand Traverse, Kalkaska, Oscoda, Alcona, Iosco, Mason, Huron, Tuscola, Sanilac, Montcalm, Gratiot, Ottawa, Kent, Ionia, Clinton, Shiawassee, Genesee, Lapeer, St. Clair, Allegan, Barry, Eaton, Livingston, Oakland, Van Buren, Calhoun, Washtenaw, St. Joseph, Branch, Hillsdale, and Lenawee in the Lower Peninsula. Usually lacking the equipment and facilities that pertain to a city association, the small towns and rural districts covered by this work carry out projects of study and recreation under the general direction of a county

secretary associated with a county committee of twenty to twenty-five residents, and, when practicable, local associations were also established. As described by the state secretary in charge of rural work, "county work of the Young Men's Christian Association is an effort on the part of an organized group of Christian men to develop Christian character in the lives of men and boys in the various communities of the county. It works with the home, the school, the church and other constructive agencies. . . . Its aim is to stimulate boys and young men to be physically fit, mentally alert, socially straight, and religiously definite." The "Christian Citizenship Training Program" is employed, being carried out under local leadership supported by public opinion.

Undoubtedly, the migration of young people from the rural to the urban districts has adversely affected the condition of the rural church. "The loss to the country church," writes Rev. C. H. Harger, "is as real, and as great as is the loss to the farms and to the country towns; for among these young people were the coming constituents and members of the small town country churches. It has taken many of the small town churches twenty years to overcome the inherited indifference of parents, the influence of early environment, and develop in some of these young people an interest in religion. Those who took with them to the cities a Christian experience and the purpose to live clean and useful lives, it is noticeable, benefited by the change. Not a few of this

class have been singled out and advanced from places of common labor to positions of responsibility and large trust.

"It is also noticeable that not a few of those who have returned, have been demoralized by their experiences in the city. They have formed objectionable habits which they did not have before. Many have lost their former energy and have become indolent; they have lost the spirit of thrift and have become spendthrifts; all are dissatisfied with the old surroundings, and they are all anxious to get back to the factories and to the places of pleasure and pastime in the cities. No matter whether these remain in the country or return to the city, in their present state of mind they are mentally, and therefore physically, incapacitated for efficient work on the farm; they are lost to the country."<sup>1</sup>

The writer is by no means hopeless regarding the rural church. Rural life is favorable to religion. But it is required that the rural church progress with the developing mind of the rural population. "It seems to me an opportune time for the country church to get a new hearing and to demonstrate again as during the war that it can serve the people on week days as truly as on Sunday." Harger points out that the agencies that are serving country life, such as the extension workers of the Michigan Agricultural College, should not be ignored by the clergy-

<sup>1</sup> Harger: "The Country Church in Michigan." Michigan Congregational Conference, pub., Lansing, 1921, 9. See also *The Michigan Farmer*, July 23, 1921.

man of a rural parish or his church people. The rural church should promote boys' and girls' club work and serve the whole community as a social center. It will thus gain a new and stronger hold on the countryside which will serve it well in its religious ministrations.

Each summer the Michigan Agricultural College holds a conference for the benefit of rural clergymen and their wives, for discussion and instruction calculated to enrich their rural work. In 1920, the Michigan Congregational Conference, for example, paid the transportation and local expenses for a group of fifteen of its pastors and their wives, to enable them to attend this conference, and the outlay was deemed to be well spent.

## CHAPTER XII

### GOVERNMENTAL WORK FOR COUNTRY LIFE

THE legislature of 1921 gathered together into one department the several governmental agencies of Michigan which had functions directly related to agriculture, placing the department under a commissioner with a salary of \$5,000 a year, empowered, with the approval of the State Administrative Board, to appoint assistants and employees and determine their compensation. To this new department were at once transferred the Department of Animal Industry, the State Food and Drug Commissioner, the State Veterinary Board, the Immigration Commission, the Commissioner of Immigration, and the State Director of Markets. The powers and duties of the State Board of Agriculture in relation to the inspection and regulation of orchards, vineyards and nurseries, and apiaries, the testing of agricultural seeds, the analysis of commercial fertilizer, the testing and examination of insecticides, and the analysis and testing of commercial stock foods, the investigating and improving of marketing conditions, were likewise intrusted to the Department of Agriculture of the State. The offices of State Inspector of Orchards and Nurseries, and of

Apiaries were abolished and their functions bestowed on the Department. It also takes over the duties of the Department of State in the collection and publication of statistics and other information relating to agriculture. The control of all lands and other property vested in the State for the purpose of holding agricultural fairs devolved on this new department. An annual state fair at Detroit was authorized, which was placed immediately under the direction of a Board of Managers of State Fairs of twenty members, appointed by the governor and senate. The income should constitute a perpetual revolving fund to defray Fair expenses. The Michigan Agricultural Fair Commission was at the same time abolished. (See Fig. 7.)

It was made the duty of the State Department of Agriculture "to foster and promote in every possible way the agricultural interests of the State of Michigan; to coöperate with agricultural agencies in the different counties of the state and of the federal government; to foster direct trading between the producer and the consumer; and to prevent, and assist in preventing, by all available means authorized by law, the sale of unimproved land and lands not suitable for agricultural development within the state by fraud, misrepresentation or deceit and the publication of false or misleading statements or advertising matter designed to affect such sales."

The creation of this new department is in line with the suggestion of the United States Secretary of Agriculture in 1919, who urged the establishment

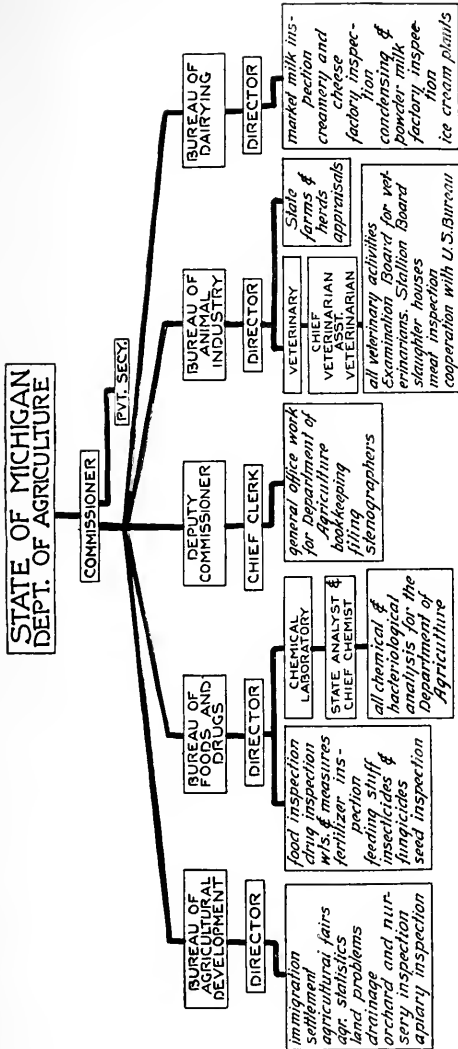


FIG. 7. Plan of organization of the Michigan Department of Agriculture (1921).

of such departments in all states, whereby the coöperation of the various bureaus of the federal department with state agencies would be much easier and more effective.<sup>1</sup> It was his view that the agricultural colleges would confine their attention to educational work and the state departments of agriculture to regulatory and administrative duties, and with whom the federal bureaus would be associated in matters related to quarantines, the control of animal diseases, orchard and nursery inspection, seed inspection, feed and fertilizer control, statistical inquiries, the promotion of rural finance, distribution and marketing along approved lines.<sup>2</sup>

<sup>1</sup> U. S. Dept. Agr. Bull., Jan., 1919: "Need of Strong Departments of Agriculture in the States," 7.

<sup>2</sup> The tentative scheme of organization of the Department of Agriculture (July, 1921) provides for four bureaus: agricultural development, woods and drugs, animal industry, and dairying, each having a director at its head. The Bureau of Agricultural Development comprises the divisions of immigration, settlement, agricultural fairs, agricultural statistics, land problems, drainage, orchard and nursery inspection, apiary inspection. The Bureau of Foods and Drugs comprises the divisions of food inspection, drug inspection, weights and measures, fertilizer inspection, feeding stuffs, insecticides and fungicides, seed inspection; chemical laboratory (State Analyst and Chief Chemist, for the Department of Agriculture). The Bureau of Animal Industry comprises all veterinary activities (Chief Veterinarian and Assistant Veterinarian; Examination Board of Veterinarians; Stallion Board, Slaughterhouses, meat inspection; coöperation with the United States Department of Agriculture, Bureau of Animal Industry; state farms and herds; appraisals). The Bureau of Dairying comprises inspection of market milk, creamery and cheese factories, condensed and powdered milk factories; ice-cream plants. At the head of the Department of Agri-



Replacing the Livestock Sanitary Commission, the legislature, in 1919, created the Department of Animal Industry, in charge of a commissioner appointed for a six-year term, and reassigned to the Department of Agriculture in 1921. On the recommendation of the Commissioner of Animal Industry, the governor was directed to appoint a state veterinarian, also for a six-year term. This official must be a graduate of an institution qualified to confer the degree of veterinary surgeon and competent to diagnose, treat and control diseases of live-stock. General charge of the protection of the health of the domestic animals of the State from contagious and infectious diseases was given to this commissioner. It followed that quarantine was subject to the commissioner's direction. The presence of contagious and infectious disease among animals was required to be reported to the Commissioner, whose office is in Lansing. In case the destruction of diseased live-stock became necessary as a protective measure, the Commissioner was to appraise its value and on this basis the owner was entitled to recover from the State the sum thus determined, with restrictions of amount as to tuberculous cattle. The observance of quarantine regulations was definitely enjoined on the owners of animals exposed or infected. At the same time, the importation of such live-stock was pro-

culture is a commissioner, while his subordinates include a deputy commissioner, chief clerk (general office work for the Department of Agriculture, bookkeeper, stenographers).

hibited. The representative of the Department of Animal Industry in each county was to be the county agent.

The practice of veterinary surgery, medicine or the grant of a license by the State Veterinary Board, which consists of three members with stipulated dentistry is unlawful in Michigan except following qualifications. Such a license is grantable only on an examination following a regular course of instruction in an improved veterinary college. There is provision for the reciprocal licensing of veterinarians from other states and provinces on the basis "of equality of educational standards and mutual recognition," equal to those determined by the statute. Practitioners living outside of Michigan but adjoining its boundary are permitted to practice in Michigan after obtaining a license and provided reciprocity is granted. All Michigan licenses are revocable for cause after a hearing of charges.

In 1913, the legislature ordered that "no person shall feed to animals or fowls the flesh of an animal which has become sick, or which has died from such cause, or offal or flesh that is putrid or unwholesome," reckoning such an offense a misdemeanor with an attached penalty of not to exceed \$100 fine or ninety days in jail or both.

The administrative work of the old Dairy and Food Department, established by the legislature in 1893, was assigned to the new Food and Drug Department in 1917. The commissioner of this department has "charge of the supervision and enforcement

of all laws of this state relating to the dairy and food, drug and liquor business, weights and measures," and other duties prescribed by law. Among the statutes thus falling to the Food and Drug Commissioner to enforce are those prohibiting the adulteration and misbranding of foods, with special provisions relating to the adulteration and misbranding of butter, cheese, lard, fruit, jelly or fruit butter, buckwheat flour, vinegar, maple sugar and sirup and sausage, whose purity is protected by law. A series of statutes, under the administration of this department, is designed to protect the purity and sanitary qualities of milk and milk derivatives, and to establish standards of fat-content. The percentage of milk-fat required for butter is 80, of cream 18, and of milk 3. To put an end to short-weight milk containers used in the retail trade, it was required that bottles or jars should have "clearly blown or otherwise permanently marked in the side of the bottle, the capacity of the bottle and the word 'sealed,' and in the side or bottom of the bottle the name, initials or trademark of the manufacturer and designating number, which designating number shall be different for each manufacturer and may be used in identifying the bottles." The use of all other containers is prohibited under penalty and forfeiture of bonds to the State, while return shipments of milk containers over a common carrier are required to be received washed and cleansed. The use of the Babcock test by licensed testers is subject to regulation designed to secure a fair average sample of the milk

tested. An act of 1917 authorizes the appointment of local medical milk commissions "for the purpose of supervising the production, transportation and delivery of milk which it is intended to use for infant feeding and sick-room clinical purposes, under whose supervision certified milk may be sold in cities, villages and townships. The sale of butter under a State brand or registered trademark which is not now used is provided for, the issuance of the brand being under the control of a State commission. The brand is required to carry the words, 'Michigan Butter, License Number——', and the words, 'State Butter Control.'" Milk by-products, such as skim-milk, whey and buttermilk, to be used for feeding purposes for farm animals must be pasteurized before being returned or delivered to any person.

For the fruit trade, an act of 1917 regulates the size of baskets. The standard for grapes and other fruits and vegetables is the two-quart, four-quart and twelve-quart climax basket, whose dimensions are definitely prescribed; while the standard basket or other containers for small fruit, berries and vegetables, is of the capacity of one-half pint, pint, quart or its multiples, dry measure, also with fixed dimensions. An act of the same year determines the grades for apples. "Michigan standard fancy" apples consist "of hand-picked, properly packed apples of one variety, which are well-grown specimens, normal in shape, uniform in size, of good color for the variety, and which are free from dirt, insect injury, fungus disease, bruises and other defects, ex-

cept such as are necessarily caused in the operation of packing." Inferior grades are designated "Michigan Standard A," "Michigan Standard B," and "Michigan unclassified." Containers of apples offered for sale must have the name of the packer and other relevant information displayed on the surface, while the apples on the inside face of the package when offered to view must fairly represent the contents throughout. The size of fruit and vegetable barrels is likewise definitely prescribed.

The State Food and Drug Commissioner is also State Superintendent of Weights and Measures, whose standard is required to conform to that adopted by the United States Bureau of Standards. In addition, counties, through their boards of supervisors, and municipalities may employ a sealer of weights and measures, and sixteen counties and twenty cities do. An act of 1863 specifies the weight a bushel of various kinds of grains and other commodities, unless a different weight is contractually agreed on, which for wheat is 60 pounds; rye, 56 pounds; shelled corn, 56 pounds; corn on the cob, 70; corn-meal, 50; oats, 32; buckwheat, 48; beans and clover seed, 60; timothy seed, 45; barley, 48; potatoes, 60; onions, 54; peas, 60; cranberries, 40; Michigan salt, 56; mineral coal, 80; and orchard-grass seed, 14. Definite specifications for the construction of platform and other scales are published by the Department.

For the purpose of acquiring information regarding the production of farm products in Michigan,

a coöperative agreement has been entered into between the State and the United States Department of Agriculture, which together bear the necessary expense. Some 2,600 reporters gather the information locally, reporting either to Lansing or Washington. The county and township reporters mail their results directly to Washington where they are tabulated. The field agents report to Lansing, the tabulation of which is then forwarded to Washington. The results, as finally ascertained by the Federal Crop Reporting Board, are telegraphed to Lansing for publication. About 200 reporters are stationed in the Upper Peninsula. In addition to the regular force special agents report particular crops in which each is interested, as for beans, maple products, honey bees, potatoes, live-stock, fruit, prices, mills and elevators. This service for some years was maintained as a bureau in the Department of State but the legislature of 1921 transferred it to the new State Department of Agriculture. Further legislation of this session assigned a new, but greatly desired, function to the township and (outside of Detroit) city supervisors, who are required to collect information regarding farm products at the time of making their assessment rolls in the spring of each year. On blank forms prepared by the Commissioner of Agriculture, the supervisors henceforth will obtain statistics showing the total number of acres in each farm, the acreage of each crop sown or planted, the acres of tillable land used exclusively for pasture, the acreage of new lands

brought under cultivation for the first time, the number of growing fruit-trees and vines of bearing age, the number and classes of live-stock, and such other data as may be required. This information is, when possible, to be secured through a personal interview with the owner or operator of the farm. Returns are made to the State Commissioner of Agriculture for publication.

Under the direction of the department of farm management of the Michigan Agricultural College, classes in farm accounting have recently been held for adult farmers in various counties of the State, and instruction and assisting in the problems of farm management have been afforded by the staff of this department by direct visitation and by correspondence. The general aim is to direct farm activities along lines that shall be most profitable economically. Through questionnaires, the department seeks to gather information directly from farmers which will indicate the kind of farm practices now being employed and out of which may come suggestions for a more economical system of farm operations. There is coöperation in this work between the College and the Grange, the farm bureaus and the farmers' clubs. The Michigan State Grange is reported to have made a considerable appropriation for the investigation of farm practice and the encouragement of farm accounting and improved methods. A feature of this work has been the distribution at low cost of farmers' account-books, prepared and sold by the College. Some three thousand

copies of these books are stated to have been thus disposed of to July, 1921. It is hoped thereby to standardize farm accounting methods.

#### CONSERVATION POLICIES

As a part of the governor's scheme of reorganization of the State government, the legislature of 1921 established the Department of Conservation, directed by a commission of six members, who should "be selected with special reference to their training and experience along the line of one or more of the principal lines of activities vested in the Department of Conservation and their ability and fitness to deal therewith." This commission was to appoint a Director of Conservation at a salary of \$5,000 a year, and such assistants and employees as might be required under the act. The State Administrative Board was to determine the number and compensation of these additional employees. The powers and duties hitherto belonging to the Public Domain Commission, the State Board of Fish Commissioners, the Mackinac Island State Park Commission, the Michigan Geological and Biological Survey, the Michigan State Park Commission, and the State Game, Fish and Forest Fire Commissioner, were transferred to the new Department of Conservation. It was made the duty of this Department "to protect and conserve the natural resources of the State of Michigan; to prevent the destruction of timber by fire and otherwise; to promote reforestation of non-agricultural



lands belonging to the state; to guard against the pollution of lakes and streams within the state; and to foster and encourage the protecting and propagation of game and fish. On behalf of the people of the State, the Commission of Conservation may accept gifts and grants of land and other property for any of the purposes contemplated by this act." The investigation of the undeveloped natural water-power of the State was also made the duty of the Commission of Conservation, as well as to make a report to the governor and legislature before January 15, 1923.

The first appointments to the Conservation Commission were not wholly reassuring as to the character of the work that was destined to be accomplished by it; and it is still too soon to pass judgment on this mooted point. It was hoped that somewhere in the act provision had by implication been made for a soil inventory, and, if not here, then in the act creating the Department of Agriculture. This, too, remains a matter of doubt. A backward step was taken by the Conservation Commission when it discontinued the work of the topographical and biological survey previously conducted by the Michigan Geological Survey. Michigan cannot hope for effective work in this department until scientific and administrative ability wholly replaces political considerations in the making of appointments to the Commission itself and in all departments of its work. To this new Department of Conservation, therefore, falls primarily the duty of promoting the

conservation of the State's natural resources. Whether it will be able to accomplish anything of note remains to be seen. That the legislature failed specifically to recognize the great importance of a land inventory and soil classification is disappointing. It is true that such a soil survey is now under way under the aegis of the Michigan Agricultural College coöperating with the United States Bureau of Soils; but the plan of the work does not seem to conform to advanced conceptions of what such a survey ought to be; nor in the work as now carried on is full use being made of all the scientific resources, personal and otherwise, available in the State, through coöperation of its expert talent from its institutions of higher learning, the Geological Survey, and elsewhere. It is evidently too great and broad an undertaking for one investigator or department to have in charge without full coöperation with all available agencies for obtaining the largest results.

Such forest policy as the State may be said to have dates from the year 1899 when the legislature created the Michigan Forestry Commission of three persons, including the Commissioner of the State Land Office, whose duty was described "to institute inquiry into the extent, kind, value and condition of the timber lands of the state; the amount of acres and value of timber that is cut and removed each year and the purpose for which it is used; the extent to which the timber lands are being destroyed by fires, used by wasteful cutting or consumption, lumbering, or for the purpose of clearing the land for

tillage. It shall also inquire as to the effect of the diminution of timber and wooded surface of this state in lessening the rainfall and producing droughts, and the effects upon the ponds, rivers, lakes and the water-power and harbors of the state, and affecting the climate and disturbing and deteriorating natural conditions." It must make a study of second-growth timber, the protection, condition and improvement of overflowed and stump lands. The Commissioner of the State Land Office was directed to withdraw from entry 200,000 acres of state tax homestead lands, and the Commission was authorized to receive conveyances of land from private sources. The Commission was to set before the legislature a forestry policy for the State, and the act carried an initial appropriation of \$2,000 a year for inaugurating this work. The amount of this appropriation may be taken as the due measure of the importance of the work which the Forestry Commission had been set to perform as held by the combined legislative wisdom of the day.

In 1901 the legislature placed lands in Roscommon and Crawford counties under the Forestry Commission to be held as a permanent forest reserve. In 1903 the State Land Commissioner was made Forest Commissioner, whose "orders shall be supreme in all matters relating to the preservation of the forests of this state and to the prevention and suppression of forest fires." By the same act township supervisors, mayors of cities and presidents of villages were made local fire wardens. The Forest Commissioner was

directed to appoint a chief fire warden. His salary, as might be expected, was only \$500 a year. His duty was to enforce the provisions of "this act throughout the state." Provision was made for investigation and inquiry regarding the forests of the State and their protection from fire through the chief warden and his deputies, and such additional assistants as in an emergency might be necessary. With its usual niggardliness in such matters, the legislature put the daily wage of fire wardens at \$2, one-third chargeable to the State and the residue to the local municipality, but it set forth emphatically the responsibility and penalties for the careless or malicious setting of fires in woods and grass lands, provisions which, if they had ever been enforced, would have done much to solve the forest fire problem in Michigan. An act of June 4 of the same year definitely designated lands in Crawford and Rosecommon counties, described as "delinquent state tax, homestead, swamp and primary school lands," as a forest reserve under the control of the Forestry Commission, which was to place them in charge of a Forestry Warden and his deputies, for the purpose of protection and reforestation. The tract amounted to some 34,000 acres, and Filbert Roth, later head of the Department of Forestry of the University of Michigan, was appointed Forestry Warden. The reforestation was undertaken in 1904, the running of fire-lines in 1905. Restraining trespassers and disposing of dead and down timber was instituted.

In his annual report, Roth set forth with clearness and emphasis the forest requirements of the State, the harm wrought by wasteful methods of management. His own policy with reference to the forest reserves was used, but as this proved unsatisfactory, a nursery at Higgins Lake was established.

In 1907 the office of State Game, Fish and Forestry Warden was created out of the former offices of Chief Warden and Game and Fish Warden, which, unlike the Forestry Warden, was charged with general protective work throughout the State. It was obligatory on the deputies of the Game, Fish and Forestry Warden "to familiarize themselves by personal investigation with the locality and the condition of the cut-over lands, prairie lands and other districts in their respective counties where fires are most likely to start and spread, and to take such precautions as they shall deem reasonable and proper to prevent the starting or spreading of fires in such districts, and in doing so, may enter upon lands and remove or destroy brush, rubbish and other dangerous combustible material, wherever necessary." This provision of law, if it had remained more than a dead-letter, would have done much to relieve Michigan of the perennial losses from forest fires. The State Game, Fish and Forestry Warden has become the State Game, Fish and Forest Fire Commissioner, but the fires burn as frequently and as fiercely as ever. The Forestry Warden became the State Forester, but he cannot obtain results without

resources. The fatal flaw has been defective personnel or defective resources for such personnel as was capable of achieving anything.

In 1909 the Public Domain Commission was created. The Secretary of State, Auditor-General, the Commissioner of the State Land Office (after 1914 the Superintendent of Public Instruction), and persons appointed by the governor from the Regents of the University of Michigan, the State Board of Agriculture, and the Board of Control of the Michigan College of Mines on nomination of these bodies themselves, composed the "P. D. C.," as common parlance styled it. The office of Immigration Commissioner was attached to this new body, which in 1915 also acquired the appointment of the State Game, Fish and Forestry Warden, whose designation later became the State Game, Fish and Forest Fire Commissioner. There was also to be a State Forester to have charge of the forests, and a Chief of Field Division to attend to cases of trespass and in general look after the real estate operations of the Commission. The secretaryship of the Public Domain Commission might have become an office of great importance in the work of conservation which evidently had been in the minds of the sponsors of these alterations in the organic acts related to this subject. But scarcely any will claim that the secretaryship was ever held by any one of aggressive tendencies or possessed of a well-defined progressive policy, so the position has continued to be largely clerical.

Since the creation of the Michigan Forestry Com-

mission in 1899, and its supplanter, the Public Domain Commission, definite areas of land, now aggregating 157,664.74 acres, have been set apart as State forests in the northern counties of the southern peninsula and another on the Lake Superior shore of the northern peninsula. Fire-lines have been run, steel watch-towers have been erected, a small fire fighting force has been organized in relation to both the State and private forests, a small tree nursery for growing seedlings has been established at Higgins Lake in Crawford County, plantations of several varieties of evergreen trees (at present white, Norway, jack and Scotch pine) have been instituted in various State forests, amounting in 1920 to 9,124 acres. Exchanges of State lands with the United States and with private owners have been consummated for the purpose of consolidating present holdings; but the net result is egregiously inadequate in comparison with the demands of the existing situation. There are ten to twelve million acres of cut-over and undeveloped lands requiring attention, which it seems physically impossible to re-stock with a new forest-cover by artificial means. Nature would accomplish very much unaided, but her efforts are frustrated by the lack of fire control and the utter inadequacy of the measures taken. The efforts of the Public Domain Commission up to 1921 have been largely of a routine character. The laws relating to the burning of slashings and forest waste that constitute a fire menace, and to the malicious or careless starting of forest and grass fires, remain unenforced in most instances,

nor have the penalties been applied. It would not be historically correct to say that nothing has been accomplished, but the achievement is pitifully disproportioned to the necessities of the existing situation.

Undoubtedly Michigan has lacked a constructive conservation policy and plan. The various activities under this head that the legislature has from time to time sought to create have been disorganized and unrelated. One board has dealt with fish propagation, another with fish protection. The same agency was charged with game and with forest protection, although in the opinion of experts the work calls for differentiation between these two functions. The work assigned to the immigration commissioner was neglected. There was no organized coöperation between the Michigan Agricultural College, the University of Michigan and the Michigan College of Mines, the State Geological Survey in the prosecution of the State soil survey instituted in 1915 by the Agricultural College and resumed in 1920. There are drainage projects transcending the boundaries and resources of local drainage districts which might better be carried out by a State drainage department, but there is no such department. There is no complete survey of the inland waters of the State and their fish and other resources. Inadequate provision has been made for re-stocking the waters of the State with fish. There has been no mobilization of the abundant intelligences in undertaking a comprehensive solution of these problems.



## ROADS

The present highway system of Michigan comprises a network of about 75,000 miles, constructed by townships, good roads districts, the counties, and the State. This is the order in which the adoption of road construction by the several kinds of districts was placed on the statute book. It will be observed that these districts represent an area successively larger than that covered by the earlier type, answering to the growth of the State and the expansion of local interests. As a unit of road work the township antedates statehood, and its road officials are the commissioner of highways and the overseer or overseers of highways. The voting of road taxes rests directly with the voters in their annual township meetings or with the township boards. Two taxes are levied: the road repair tax is on taxable property within the township outside of incorporated villages; the highway improvement tax is on all property within the township including incorporated villages. Good roads districts, of which there are (1920) only three in the State, comprise a union of township and municipalities for road work.

The act of the legislature of 1909 which established the present county road system was revolutionary in its effect, for it created a larger unit of road construction with an organization competent to carry out a comprehensive highway policy under ample financial support. As the law now stands, a board of county road commissioners, of three mem-

bers, elected at the autumnal elections in the even-numbered years, directs the county road system, which is financed by the county supervisors with State aid. Acting only as an "administrative board," the county road commission appoints a superintendent, or engineer, who is in direct charge of the highway work which the commission has undertaken. The commission adopts as part of the county system such roads within the county outside of cities and villages as it may determine, and also roads within municipalities by agreement therewith. The tax for the county road is voted by the board of supervisors.

The State assists highway construction and maintenance through grants in aid to road districts, as just described, based on the character and dimensions of the road, and itself constructs and maintains what are designated "state trunk-line highways," which are main through routes within the State, charging a portion of the cost to the counties traversed in accordance with a schedule in the case of federal aided roads based on the relation between trunk-line mileage and assessed valuation. This work is financed through the State's moiety of the tax on automobiles, the general property tax levied by the legislature, the sale of bonds, and the State's quota of the federal grant in aid of highway construction. The State Highway Commissioner and his corps of experts, with whom are associated an advisory board, administers the State Highway Department, which prepares plans and specifications, determines the amount and recipients of State aid,

lets contracts, and performs a variety of duties. The act providing for the construction of highways by this department was enacted in 1919 and, up to June 30, 1920, 592 miles of trunk-line road were placed under construction by the State which, it was estimated, would cost nearly \$10,000,000. It should be understood that trunk-line roads are not necessarily improved, but of the 5,500 miles in Michigan, 2,392 were improved up to the end of the fiscal year of 1920. At the same time, a total of 335 miles of federal-aided road had been placed under construction, to cost \$5,633,000. The State Highway Department constructs bridges on State trunk-line highways, and 154 of these of more than thirty-foot span had been completed and 62 others had been placed under construction, to cost some \$2,000,000.<sup>1</sup> The State also maintains trunk-line highways and requires similar action on the part of districts receiving State reward under penalty of a deduction of the cost of maintenance from any reward moneys that may accrue to such a delinquent district or of having the work done directly by the State and charged against the district. Many districts have instituted a regular patrol system. From May 1 to December 31, 1919, the State participated in the maintenance of 4,878 miles of trunk-line and federal aided road, at a total cost of \$1,263,746, of which amount the State contributed 62.1 per cent.<sup>2</sup>

<sup>1</sup>"Eighth Biennial Rept. of the State Highway Commissioner." Lansing, 1920, 7, 8.

<sup>2</sup>*Ibid.*, 14.

The "Covert Act" of 1915 provides a method by which the owners of 60 per cent of the land fronting on a highway which it is desired to improve may petition for its improvement, whereon the county road commission or the State Highway Commissioner coöperates in the drafting of specifications and the letting of contracts. Such roads serve as feeders to main highways or links in incomplete systems, and have been constructed beyond what was anticipated when the act was first adopted.

Seven classes of roads are recognized by the law, in accordance with which the reward the State allows the road district responsible for construction is determined. Lowest in this classification is a road of class A—a sand-clay road, whose basic width of metalled surface is nine feet and whose grade does not exceed 6 per cent, except where circumstances warrant a departure from this maximum in accordance with specifications approved by the State Highway Commissioner. The reward is 25 per cent of the cost but may not exceed \$3,000 a mile. To June 30, 1920, 201 miles of road of this class had been built.

The six remaining classes have similar requirements as to grade, contour, and basic width, but vary the State reward according to the materials used and the width of roadway constructed. Thus a road of class B is composed of gravel or burnt shale. A class C road is made in two courses; at the bottom, crushed stone or slag, and a top course of gravel or blast furnace slag. D class roads have a bottom

course of gravel or slag and a top of crushed stone. Of the gravel roads in class B, 3,415 miles had been built to June 30, 1920; while the roads in classes C and D were manifestly less favored, since only 286 miles of class C and 11 miles of class D had been constructed at the same date. On the other hand, there had been constructed 783 miles of the class E type, which is a macadam road with or without a bituminous binder, and properly bonded. The concrete type belongs to classes B, C, D and E, while classes F and G are entitled to an additional \$2,500 a mile and trunk lines may receive State reward to 50 per cent of their cost but not to exceed \$15,000 a mile.

The surface sands and gravels of Michigan yield abundant material for the construction and maintenance of roads. The United States Geological Survey reports for 1919 a production of 2,639,483 short tons of gravel, 539,800 of building sand, 204,045 of paving sand, and 67,916 of railway ballast, in addition to large quantities of sand used for manufacturing and other purposes. There was undoubtedly much material produced and used locally that did not appear in the record. In addition enormous quantities of waste rock from the iron and copper mines and from the quarries are available and are similarly employed. Much use also is made of the stamp-mill sand that is a by-product of stamp-mill operations along Portage Lake and Lake Superior in the copper region.

## DRAINAGE

The preliminary report of the United States Census for 1920 relative to drainage in Michigan shows that on December 31, 1919, Hillsdale County had 204,165 acres in organized drainage enterprises. Similar figures for Jackson County were 76,139 acres; for Lenawee, 275,535; Monroe, 251,387; Washtenaw, 193,284; and Wayne 259,667. This indicates that the percentage of each county in drainage enterprises was as follows: Hillsdale, 53.4; Jackson, 16.8; Lenawee, 58; Monroe, 68.6; Washtenaw, 36.5; and Wayne, 65.4. In Allegan County 58.8 per cent of the area is in drainage enterprises; in Barry, 40.3; in Eaton, 95; Ionia, 79.1; Kent, 26.5; Montcalm, 33.1; and Ottawa, 71. In Berrien County the percentage was 33.7; in Branch, 48.3; Calhoun, 57.8; Cass, 20.3; Kalamazoo, 22.1; St. Joseph, 10.5; Van Buren, 44.1; Benzie-Charlevoix, .2; Chippewa, 1.8; Emmet, .5; Grand Traverse, .6; Manistee, 3.4; Missaukee, 8.4

The bulletin on Drainage in Michigan, a part of the Fourteenth United States Census, notes that drainage enterprises are confined largely to the most southerly forty-seven counties of the Lower Peninsula. The total works completed by the drainage enterprises to December 31, 1919, comprise 16,023.8 miles of open ditches, 2,173.9 miles of tile-drains, and 33.1 miles of accessory levees. Under construction were 118.4 miles of ditches and 8.4 miles of tile-drains. These figures do not include drains

or levees installed by individual farm owners, supplemental to the works of the enterprises, nor the works of flood protection or levee districts that had not undertaken the construction of ditches or tile-drains. There are three pumping districts for land drainage among the enterprises in Michigan. The Census found the principal crops grown upon the drained lands to be wheat, corn and sugar-beets. The aggregate area of the farm land that was reported as provided with drainage is 3,156,632 acres. The area of farm land reported as needing drainage is given as 2,070,387. The area requiring drainage only is 579,813 acres, while that requiring both drainage and clearing is given as 1,490,574 acres. The total land in operating drainage enterprises, which include the completion of drainage works authorized or which had begun actual construction work on or before January 1, 1920, is 9,729,171 acres, which includes 7,182,352 acres of improved land, and which constitutes 55.6 per cent of all improved land in farms. The timbered and cut-over land in these enterprises is estimated at 2,195,562 acres, and of other unimproved land, 351,257 acres. The area of land that is swampy or subject to overflow in these enterprises is 1,020,207. The area that suffers a loss of crops from defective drainage is put at 692,224 acres. The total assessed acreage is 15,766,478. The aggregate capital invested in or required for the completion of operating enterprises is \$25,048,980.

Michigan's first comprehensive drainage law was enacted in 1839, but the present county drain sys-

tem was established by Act 254 of the legislative session of 1897. The Miller and Simons report on drainage of 1918 gave the number of county drain commissioners in the State as seventy, of whom sixty-three were serving in the southern peninsula and seven in the northern. Thirteen counties had no drain commissioners, namely Antrim, Crawford, Kalkaska, Oscoda and Otsego in the Lower Peninsula; and Baraga, Dickinson, Houghton, Gogebic, Iron, Keweenaw, Mackinac and Schoolcraft in the Upper Peninsula. The report states that during the twenty years, 1898-1917, expenditures on county drains were made in sixty-three of the eighty-three counties of the State, while Alcona, Antrim, Crawford, Kalkaska, Leelanau, Montmorency, Ogemaw, Otsego and Oscoda in the Lower Peninsula, and Alger, Baraga, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Marquette and Schoolcraft in the Upper Peninsula, had spent nothing for this purpose.

Miller and Simons criticize the Michigan drainage system as "piece-meal" in design and execution, lacking a well-planned outlet with a network of laterals. "Too often small drains," they observe, "constructed independently, without following any general plan have resulted in discharging the water from the individual drains into existing natural or artificial water-courses which already may be over-taxed; resulting in the flooding of the lower lying lands, thus aggregating the necessity for improve-



ments of the water-courses. . . . The tendency in the construction of county drains in Michigan has too often been to limit the size and depth in order that they might be of a type readily constructed by teams and scrapers or, as in many cases, by hand." This necessitates reconstruction with all the legal performance that must accompany it.<sup>1</sup>

Miller and Simons compute that, under the present Michigan drainage law, about 9,300 drains have been constructed, whose aggregate length is approximately 20,000 miles and cost approximately \$18,000,000. The law provides for the payment of costs by the beneficiaries in not to exceed three installments, and the investigators compute that some 60 per cent of the drains has been paid for in one installment and the remainder largely in not to exceed two installments. Miller and Simons point out that the rights of property owners are amply protected in the Michigan drain law, and that excessive costs have usually been avoided and litigation almost wholly so. On the other hand it has frequently, in a proposed drainage project, been impossible to secure the requisite majority of interested property owners' signatures to the petition requesting the establishment of a drain; and the inability of the drain commissioner, as against the petitioners, to determine the route and area of the drainage district, has operated to the detriment of a project that would better have been constructed on other

<sup>1</sup> Miller and Simons: "Drainage in Michigan," 28.

lines and specifications than that which was proposed.<sup>1</sup> The Michigan drainage law is also criticized because of a lack of provision for adequate and definite estimates of cost in advance of construction. There is often a lack of competent engineering advice before construction is undertaken, resulting in ineffective drains produced at high cost. The method of cleaning out drains is criticized as needlessly cumbersome; it is suggested that an annual maintenance tax for this work should simplify the process and insure better results. The present law is criticized because it fails to provide for access to an existing drain by a land-owner whose land is not traversed by it, save by resort to the detailed procedure laid down for the original construction of a project. Projects involving outlets of considerable extent, draining wet lands that can produce nothing until such outlets are established, suffer from the lack of provision for the issue of bonds by drainage districts whereby the expenditure can be deferred until production is instituted on the drained lands.

It will appear from the preceding paragraph that the county is the unit for drainage and reclamation operations in Michigan. There are drainage projects, however, which greatly transcend county boundaries and financial resources for their accomplishment. An example is the Saginaw basin and the district tributary to the Taquemon River of the Upper Peninsula. In the case of the Saginaw, evidently the drain commissioner of no one county is competent to

<sup>1</sup> *Ibid.*, 52.

determine the scope and execution of the project as a whole. Drainage operations on the upper reaches of the tributaries of this stream will most surely affect the interests of the cities adjacent to the lower river; while if these municipal interests are to determine the whole project, the drainage of the low-lying overflowed lands above these municipalities is directly affected. Drainage operations involving the deepening of the channel of the Manistique or the Taquemon, which will require extensive channeling in solid rock, will involve a financial outlay doubtless beyond the means of local drainage districts to provide. To meet the requirements of situations such as these, and to prepare plans and specifications for the larger drainage projects, apportion costs, adjust differences, and develop a comprehensive drainage system for the entire State with reference to the general good, seems to be the proper function of a state drainage department. Although its establishment has from time to time been broached, as yet the legislature has not taken the necessary action, unless it may be considered to have been comprised in the newly created departments of conservation or of agriculture.<sup>1</sup>

The glacial topography of Michigan, as indicated in Chapter I, has created large tracts of land which can only be recovered to agricultural uses through artificial drainage. It is estimated that there are

<sup>1</sup>See Miller and Simons: "Drainage in Michigan." Lansing, 1918, 58ff. This monograph was prepared with special view to the information of the legislature (session of 1919) which was expected to consider this subject.

4,400,000 such acres. The statute provides that "drains may be located, established, constructed and maintained, and drains and water courses may be cleaned out, straightened, widened, deepened and extended, whenever the same shall be conducive to the public health, convenience or welfare." The supervision of drainage operations is placed under the county drain commissioners, chosen in every county, if the requirements of law are observed, at the regular November elections in alternate years. Before the act of 1897, drainage was an affair of the townships. The drain commissioner acts only on application of at least one-half of the freeholders of the land traversed thereby. The commissioner tentatively determines the location of the proposed drain, the right-of-way is secured by release or condemnation proceedings, and, when the required hearings and official determinations have taken place, a final order of determination is issued fixing the route of the drain and the boundaries of the special assessment district which must meet its cost, together with the apportionment of costs among the beneficiaries. The work is done on contract with the land-owners or the lowest responsible bidder, whoever he may be. When drains traverse more than one county, the statute provides for the appointment of special commissioners to act with the regular county drain commissioners in locating the drains and apportioning costs, and in case of a failure to agree, provision is made for an appeal to the State Highway Commissioner as arbitrator. Drainage of State swamp lands

is now under the control of the county drain commissioners.

As a factor in development, the drainage of the wet lands of Michigan is extremely important. Collating the results of studies by Miller and Simons and by Leverett, it is estimated that in the Lower Peninsula 11.6 per cent of the area is swamp and lake. In the northern peninsula 25 per cent of the area is estimated of the same character, but information is less definite here. This works out to 4,146 square miles of lake and swamp in the Upper Peninsula. Leverett suggests that one-fourth of this is capable of drainage. Miller and Simons' estimate is similar to Leverett's, namely, 2,598,000 acres, which amounts to 24.6 per cent of the area of the Upper Peninsula. However, these investigators, in the absence of sufficient data, did not estimate the reclaimable wet lands. Leverett estimates that one-fourth of the wet lands of the northern peninsula are capable of drainage.

In the southern peninsula, Leverett estimates the lake and swamp area at 11.6 per cent, while Miller and Simons approximate this area, with their inclusion of 2,175,000 acres, which works out approximately 12 per cent of the aggregate southern peninsula area. In the northern twenty-one counties of this peninsula, which is also the area of sandy waste lands, Miller and Simons estimate that there are 661,000 acres of reclaimable wet land. During the five-year period, 1913-1917, fifty-seven counties of both peninsulas expended on the construction of

drainage projects \$5,917,610.50, and the area assessed for this work amounted to 3,214,500 acres.<sup>1</sup> Among these counties only three, Mackinac, Menominee and Ontonagon, are in the Upper Peninsula, where, as yet, little artificial drainage has been undertaken. In his most recent report on the lands of the northern twenty-nine counties of the Lower Peninsula, Leverett estimates their area of lake, swamp and wet lands at 4,365 square miles. The State Geologist calls attention to the fact that some 22 per cent of the soils of the southern peninsula are clay and thus susceptible of improvement through drainage; and he also points out that of the lands capable of drainage, extensive areas may be unsuited to agriculture, because of the presence of a sandy bottom or sub-stratum.

<sup>1</sup>“Drainage in Michigan,” facing p. 25.

## CHAPTER XIII

### DEVELOPMENT OF MICHIGAN WASTE LANDS

AT a time when Michigan, as elsewhere, is suffering from low prices of agricultural products, one occasionally hears a protest against any agitation for developing the waste lands, whereby additional farm products will be sent to a market already overcrowded with unsalable commodities or those salable at unremunerative prices. The man of the north country must take a different view of this problem. He observes that, in the end, it is desirable to take the broad view of any economic question; that the development of national resources, wherever they are and of whatever sort, is the fundamental American doctrine and normal reaction. Along this line America has grown great. If Michigan agriculture is now suffering, this is primarily due to defects of distribution rather than to overproduction. The present situation is undoubtedly temporary and a normal basis of prices will be reached long before any large portion of the cut-over lands is brought under cultivation. Development is a very slow process, and the products of the new lands will only very gradually reach the outside market. Indeed, much of this product will be lo-

cally consumed. Nor is it proposed to place all or any large proportion of the ten million idle acres under the plow. Large areas should be planted to new forests to replace the old ones that once occupied these lands. Other portions will go into ranches for grazing. Other parts will be employed in horticulture, whose products will be locally absorbed without any appreciable effect on the general market for farm products.

Those who purchase northern cut-over lands are either of recent European origin, whose financial resources are too meager to allow them to buy improved farms; or they are ranchers who desire tracts much more extensive than could profitably be acquired in the more developed sections of the State. By all means the foreign population should be encouraged to get back to the land. Many cannot afford high-priced improved lands; but with labor and sweat they will improve the rough stump areas, make a home in what was recently a wilderness, and develop taxable property where formerly lands went delinquent for the non-payment of taxes, thereby easing the tax burden for the entire State.

The progressive improvement of cut-over areas diminishes the forest-fire and brush-fire danger. The source of the grasshopper pest is in these same tracts of wild grass and brush lands. Finally it should be recognized that the productivity of the farms in the older sections of the State is declining because of the too continuous cropping of the land and soil erosion. It would be better to turn to the virgin



soils of the north country, giving these over-worked farms of the south a rest, permitting them to return to grass or forest for a period.

If it is true that farmers cannot make a fair return on their investment in the older sections of the State, that may be attributed to the too high valuation which they place on their holdings. If they were to capitalize their net return at the current rate of interest, they would probably find that such is the case. It would seem to be better, then, that these farmers should reduce their capital investment in lands by purchasing greater acreage at less cost farther north. It is not too far north to obtain a high return of farm products to the acre.

The Michigan Academy of Science held a symposium on the idle lands of the State at the University of Michigan, March 31 to April 2, 1920. On the thesis, "Michigan's undeveloped area represents one of the few great reserves of land suited to agricultural purposes, awaiting development," J. F. Cox of the Michigan Agricultural College pointed out that the agricultural progress of the northern cut-over areas had been hampered by the extreme variability of the quality of the soil, leading to the selection by settlers of lands too poor for agriculture, too remote from developed markets, as well as to the lack of skill in farm practice on the part of the settlers.

He points out that, "generally speaking, the better sandy loams, loams and clays of the entire cut-over country are well adapted to clover, grasses and

other forage crops, which can be depended upon to furnish excellent pastures and meadows. . . . The better types of soils are naturally seeded to June grass, alsike clover and timothy. The heavier loams, clay loams and clays, where second-growth is not too thick, carry good pastures throughout the summer seasons. On the lighter loams, the pasture tends to dry up and run short. The light pine and hardwood soils and jack-pine plains are of little value for grazing purposes, except for a very brief period in late spring and early summer, when they offer light grazing.

“After clearing, the loams, clay loams and clay can be depended upon to produce excellent crops of rye, barley, oats, spring wheat, root crops, peas and oats, and buckwheat. Winter wheat is gaining rapidly in acreage, and bids fair to become a dependable crop on adapted soils.

“Corn can be depended upon on the above-named soils for silage purposes in the lower part of Menominee and Delta counties, throughout the northern part of the Lower Peninsula and along the southern shore on adapted soils of the Upper Peninsula. Early varieties are dependable for grain, but these regions cannot be termed ‘corn lands’ in the sense that corn can compete with barley or oats as a feed grain.

“The well-drained loams and sandy loams of northern Michigan, in general, are splendidly adapted to potatoes. It is well within the realm of possibility that northern Michigan will become one of the greatest centers of potato production in the United States.

“One of the problems of feeders, who have recently brought stock into upper Michigan, is to provide for winter feed. Summer pasturage is plentiful. The clearing of more land for the production of barley, rye and oats for grain feed, of silage, root crops and clover and timothy hay, and alfalfa to winter over stock, will make this business much more secure.

“Certain areas of the Upper Peninsula can produce all crops necessary to sustain a thriving dairy and livestock development. The Ontonagon valley, for instance, a great range of approximately 250,000 acres of strong clays and clay loams of high fertility, can produce the grass, grains and winter feed such as roots, peas and oats, or possibly sunflowers and early corn varieties for silage to maintain a profitable dairying or beef-cattle industry.

“The same condition exists in Chippewa County, which has been a profitably farmed timothy and small grain region for a number of years. Great diversity of crops and proper drainage in both these regions is advisable.

“In Menominee, Delta, Dickinson and part of Alger counties are large areas of loams, and less extensive areas of clay loams, well adapted to farming which have been taken up to a comparatively small extent. Loams and better sandy loams of this region offer excellent conditions for potato growing. The rotation of rye or spring-seeded small grains with clover is well adapted.

“In the northern part of the Lower Peninsula and the Upper Peninsula considerable development has

been accomplished on the better lands, but there still remain large areas of excellent land awaiting clearing.

"In briefly stating the situation, the following facts stand out:

"1. Michigan possesses a vast area of undeveloped land.

"2. For the most part this land is stump land or poorly drained land, which will require considerable time and expense to prepare for cropping.

"3. Long-time loans at a low rate of interest would be of great help to individual farmers.

"4. The soils are extremely variable. A comparatively large acreage is well adapted to farming, and an even larger acreage can be termed unsuited for farming under present conditions.

"5. The agricultural possibilities of this area are frequently misrepresented to the detriment of its development.

"6. With proper crops, under the right conditions, a great development of successful farm communities can be made, much to the benefit of the state.

"7. Forest fires cause great damage to incoming settlers, a great loss to standing timber and the young growth, and injury to soils through burning out of organic matter. More adequate forest-fire regulations to remove this menace is necessary.

"8. A state agricultural and soil survey to properly designate the value of land for farming, graz-

ing and forestry purposes and adequate fire control are necessary for the sound and reasonably rapid development of Michigan idle lands.

"9. Settlers must in all cases be established on the good lands only and prevented by an interested state from dissipating their energies on land which cannot be profitably worked. In no case should they be permitted to be persuaded by the occasional ignorant or unscrupulous land dealer to settle on jack pine and light blueberry plains and other inferior areas. . . .

"10. Michigan's northern country has been represented both as a great desert from an agricultural standpoint, and as 'cloverland,' a coming Eden. Somewhere between the two statements lies the truth. On the whole, Michigan has in her undeveloped northern country a region of great agricultural potentiality, which, if properly developed as farming land, grazing land and forestry land, in accordance with its fitness from a soil and climatic standpoint, will add materially to the wealth and prosperity of the state."<sup>1</sup>

At this session of the Michigan Academy of Science, it was resolved that the proper procedure for the reclamation of Michigan's non-productive area should be as follows: "1. That an inventory be made of the land resources of Michigan by counties. This inventory should constitute a series of county reports,

<sup>1</sup>"Michigan Idle Land." Reprinted from the 22d Report. Mich. Acad. of Science, 1921, 21.

accompanied by maps along the following lines: a. Nature of physical conditions. b. Present economic conditions, together with the record of present and past experiences in the use of the area. c. A classification of the land according to its highest indicated use.

"2. That in the study of the physical conditions of the land (a) first and chief attention be given to soil conditions, with a classification of soils which will recognize their genesis and which will give maximum emphasis to their distinguishing qualities. (b) That climate be adequately considered as a factor in utilization; and (c) that topography, drainage, location, and the size of areas of unit characteristics be separately recognized and considered as factors affecting possible use.

"3. That an intensive study of land economics be made for each area on the manner of present utilization of the land and the history of its use. In connection with this study there should be determined (a) extent of idleness of the land, (b) the different types of use to which land is now being put, and (c) the returns from the several uses and the place of these uses in an economy of the area.

"4. That the land of Michigan shall be classified into a series of classes on the basis of return, or anticipated return, ranging from land suited to highest grade and most permanent agriculture through grazing and forest land to permanent waste land.

"5. That the work of this survey be carried out with the fullest utilization of the scientific personnel

in the State and in consultation, and if feasible in coöperation, with the proper federal agencies.”<sup>1</sup>

As compared with such highly developed agricultural states as Iowa and Illinois, Michigan possesses very large tracts of lands not yielding any products of economic importance. Such lands have been estimated to amount to ten million acres. To derive some sort of output of economic value from these unproductive areas is in part the purpose of three development bureaus that have been established, two in the southern peninsula and one in the northern.

The Northeastern Michigan Development Bureau was incorporated as an association “not for pecuniary profit,” January 31, 1910, and comprised within its interest the counties of Alpena, Alcona, Arenac, Bay, Cheboygan, Crawford, Clare, Gladwin, Iosco, Montmorency, Midland, Ogemaw, Oscoda, Otsego, Presque Isle, Roscommon, and Saginaw. The secretary’s office is at Bay City. The Western Michigan Development Bureau operates in a group of twenty counties in the western and northwestern section of the Lower Peninsula, as far south as Ottawa and Kent counties, and as far north as Emmet County, while extension to the Indiana line in 1921 was planned. Its Articles of Association, as amended May 1, 1912, set forth that the bureau is organized for the purpose of “the encouragement and advancement of agriculture, manufactures and the mechanic arts” in its territory. The secretary’s office is at Grand Rapids. All the territory within the Upper Peninsula falls within

<sup>1</sup> *Ibid.*, 2.

the scope of the Upper Peninsula Development Bureau, described in its report for 1919, as "an institution designed to contribute towards and assist in every way possible the growth, progress and development of the Upper Peninsula of Michigan . . . by assisting in every way possible individuals, corporations and organizations within the Peninsula, and to reach out for greater expansion by attracting individuals and organizations from without." The secretary's office is at Marquette.

The secretary of the Northeastern Michigan Development Bureau describes the association as "an agricultural board of trade," and in its literature are featured the agricultural advantages, including fruit-culture, live-stock, and summer vacation aspects of the district. The secretary of the Western Michigan Development Bureau calls attention to the introduction of 651 settlers into this territory in one year, together with settlers' movables; the promotion of good roads (claiming the origination of the West Michigan Pike, and a share in the starting of the Mackinac Trail); while many meetings among farmers were held, "for the purpose of inculcating better methods of farming." The three bureaus, having regard for the great acreage of cut-over grasslands in their territory, have promoted grazing, especially sheep culture, and have sought the introduction of sheep from the western ranges, especially in seasons of drought. The Upper Peninsula Development Bureau (organized in 1911) has interested itself in the settlement of cut-over lands, intro-



duction of sheep and cattle from the western ranges, the tourist business, the Great Lakes-St. Lawrence Waterway project, the destruction of noxious animals, good roads, introduction of new industries, and whatever else may appear to promise the industrial and agricultural improvement of the country.

All the development bureaus issue pamphlets replete with descriptive matter pertaining to their territory, praising their good qualities, emphasizing characteristic products and the possibility of producing crops as yet not characteristic of the region, their advantage in relation to fruit-culture, grazing, general farming, raw material, their scenic attractiveness and recreational advantages, and whatever may appear to have interest for the prospective homeseeker in these less developed areas of the State. Results are hardly capable of a statistical presentation, yet one gathers the impression that these efforts are not useless from the standpoint of attracting attention to the section and occasionally settlers also.

The sandy lands of Michigan occupy millions of acres in all sections but predominant in the northern peninsula. Their area cannot be stated definitely until a comprehensive soil survey and classification has been carried to completion. These were the old pine lands referred to in Chapter II. Here the problem is to determine what crops, forest or field, can be grown profitably to such an extent that a livelihood from the land may be secured. Experimental work has been conducted by private agencies rather

than by the Michigan Agricultural College, in the Upper Peninsula chiefly under the encouragement of the Upper Peninsula Development Bureau in co-operation with county agricultural agents and the land commissioner of the Duluth, South Shore and Atlantic Railway. In the Lower Peninsula, Edward E. Evans of West Branch has specialized in farm crops for sandy soils, producing and distributing seeds of many varieties. Sand vetch and, for the still lighter soils, the wood-pea have been found suitable. For sandy soils in northern Michigan sarradella and sainfoin are also thought to have possibilities of useful culture, while lupines, although considered as possibly useful, have not been demonstrated a valuable crop as yet. The yellow and white annual sweet clover, Swedish "golden rain" oats, broad bean, soybean, hidalgo-pea, lentil, and other imported types have been taken account of, but it is now too early for definite values to be assigned them for sandy lands in general, although in restricted areas in some instances good results appear to have been obtained. The energetic pursuit of this field of investigation may, in the next few years, determine positively what sandy soils are capable of accomplishing in the agriculture of Michigan.

Near Grayling, Crawford County, in the sandy land area of the Lower Peninsula, the Northeastern Development Bureau, in coöperation with the Michigan Agricultural College, has recently undertaken experimental investigations of crops adapted to the

light sandy soils of the region. The projects are described as having to do "with the use of lime, potash, acid phosphate, with such crops as vetch, peas, oats, sweet clover, alfalfa, etc." The demonstrations are in charge of the extension department of the College and its soils department. The Grand Rapids and Indiana Railway some five years ago began coöperative work at the demonstration farm at Howard City and demonstration plats at Cadillac and Big Rapids. Various clover, vetches, lupines, and the like, were tried out. This work was interrupted by the war. This bureau is particularly favorable to the annual white sweet clover, or "Hubam" which, with vetch, is regarded as the best soil-builder.

Agriculture in the northern counties of the southern peninsula and the whole of the Upper Peninsula presents not only problems of soil and markets but also of climate. It has, therefore, been necessary to determine, from these points of view, what crops and methods must be employed if success is to be the reward of rural industry. Trial and experience seem to demonstrate that the climate is too cool for corn to mature over much of the area, except in an exceptionally favorable season and in the southern counties of the district. Beans likewise are not adapted, although under exceptional conditions good crops have been secured. On the sandy loams and medium loams, such crops as clover, beans, peas, rye, vetch, buckwheat, corn, potatoes, root-crops and small-fruit do well; while the heavier soils produce also

crops of timothy, wheat, oats and barley.<sup>1</sup> While climate and soil conditions are regarded as favorable to the sugar-beet, its culture is confined to the southwestern portion of the district, west of Lake Michigan. All root-crops seem to thrive here; while the almost unfailing rainfall of the growing season is favorable to forage crops and live-stock. However, with live-stock there remains the problem of winter feeding, which is not insoluble and perhaps not more serious than drought feeding in the southern counties. Recent success in the growing of sunflowers for ensilage may solve this problem, although expert opinion is not unanimous in regard to the value of the crop. On the heavy clays, principally in Chippewa County, hay does exceptionally well, and has been largely exported from the region. There being no large cities in the district, the absence of large local markets must be considered. Expert opinion seems to favor the region as a dairy section, and there is now a considerable traffic in milk and cream both local and by railway to urban markets within and without the district.

In estimating the dairy possibilities of the region, the human factor must also be considered. The large foreign population, particularly Scandinavian and Finnish, is attracted naturally to dairying. Sheep-raising on the large cut-over ranges has been promoted in both peninsulas, but the consensus of expert local opinion seems to favor the industry in the hands

<sup>1</sup> Walker & McDowell: "Farming on Cut-over Lands of Mich.," U. S. Dept. Agr. Bull., 425, p. 4.



Plate VIII. The Otter Lake Agricultural School, Houghton County. This is the pioneer school of this type in Michigan.



of persons familiar with the country rather than by incoming ranchers from the western ranges. Sheep-raising on a moderate scale by local farmers has made good many times. In weighing the agricultural possibilities of the region, it must be recognized that the proximity of the Great Lakes is a factor of great importance, causing climatic conditions to vary markedly within a few miles back from the shore line. This is to be considered in relation to fruit husbandry, which in areas adjacent to the lakes on suitable land has been remarkably successful. However, care must be taken in selecting the varieties of fruit. From the list of apples, the assistant state leader of county agents in the Upper Peninsula has selected the Wealthy and Northwestern Greening as, on the whole, the types to be favored here. The Secretary of the State Horticultural Society favors the Macintosh Red. Berries, including currants, gooseberries, blackberries, red raspberries, and strawberries are universally, both in the wild and domesticated state, grown in the district. Plums and cherries produce on occasion in a very remarkable abundance, while pears yield not so well. Garden vegetables in wide variety do very well.

In the opinion of the special investigators of the United States Department of Agriculture, who studied agricultural conditions and described them in a bulletin published in 1916, "mixed farming rather than a highly specialized type is apparently well adapted to the majority of farms in this district." The study embraced 801 farms in the cut-

over district of Michigan, Wisconsin and Minnesota, where the average investment for each farm was \$6,856, and the family income \$559. In addition, if free of debt, the family had what the farm could furnish for its living. If income is small, so are expenses among persons whose standard of living is not so highly developed as among the old American stock. Grouping the farms by size and family income, the investigation brought out the fact that, of the farms investigated, those having an area of 20 tillable acres or less, the family income was \$213. Farms of 20 to 40 acres gave a family income of \$339; of 40 to 60 acres, \$533; of 60 to 80 acres, \$622; 80 to 100 acres, \$939; 100 to 140 acres, \$1,179; over 140 acres, \$1,586.<sup>1</sup> This shows the steadily increased income with the addition of tillable area. The investigators observe that "the little farm well tilled may succeed, and frequently does succeed in this area, but the prospects are brighter for the larger farm if that larger farm has sufficient area under cultivation. Among the records there are those of quite a number of farms having satisfactory labor incomes on less than forty acres of cleared land, but these farms have rich soil, exceptionally good livestock, and, as a rule, a considerable acreage of woods pasture. A family engaged in general farming may make a fair living on a farm with forty acres under cultivation and should be able to make money with 80 to 160 acres under cultivation. The

<sup>1</sup>"Farming on the Cut-over Lands of Michigan," etc., supra, 9, 10.



rapid enlargement of the cultivated area on each farm, when it can be done economically, is the first and most important agricultural problem in this district and the one that has the widest and most general application.”<sup>1</sup>

It has been shown statistically that there is no labor income on farms with a large area unimproved. To operate such a farm involves a disproportionate outlay for taxes and interest on lands yielding small or no return. Thus in the 801 farms under investigation as above noted, whose average acreage was 108, it was ascertained that farms with less than forty tillable acres had a minus labor income, while only those farms possessing a tillable area of eighty acres or more had a labor income above \$100. Manifestly, then, it is uneconomic to hold large areas of unimproved lands, except where new and favorable developments can be anticipated. This is the rationale of the vigorous campaigns for stump removal that has characterized some of the cut-over districts of the State since the war period. In the summer of 1921, it was planned actively to promote land clearing in the Upper Peninsula under expert guidance through the extension department of the Michigan Agricultural College.

The Department of Agriculture investigators reported a lack of crop rotation on the newer cut-over farms under review, while the more successful of the older farms had developed it definitely. The rota-

<sup>1</sup>“Farming on the Cut-over Lands of Michigan.” etc., *supra*, 9, 10.

tion most successful was that of grains, legumes and inter-tilled crops. These were grown in a three- or four-year rotation. In the latter grain was the crop for the first year, for the second year, hay; the third year, hay or pasture; and the fourth year, inter-tilled crops. The three-year rotation was in general use where pasture on undeveloped land was abundant.

The clearing of cut-over lands obviously calls for much heavy labor, and this seems favorable to certain sturdy European stocks inured and willing to labor under rough conditions and with low initial returns. During the early years of farm-making, there is opportunity for work in the woods during the winter and always for additional land-clearing operations. Indeed, most farmers of the northern cut-over country are only part-time agriculturists, devoting a fair proportion of their time to lumbering or other pursuits to augment the family income.

In the farm economy, care must be taken not to grow more vegetables and small-fruits than can be taken care of at home, except where urban markets are available. On the other hand, the farm will produce ample supplies of fuel from its timber and slashings, with fence-posts and stakes, not only for home use but also for shipment to outside markets. Lumber, stone, sand and gravel are usually locally accessible.

At Escanaba, in the heart of the cut-over country, exists the factory of the A. J. Kirstin Company, manufacturers of stump-pullers. Some of these operate by man-power and some by horse-power, on

the clutch and drum principle. Selling at a price ranging from \$100 to \$400, these pullers are sold to a reported amount of about \$1,000,000 annually. Three-fourths of this business is domestic and direct from factory to customer. About 10,000 machines are produced annually, the company reports; and the hand-power clutch and drum type predominate. These hand-power machines are chiefly used on small acreages. Experience has shown that usually the best combination is of explosives and stump-pullers, whereby the stumps are first riven to pieces and then removed by the puller.

In addition to explosives obtained through commercial channels, the farmers of the cut-over area have obtained large quantities of "TNT" relinquished by the United States Department of Agriculture to the State Highway Department, and by the Highway Departments to the local farm bureaus for land-clearing operations. The reported contributions thus furnished 750,000 pounds. The price was very much less than that normally paid for explosives, since, as salvaged war material, it was not distributed on a commercial basis. It proved a great boon to the stump country, but aroused some opposition on the part of private concerns handling explosives, and for this or other reasons, this source of supply was largely cut off in the spring of 1921. There remained large quantities of "government" picric acid, which it was planned to dispose of similarly when a safe method of handling had been secured. It is evident that land-clearing operations in

Michigan, even with these facilities available, have a long future before them.

It is recognized that the agricultural progress of Michigan, particularly in the undeveloped sections, is closely connected with adequate financial assistance. Outside the regular channels of banking, there is no agency specifically created for the purpose of affording financial aid to farmers or to rural development. There are at the present time no colonization companies, such as obtain in Wisconsin, for extending financial assistance to settlers. A purpose to establish such enterprises has from time to time been expressed, but as yet without definite results. Up to March, 1920, the Federal Land Bank of St. Paul, which embraces in its operations the State of Michigan, had placed loans in this State aggregating \$4,150,500, of which \$1,366,600 was allocated to the Upper Peninsula. On December 31, 1920, there had been chartered in Michigan 121 farm loan associations, 3,440 loans had been made, involving the total loans of \$6,475,000. This gave an average loan of \$1,882.<sup>1</sup> This was a year marked by a cessation of business on the part of the Federal Farm Loan Board, caused by the pendency in the Supreme Court of the United States of a suit involving the constitutionality of the Federal Farm Loan Law and the consequent discontinuance of the operations of the Federal Farm Loan Board. With the final decision of the court favorable to the act, it may be expected that the benefits of the law will manifest

<sup>1</sup> Rept. of Federal Farm Loan Bd., Feb. 9, 1921, 5.

themselves in Michigan on a much larger scale than hitherto.

Even cursory observation of the cut-over districts of Michigan makes clear the impossibility of developing some of them agriculturally. The area of these lands in arrears for taxes in 1920 was stated to be three million. During five years the acreage reverting to the State because of the nonpayment of taxes is given as 2,300,000.<sup>1</sup> There are on the tax rolls 5,000,000 acres with an average value of \$5 an acre. This is nearly one-seventh of the State. Of the lands which revert to the State as delinquent for taxes, some are re-sold, some are exchanged with private or public holders in order to consolidate the State's holdings; and some are transferred to the Public Domain (now Conservation) Commission to be held as public lands, some of them to be organized as State forests. The fact that these lands reverted because they were unable to produce returns equal to the tax requirements assessed against them, indicates that they will permanently remain public property, and the State intends to hold them as such. Of the lands which are re-sold at the annual tax sale, many acres revert, and revert again and again to the State, after this or that purchaser has discovered their worthlessness for agriculture, mining or other industry.

The problem of the economic utilization of the cut-over non-productive lands within the State is peren-

<sup>1</sup>Janette: "Michigan's Millions of Idle Acres," Detroit, 1920, 12.

nially discussed and remains obviously unsolved. At the outset, it must be understood that the character of these lands, except where experimentally ascertained, is not determined, and in few cases is a matter of public record. Obviously then, the first attention must be given to their classification after investigation by competent authorities, who have in view all the elements that enter into the determination of their economic importance. The cut-over areas contain some excellent arable land, capable of producing field and forage crops equal to the best sections of the State; other tracts may provide range for live-stock through native and cultivated grasses; while another portion will produce forest products more advantageously than field crops or pasture. It has been proposed that the State should resort to condemnation proceedings on the initiative of townships, counties or municipalities, to disengage the idle lands of the north country from the dead hand of their present possessors who are failing to make any economic use of them, while, fire-swept season after season, they constitute a general fire hazard and are steadily being impoverished by the same destructive agency. Thereon, the State should carry out a policy of reforestation for that portion of the area which offers itself as best adapted to this use, while other areas can be set aside for grazing purposes to all who may wish this accommodation. Coincidentally, provision would be made by State or local administration for fire control through an ade-

quate system of wardens, fire-fighting equipment, and removal of slashings.<sup>1</sup>

C. O. Sauer has sketched a plan for a soil survey, which includes such data as would normally interest the homeseeker and purchaser of a farm. Of primary interest, he points out, is the location of the markets accessible to the farmer, which should be plainly indicated on a sketch map of the region. The map also shows significant topographical and drainage features. Geographical features should be described in terms of their origin. Local names of soils should be retained wherever possible. Soils should be related to slopes in the description of them. There should be a brief interpretation of the climate, including "the average length of growing season, frequency of unseasonable frosts, depth of frost action, amount and duration of snow-cover, distribution of rain during growing season, frequency of droughts and rainy 'spells' at critical periods, intensity of precipitation, occurrence of hail and violent wind-storms." Farmers' experiences of local weather conditions should not be ignored. Typical farm practices should be described. There should be abundant photographic illustration. A map showing the actual use to which the land is being put should be included. Present or past forest cover should be noted. Such a map is very significant to the student and inquirer. The history of the use of the land should be stated.

<sup>1</sup>"Michigan's Millions of Idle Acres," 44.

## CHAPTER XIV

### STATUS AND TENDENCIES IN MICHIGAN RURAL LIFE

A SUMMARY statement of census findings will afford us a measure of the State's resources and will show how near we have yet come to reaping the capabilities of the land. Between these results and a fair optimism lie the possibilities of the production of the State; and the figures of different periods show the tendencies.

The aggregate population of Michigan in 1920 was 3,668,412, a decided increase from the returns for the previous decade which showed 2,810,173. Of the total, the one city of Detroit had 993,678, an increase of 113.3 per cent over the 1910 figure of 465,766. On the other hand, the population of Michigan in 1920 dwelling in the rural sections, represented by places of less than 2,500 inhabitants, was 1,426,852, which was 38.9 per cent of the total population. Evidently Michigan had ceased to be predominantly a rural commonwealth after the manner of its pioneer period. Only twenty years before, the rural inhabitants had numbered 60.7 per cent of the whole. Thus in a score of years the rural had yielded to the urban element in its composition. Of the



eighty-three counties of the State in 1920, thirty-three, Allegan, Berrien, Branch, Cass, Charlevoix, Cheboygan, Chippewa, Clinton, Eaton, Emmet, Gratiot, Hillsdale, Houghton, Ionia, Iron, Isabella, Lapeer, Lenawee, Livingston, Macomb, Manistee, Mason, Mecosta, Menominee, Midland, Monroe, Montcalm, Ottawa, Presque Isle, St. Joseph, Shiawassee, Tuscola and Van Buren, showed a larger rural than urban population, as the census employs the term.

The most striking feature of the census returns, but one for which observers of rural conditions were prepared, was the drift from the rural to the urban communities. Between 1910 and 1920 Alpena, Allegan, Barry, Bay, Berrien, Branch, Cass, Cheboygan, Clinton, Eaton, Emmet, Grand Traverse, Gratiot, Hillsdale, Houghton, Ionia, Isabella, Kent, Lapeer, Lenawee, Livingston, Manistee, Mason, Mecosta, Menominee, Monroe, Montcalm, Muskegon, Ottawa, Saginaw, St. Clair, St. Joseph, Schoolcraft, Shiawassee, Tuscola, Van Buren, Washtenaw and Wexford showed a definite loss of rural population. Of the counties which had a positive increase of rural population, Gogebic, in the extreme northwestern portion of the State, led with its rural growth of 32.5 per cent, while Iron had 26.6 per cent of increase. These northern counties are in the formerly undeveloped but now developing section of the State. The effect of the adjacent automobile industry on the rural sections of the counties containing them is not manifested in Genesee County, whose rural popula-

tion increased 21.4 per cent in the decade; in Ingham, whose rural increase was 9.7 per cent; and Oakland, with a rural increase of 16.7 per cent of population.

The census of 1920 enumerates 196,647 farms in Michigan, of which the fifteen counties of the Upper Peninsula had 12,317. In the well-developed agricultural counties of the south are the largest number of farms. Kent County had 5,605; Lenawee, 5,083; Berrien, 5,444; Saginaw, 5,143; Allegan with 5,734 stood at the top of the column; while Menominee led in the Upper Peninsula with its 2,106, followed by Houghton with 1,741. Many of these counties having a large number of farms are of relatively small area. Allegan's area is 833 square miles; Lenawee's 743; and Berrien's 569. This contrasts with the situation in Marquette County, the largest in the State, whose area of 1,870 square miles contained only 846 farms, and Mackinac's area of 1,044 square miles had 479 farms. Counties in the northern portion of the southern peninsula also show relatively few farms. Thus Roscommon, in 1920, had 267 farms; Ogemaw, 1,281; Montmorency, 421; Oscoda, 278; and Crawford, 212.

The Fourteenth Census (1920) ascertained that there were in Michigan in 1920 an aggregate of 196,447 farms out of 6,448,366 farms in the entire United States, which placed Michigan in the fifteenth place under this head. The number of acres in Michigan farms was 19,034,204, the rank being twenty-third. The number of acres of improved land was 12,926,241, while 3,217,100 acres were in

woodlands. Of other unimproved land, the acreage was 2,890,863. The average number of acres to a farm in Michigan was 96.9; the average number of improved acres 65.8. The value of farm lands and buildings is \$1,437,862,310, the State's rank being fourteenth. The average value of land and buildings to a farm is estimated as \$7,313, at \$75.58 an acre. The rank of the State in value for each farm was twenty-ninth, and in value an acre, sixteenth.

Classified with reference to their size, there are in Michigan 12,744 farms under 20 acres. The farms ranging in size from 20 to 49 acres numbered 40,765; from 50 to 99 acres, 71,391; from 100 to 174 acres, 52,645; from 175 to 499 acres, 18,075; of 500 acres and over, 827. These figures clearly bring out the fact that Michigan farms average of only moderate size, a good acreage in the minds of the farming population appearing to be 80.

Of the total number of farms, 34,722 were operated by tenants, in which respect Michigan ranked twenty-fourth. There were 23,280 share tenants; 422 share-cash tenants; and 9,312 cash tenants. Of farms operated by their owners, Michigan ranked sixth, having 159,406. There were 72,866 owned farms free from mortgage (the rank of the State being here eleventh). Of the owned farms, 78,761 were mortgaged, in which respect the State ranked second. Thus it appears that 51.9 per cent of the owned farms were mortgaged. The farm mortgage debt in Michigan was \$144,103,067 for 67,119 farms reporting this item. In the amount of its farm mort-

gage debts only Wisconsin and Missouri exceeded Michigan. The average interest rate for farm mortgages was six per cent. The average mortgage debt to a farm was \$2,147.

The value of all farm property in Michigan was reported at \$1,763,334,740, of which land alone represented \$959,186,538, and the buildings \$477,499,672. The implements and machinery were rated at \$122,389,927 and the live-stock at \$204,258,603. The value of all farm property for a farm worked out at \$8,976, in which item the State ranked thirteenth. In value of all farm property Michigan ranked fourteenth, of land alone sixteenth, of buildings seventh, of implements and machinery fourteenth, of live-stock sixteenth.

The total farm expenditures for labor were given as \$31,944,861 for the year 1919, the State ranking eighteenth under this head. Out of this total, \$24,875,549 were paid in cash, the balance going under the heading of rent and board. The reported expenditures for fertilizers were \$4,887,253, and \$22,104,883 for feed.

The number of foreign-born white farmers in Michigan in 1920 was 48,264, of which 2,034 were born in Austria; 13,393 in Canada; 1,142 in Denmark; 2,203 in England; 3,947 in Finland; 264 in France; 9,745 in Germany; 3,280 in Holland; 933 in Hungary; 819 in Ireland; 298 in Italy; 654 in Norway; 2,479 in Poland; 1,538 in Russia; 436 in Scotland; 3,088 in Sweden; and 371 in Switzerland.

Male persons operated 190,671 farms; and females, 5,776 farms. Of the owners, 153,872 were males and 5,534 females. Of the managers, 2,300 were males and 19 females. Of the tenants 34,499 were males and 223 females. Females operated 440,426 acres.

The total area of organized drainage enterprises in Michigan was 9,778,269 acres. Improved farm land amounted to 7,754,161 acres, while timbered and cut-over land comprised 1,663,345 acres. Other unimproved land was 360,763 acres. The total land area of the State was 36,787,200 acres. The area in drainage enterprises was 26.6 per cent. Swampy or wet lands or those subject to overflow in organized drainage enterprises was given as 1,037,361 acres. The cost of organized drainage enterprises was reported at \$25,480,099.

The census returns show the total value of all farm crops in Michigan in 1919 to have been \$404,014,810, distributed as follows: cereals, \$170,897,885; hay and forage, \$105,280,992; vegetables including potatoes \$65,096,550; all other crops, \$62,739,383. The total value of live-stock products in 1919 was \$111,076,235, as compared with \$48,380,551 in 1909. Of dairy products the value was \$71,074,727 in 1919, and \$26,727,538 in 1909. Chickens and eggs returned a value of \$34,960,771 in 1919 and \$17,926,239 in 1909. Wool and mohair were valued at \$4,623,778, as against \$3,430,032 a decade earlier. Honey and wax had a value of \$416,959 in 1919 and \$296,742 ten years before.

These valuations obviously should be considered in connection with the high prices prevailing at the later date.

The State ranked sixteenth as a producer of corn in 1919; fifteenth in wheat; twelfth in oats; eighth in barley; second in rye; fifth in buckwheat; and ninth in hay. In sugar-beets Michigan ranked second; sixth in maple sugar; fifth in maple sirup; fifteenth in honey. Michigan ranked twenty-first in swine; sixteenth in number of all cattle; thirtieth in beef cattle; ninth in dairy cows; fifteenth in number of horses; thirty-seventh in number of mules; and twelfth in number of sheep.

A comparison of the yields to the acre of important farm crops, based on the reports of the Bureau of Crop Estimates of the United States Department of Agriculture, shows that Michigan produced corn in 1920 at the rate of 40 bushels to the acre, while the yield in Wisconsin was 43.9 bushels, Illinois 34, Iowa 46, and New Hampshire 45. Michigan's yield of wheat ran 15.5 bushels to the acre as compared with Minnesota's 19.6, Ohio's 12.7, Kansas' 15.4, and New York's 23.3 bushels. The yield of oats was 39.6 bushels to the acre, as against 41 bushels in Indiana, 34 in South Dakota, and 39 in Pennsylvania. Of barley the acre yield in Michigan was 26 bushels, 31.7 in Wisconsin, 18 in North Dakota, and 27.7 in Ohio. Similarly the State produced rye at 14.7 bushels, as compared with a yield in Wisconsin of 16 bushels, 17 in Minnesota, and 17.5 in New York. Buckwheat yielded 14.5 bushels

to the acre, as compared with Ohio's output of 20.9 bushels, and Indiana's yield of 20 bushels.

Potatoes yielded 105 bushels to the acre, while New York produced 125 bushels, Ohio 100, and Minnesota 95. The production of hay ran at 1.21 tons to the acre in Michigan, 1.70 tons in Wisconsin, 1.44 in Iowa, and 2.60 in Nebraska. Beans yielded 13 bushels to the acre in Michigan, 14 in New York, 8 in Colorado, and 10 in California. Of sugar-beets, Michigan's acre product was 8.67 tons, as against 10.70 for Colorado, 9.64 tons in Ohio, 8.66 in Wisconsin, and 11.57 in Utah. Other crops, like flax-seed, hops and tobacco, which are important in other northern states, are negligible in Michigan.

As might be surmised from what has already been stated regarding the relative productivity of the several sections of the State, the southern tier of counties make the largest aggregate showing of agricultural products. The Annual Summary of the Michigan Coöperative Crop Reporting Service indicates that the counties producing more than 500,000 bushels of wheat include Gratiot, Allegan, Berrien, Cass, Kalamazoo, Kent, Ottawa, Barry, Calhoun, Clinton, Eaton, Hillsdale, Ionia, Genesee, Lenawee, Monroe, St. Clair, and Washtenaw, all southern counties of the southern peninsula. The counties producing more than 1,000,000 bushels of corn include Gratiot, Mecosta, Montcalm, Huron, Saginaw, Sanilac, Tuscola, Allegan, Berrien, Cass, Kalamazoo, Kent, Barry, Branch, Calhoun, Clinton, Eaton,

Hillsdale, Ingham, Ionia, Jackson, St. Joseph, Shiawassee, Genesee, Lenawee, Livingston, Monroe, Oakland and Washtenaw, also southern, but with a more northerly trend than appear in the list of wheat-producing counties. Eight southern counties produced more than 1,000,000 bushels of oats: Gratiot, Huron, Saginaw, Sanilac, Tuscola, Clinton, Genesee and St. Clair. The large yields of rye and barley are also in this territory. While the only counties producing over 1,000,000 bushels of potatoes are also southern, large yields are reported for the northern counties. It should be understood, however, that, while the northern counties are usually larger in total area than those in the southern portion, their farm areas are much smaller. It is interesting to observe that, where northern counties make any showing in the production of a crop, the acre yield runs higher frequently than for the most southerly counties, as, for example, in the case of potatoes, whose yield in 1920 was reported at 134 bushels to the acre in Houghton County and 60 bushels in Branch County (taking the extremes of the State). The yield of oats in Menominee County was 27.3 bushels to the acre, and Hillsdale County 23.4 bushels. The hay output in Chippewa County was 1.57 tons to the acre and 1.36 in Lenawee County. Corn yielded 39 bushels to the acre in Delta County and 36 in Clinton, but it should not be supposed that the aggregate corn crop is large in northern Michigan.

Since the beginning of the State's history, agriculture has received its greatest development in the



southern counties. The Fourteenth United States Census, however, reveals that it is hardly holding its own in this section. Quite uniformly in these counties appears a diminution of the total acreage in farms and the acreage of improved farm lands. Thus in the decade, Oakland County showed a decrease of total farm area of 14.8 per cent, while the area of improved farm lands decreased 16.5. Similarly the improved farm lands of Macomb County fell off 4.4 per cent; of St. Clair, 1.9; of Calhoun, 3; of Washtenaw, 3.9; Monroe, 3; of Lenawee, 2.5; of Wayne, 18.3; of Hillsdale, 3.4; of Livingston, 6.5; of Berrien, 2.3; of Cass, 2.1; of Allegan, 7.5; of Barry, 2.5; of St. Joseph, 3.6; of Kalamazoo, 7.2; of Branch, 3; and of Van Buren, 5.7 per cent. These are the oldest agricultural counties of the State, in part of which farming has continued for about a century. Even the central counties of the southern peninsula have a similar trend. During the same period the area of improved farm land in Oceana County decreased 1.1 per cent; of Clinton, 2.3; of Shiawassee, 2.4; of Ionia, 4; of St. Clair, 1.9; of Sanilac, 4.5; of Bay, 17.8; of Eaton, 1.8; of Jackson 2.8; of Genesee, 6.8; of Ingham, 3.9; of Lapeer, 1.7; of Kent, 3.5; of Ottawa, 3.6. Undoubtedly in counties like Wayne, Oakland, Ingham and Genesee, there has been a tendency for the city to encroach on the country; but such an explanation does not apply to such predominantly rural counties as Clinton, Branch or Eaton. Taken in connection that a similar decrease in the total farm

area in these counties has occurred, it must be assumed that there is a retrograde agricultural movement in this section of the State.

On the other hand, the counties in the northern portion of the southern peninsula and throughout the northern peninsula have displayed an agricultural advance in the decade. Thus Arenac County showed an increase of 31.1 per cent in improved farm lands; Clare County an increase of 22 per cent; Gladwin, of 34.9 per cent; Mason, 7.2; Manistee, 13.7; Lake, 7.3; Newaygo, 0.9; Montmorency, 30.2, and Ogemaw, 21. These counties are without large cities but with a much smaller proportion of their land in farms, because of the poverty of the soil or the presence of forest lands, public or private. Thus Arenac County has only 135,334 acres in farms, while Van Buren has 341,089 acres, and Branch County 308,805. Manistee County has 147,569 acres in farms, as against 308,805 acres in Branch County, although Manistee exceeds Branch County in area by 65 square miles. Although the farm area in these northern counties is proportionally less, the census returns indicate that it is materially increasing.

An even more striking situation appears for the counties of the Upper Peninsula, where soil conditions on the whole are believed to be much more favorable than in the northern counties of the southern peninsula. Thus Gogebic County in the decade showed a total farm area increasing by 109.2 per cent, and an improved farm land area increasing by 107.3 per cent; but the acreages themselves were

relatively small, 27,442 and 9,829 respectively. Similarly Houghton County in the copper country increased its farm area by 43.6 per cent, and its improved farm lands 58.1 per cent, the acreage of improved lands being 56,798. Chippewa County, relatively well developed agriculturally, had in 1920, 185,202 acres in farms and increased in the decade 5.1 per cent; while its 105,870 improved acres showed an increase of 33.4 per cent. Marquette County, with 88,450 acres in farms, increased 30.4 per cent; and Menominee County, with 222,353 acres in farms, increased 32.8 per cent. Delta County's 142,137 acres in farms increased 26 per cent, while its 53,021 acres of improved farm land had increased 23.5 per cent. These figures confirm the opinion that the cut-over lands of the northern counties are witnessing the most definite agricultural advance; for here are good as well as poor soils at moderate prices available to the farmer, often of foreign parentage, lacking capital but willing to labor and sustain the privations of pioneering in a new country.

If one compares representative counties in the three sections of the State having distinctive agricultural features, one perceives to what extent the northern counties lag behind the southern in agricultural development. Thus in the Upper Peninsula, Marquette County with an aggregate area, as reported by the census, of 1,196,800 acres, has only 88,450 acres in farms; Menominee County, with 675,840 acres, has less than one-third of this area in farms; Delta County, with 748,160 acres, has less

than one-fifth in farms. In the northern counties of the southern peninsula, Arenac, with a total area of 239,360 acres, has 135,334 in farms; Gladwin, with 332,160 acres, has 154,633 in farms; and Clare, with 372,480 acres, has 186,581 in farms. Finally, selecting representative counties from the three southernmost tiers in the Lower Peninsula, Hillsdale County, with an aggregate area of 381,680 acres, has 362,815 in farms; Calhoun with 443,420 total acres, has 407,958 in farms; and Eaton, with 365,440 acres, has 342,500 in farms. In the northern counties there are sections not included in the present farm acreage that cannot reasonably be expected to serve any agricultural purpose. One large owner in this territory is reported recently to have turned back to the State 22,000 acres rather than pay taxes on these unproductive lands; very much of the State's present holdings under the control of the Conservation Commission were acquired in this manner. On the other hand, there is a large but undetermined acreage whose situation as regards soil, climate and drainage warrant high hopes of important agricultural productivity.

Isle Royale in Lake Superior, at one time prized for its copper deposits but which in this respect proved disappointing, is now largely abandoned and unoccupied save by a few fisher folk. The United States still holds large acreage on the island, which is of itself good evidence of its non-availability for economic uses. Drummond Island, at the head of Lake Huron, is chiefly important for its timber re-

sources. The best farming area is in the eastern section of the island. Its agricultural development is, however, backward. Beaver Island, in northern Lake Michigan, has had a more distinctive agricultural history. In the fifth decade of the last century it was the site of a Mormon colony, come hither from Wisconsin, which during the régime of "King" James Jesse Strang, had established a flourishing agriculture there. Eventually the Mormons got into difficulties with their neighbors, chiefly the fishermen of that part of the lake, and were dispersed after the assassination of their quondam "king." Some of their descendants are said to be residing still on Drummond Island but without any religious affiliation with Mormonism. Agriculture on Beaver Island today is reported to be in a degenerate state. Soil conditions on Beaver Island are variable, light sands and clays occupying its surface, with good arable land in the interior. The surface is quite level with a tendency to undulation. Some of the elevations once bore such Biblical designations as "Mount Pisgab," in Mormon days, while the island had its "Sea of Galilee" and "River Jordan." There is considerable swamp land on the island and artificial drainage is necessary.

Agricultural conditions on the Manitou Island of Lake Michigan are reported to be above the average. One observer states that the farmers are up-to-date and that the yield of potatoes and other crops was, in 1919, above the average on the mainland. Here the Michigan Agricultural College has had a plan-

tation of Rosen rye for the purpose of securing seed free from cross fertilization. Some of this rye has been offered for sale by the Michigan State Farm Bureau. High Island, near by, is largely in the possession of the religious society known as "The Israelite House of David," situated near Benton Harbor, which reports the ownership of some 2,980 acres out of the 3,200 of the island. The island yields saw-timber, and the House of David has under cultivation some 200 acres, part of which is devoted to fruit and the remainder to the growth of vegetables, which yield abundantly, it is stated, and are of fine quality.

In Michigan agriculture, it must have become clear that no crop or feature predominates. Thus, the Crop Reporting Service of the United States Department of Agriculture shows that, in 1920, the State ranked first as a producer of rye, third as a producer of potatoes, fourth in buckwheat, third in apples, and fourth in pears.

The growth of coöperation among Michigan farmers is one of the most striking features of recent agricultural history. The American farmer is normally individualistic, but the force of circumstances has directed him along this new path. There were reported in May, 1921, 123 coöperative associations, members of the Michigan Potato Growers Exchange. At the same date, the number of coöperative creameries was at least 74. The membership of the Michigan Livestock Exchange similarly comprised 104 coöperative associations. The list of associated ex-

changes includes 21 local associations, chiefly fruit.<sup>1</sup> It was believed that there were about 100 live-stock shipping associations and coöperative elevators in the State.<sup>2</sup>

The "Directory of American Agricultural Organizations," published by the United States Department of Agriculture in 1920, lists some forty-nine associations and societies among farmers, designed to promote their economic or social interests; but the list is far from complete, since there are known to be a large number of coöperative associations, of a very local range, not included in this directory. As a business man, the Yankee farmer, who is still an element of great importance in Michigan agriculture, especially in the southern peninsula, does not take kindly to coöperation, and it is apparently chiefly among the more alien elements that coöperation flourishes best. Habits of coöperation acquired in the old country persist on American soil. Thus, in Finland, in 1920, there were reported 623 coöperative associations, which is indicative of a well-developed practice of coöperation among persons of Finnish nationality. Recalling that the Finnish population of the Upper Peninsula is large, in rural as well as urban areas, it follows that coöperative business arrangements among them are not infrequently encountered. There were, in 1920, thirty-eight coöperative stores listed in the Upper Penin-

<sup>1</sup> *Monthly Crop Reporter*, April, 1921, 40, 41.

<sup>2</sup> From a detailed list prepared by Hale Tenant, Agent in Marketing, Michigan Agricultural College, May 9, 1921.

sula. A survey of twenty-six of these elicited the fact that the average membership of the associations reporting was 245, which would indicate a total membership of 9,310 for the entire number of stores. The total capitalization is given as \$559,500, for twenty-five stores reporting. The total paid-in capital was put at \$212,418 for these stores. The aggregate of sales was \$3,821,158, for twenty-four stores. This gives an average annual business of \$125,881. The turn-over of sales amounted to 14.2 times the paid-in capital. The overhead expense averaged 10.1 per cent, and ranged from 5 to 15 per cent. In all but four stores, only one vote was allowed to each member regardless of the number of shares owned. There was a nominal or small rate of interest on stock (5 to 6 per cent). Profits were divided on the basis of purchases by members. In addition to stores, there are coöperative creameries, insurance societies and grist mills, while the Finnish and other sections of the population were very willing to become members of the farm bureaus. The spirit of coöperation expresses itself socially as well as economically, mutual relief and help being freely offered and received.

In the southern peninsula, coöperative stores are infrequently encountered, while there is a strong tendency to establish coöperative shipping associations, elevators, and threshing outfits. Definite statistics are lacking.

A distinctive tendency in Michigan agriculture



is the desire of farmers for the inspection and grading of their products. Thus, the Michigan State Farm Bureau has reported great interest in the process of grading wool gathered into the wool-pool in its various warehouses throughout the State, and the fact that there are in reality definite grades of wool is becoming recognized by the farmers. A corollary is the recognition that prices should be adapted to gradations in quality. The inspection service of the United States Department of Agriculture, Bureau of Markets, extends to a few points in Michigan, the chief inspection office being situated at Detroit, while service is extended to Bay City, Flint, Grand Rapids, Jackson, Lansing, Port Huron, Saginaw, Battle Creek, and Kalamazoo, and requests for additional points of service are being pressed. Thus, the farmers of Chippewa County were desirous, in 1921, of having this inspection service for their export hay. Through this service, both shippers and purchasers have reliable and impartial information on which to base a judgment in case of disputes between them, railroads have a fair basis for an adjustment of claims, and the consuming public is protected against loss and imposition.

There is little tendency to work farms with labor that is transient and not from the farmer's family. Thus, the United States Department of Agriculture reports that, in 1920, the percentage of grain harvest work done by transient labor drawn from without the county was 5 in Michigan, while in

Kansas it was 31 per cent, in North Dakota 41, and Washington 43 per cent.<sup>1</sup> There has been, however, a large influx of country dwellers into the large cities, especially the centers of automobile manufacture, until the movement was checked by the adverse industrial conditions of the winter of 1920-1921. This had the effect of causing the abandonment of many farms to an extent which, in the summer of 1920, was truly alarming. An estimate of the State crop reporting service, based on an investigation conducted in April, 1920, through the public schools, was to the effect that 18,232 farms would not be worked that year, and that 11,831 farms were not operated in 1919. It was estimated that of the 214,565 farm-houses in the State, 30,300 (in 1920) were vacant, and that some two-thirds of these were not occupied in 1919. The total number of men and boys on the farms of Michigan was given as approximately 230,000, which represented a loss of 20,000 during the year preceding, and a still further drop from the figure of 276,000 of three years previous.<sup>2</sup> Taking the average size of farms as 91.5 acres, there appeared to be an average of one man or boy to operate each 82.5 acres. The effectiveness of this force was still further reduced by the attendance of boys at school for a part of the time, while most of the men were above the age of fifty. It was obvious that the superior attractiveness of urban life had done its work.

<sup>1</sup> *The U. S. Monthly Crop Reporter*, April, 1921, 45.

<sup>2</sup> *Mich. Crop Rept.*, May, 1920, 4.

A year later the situation was radically altered. In April, 1921, the percentage of farm labor was, on the side of supply, 108 per cent of the demand. The farm labor supply was 94 per cent of normal, while the demand was 87 per cent of normal. The supply of farm labor was, in 1921, 123 per cent of the supply in 1920.<sup>1</sup>

In 1920, the average wages of farm laborers employed by the month, as reported by the Michigan Crop Reporting Service, were \$53 with board and \$75 without board. In 1919, these wages were \$42 and \$60. Day wages for harvest labor were \$4.10 with board, in 1920, and \$4.95 without board. In the preceding year, these wages were \$3.50 and \$4.30. For other than harvest labor, the wages in 1920 were \$3.30 and \$4.15 as against \$2.80 and \$3.60 in 1919.<sup>2</sup>

The returns of the Fourteenth United States Census indicate the amelioration of the conditions of rural life that have taken place. In 1920, there were 82,437 automobiles on farms in Michigan; to which are to be added 78,919 trucks and 5,584 tractors. There were 15,695 farms reporting gas or electric light, while 29,729 farms had water pumped into the house. Obviously there are many farms in Michigan which lack these conveniences. Half of the 196,000 farms still want telephone service, for example.

The yields will increase with the growth of population. New lands will come under the plow. New

<sup>1</sup> *Mich. Crop. Rept.*, April, 1921, 11. Cf. *U. S. Monthly Crop Report*, April, 1921, 37.

<sup>2</sup> *Ibid.*, Dec., 1920, 4.

crops and animals—or at least new varieties and breeds—will come into prominence. The means of communication will be bettered and extended. The vast waterways and the water-powers will be developed. Educational agencies will multiply in numbers and effectiveness. The institutions of rural life will greatly increase and take on new meanings. The statistics show a steady development; this progress will proceed. New agricultural methods will come. We have every reason to expect that the rural life of Michigan will keep step with the urban life; the constructive forces of society in the future will make this possible.

## STATISTICAL APPENDICES

- Appendix A—Farms and Farm Property.
- Appendix B—The Number of Farms in Michigan by Counties, 1900, 1910 and 1920.
- Appendix C—Population of Michigan by Sex, Color, and Nativity.
- Appendix D—Urban and Rural Population of Counties, 1920, 1910, and 1900.
- Appendix E—Urban and Rural Populations 1920, 1910 and 1900.
- Appendix F—Crops.
- Appendix G—Live-Stock and Live-Stock Products.
- Appendix H—Pure-Bred Live-Stock.

## APPENDIX A

## FOURTEENTH CENSUS: 1920.—FARMS AND FARM PROPERTY \*

FARMS AND FARM ACREAGE	JAN. 1, 1920	APR. 15, 1910	The number of farms in Michigan in 1920 was 196,447. These farms contained 19,- 032,961 acres, of which 12,925,521 acres were improved land. From 1910 to 1920 the num- ber of farms decreased 5.1 per cent; the total acreage increased 0.5 per cent; and the im- proved acreage in- creased 0.7 per cent. In 1920, 51.7 per cent of the land area of the state was in farms, and 65.8 per cent of the farm land was im- proved.
Number of farms.	196,447	206,960	
Operated by:			
Owners . . . . .	159,406	172,310	
Free from mort- gage . . . . .	72,869	88,705	
Mortgaged . . . .	78,758	82,631	
No mortgage re- port . . . . .	7,779	974	
Managers . . . . .	2,319	1,961	
Tenants . . . . .	34,722	32,689	
Operated by:			
White farmers...	195,714	206,014	
Native . . . . .	147,450	147,790	
Foreign born...	48,264	58,224	
Colored farmers..	733	946	
Land in farms:			
Total, acres....	19,032,961	18,940,614	
Improved, acres..	12,925,521	12,832,078	
Average acreage per farm:			
Total . . . . .	96.9	91.5	
Improved . . . . .	65.8	62.0	
FARM VALUES	JAN. 1, 1920	APR. 15, 1910	The number of white farmers in 1920 was 195,714, of whom 147,- 450 were native and 48,264 foreign-born. Of the native white farm- ers, 115,624 were own- ers, 1,925 managers, and 29,901 tenants. Of the foreign-born white farmers, 43,219 were owners, 385 managers, and 4,660 tenants. The 733 colored farmers comprised 563 owners, 9 managers, and 161 tenants. The number of female farmers was 5,776, including 5,534
All farm property.	\$1,763,334,778	\$1,088,858,379	
Land and build- ings . . . . .	1,436,686,210	901,138,299	
Implements and machinery . . . .	122,389,936	49,916,285	
Live stock.....	204,258,632	137,803,795	

\* Tables A, F, G, H are the press summaries, being statements of "preliminary figures," subject to correction, by the Bureau of the Census, Department of Commerce.



## APPENDIX B

TABLE SHOWING THE NUMBER OF FARMS IN MICHIGAN, BY COUNTIES, 1900, 1910 AND 1920: FROM THE FOURTEENTH U. S. CENSUS

COUNTY	1920	1910	1900
State total .....	196,647	206,960	203,261
Alcona .....	932	884	743
Alger .....	386	278	124
Allegan .....	5,734	6,217	6,089
Alpena .....	1,275	1,326	1,187
Antrim .....	1,481	1,641	1,283
Arenac .....	1,392	1,440	1,186
Baraga .....	653	412	241
Barry .....	3,315	3,428	3,570
Bay .....	3,216	3,233	3,193
Benzie .....	973	1,245	949
Berrien .....	5,444	5,252	5,094
Branch .....	3,222	3,378	3,475
Calhoun .....	3,646	3,761	4,100
Cass .....	2,572	2,556	2,609
Charlevoix .....	1,306	1,460	1,295
Cheboygan .....	1,186	1,499	1,164
Chippewa .....	1,569	1,399	1,036
Clare .....	1,248	1,302	852
Clinton .....	3,323	3,497	3,777
Crawford .....	212	248	228
Delta .....	1,395	1,128	868
Dickinson .....	429	235	118
Eaton .....	3,719	3,902	4,190



## APPENDIX B—Continued

COUNTY	1920	1910	1900
Emmet .....	1,298	1,457	1,134
Genesee .....	3,639	3,896	4,501
Gladwin .....	1,452	1,395	769
Gogebic .....	528	257	80
Grand Traverse ....	1,724	2,031	1,722
Gratiot .....	3,859	4,205	4,587
Hillsdale .....	4,025	4,298	4,391
Houghton .....	1,741	1,033	362
Huron .....	4,604	4,728	4,871
Ingham .....	3,424	3,508	3,815
Ionia .....	3,223	3,602	4,052
Iosco .....	929	958	743
Iron .....	621	381	231
Isabella .....	3,333	3,456	3,436
Jackson .....	3,544	3,736	3,860
Kalamazoo .....	3,159	3,372	3,308
Kalkaska .....	796	842	679
Kent .....	5,605	6,276	6,554
Keweenaw .....	72	36	22
Lake .....	703	732	625
Lapeer .....	3,614	3,808	4,051
Leelanau .....	1,347	1,444	1,395
Lenawee .....	5,083	5,334	5,662
Livingston .....	2,632	2,775	3,082
Luce .....	194	195	144
Mackinac .....	479	490	394
Macomb .....	3,570	3,764	3,852
Manistee .....	1,499	1,648	1,311
Marquette .....	846	661	513
Mason .....	2,011	2,124	1,885
Mecosta .....	2,676	2,823	2,970
Menominee .....	2,106	1,677	1,430

## APPENDIX B—Continued

COUNTY	1920	1910	1900
Midland .....	2,163	2,246	2,153
Missaukee .....	1,359	1,439	1,036
Monroe .....	4,108	4,321	4,458
Montcalm .....	4,490	4,678	4,714
Montmorency .....	421	466	336
Muskegon .....	2,036	2,373	2,334
Newaygo .....	2,836	3,130	2,846
Oakland .....	4,035	4,993	4,977
Oceana .....	2,357	2,806	2,650
Ogemaw .....	1,281	1,283	811
Ontonagon .....	917	371	187
Osceola .....	2,310	2,574	2,287
Oscoda .....	278	344	210
Otsego .....	573	551	570
Ottawa .....	4,296	4,603	4,522
Presque Isle .....	1,056	1,086	846
Roscommon .....	267	249	136
Saginaw .....	5,143	5,370	5,818
St. Clair .....	4,159	4,527	4,980
St. Joseph .....	2,436	2,623	2,697
Sanilac .....	5,111	5,659	5,820
Schoolcraft .....	381	441	352
Shiawassee .....	3,359	3,577	3,763
Tuscola .....	4,658	5,244	5,492
Van Buren .....	4,662	4,952	4,842
Washtenaw .....	3,550	3,837	4,151
Wayne .....	3,858	4,775	5,131
Wexford .....	1,583	1,779	1,340

## APPENDIX C

## POPULATION OF MICHIGAN BY SEX, COLOR, AND NATIVITY

Washington, D. C., July 19, 1921.—The Bureau of the Census, Department of Commerce, to-day issued a preliminary statement giving the composition of the population of Michigan according to sex, color, and nativity, as shown by the census taken as of January 1, 1920.

The total population of the state, 3,668,412, comprised 1,928,436 males and 1,739,976 females. The corresponding figures for 1910 were as follows: Total, 2,810,173; males, 1,454,534; females, 1,355,639. During the decade the total population increased by 30.5 per cent, the male population by 32.6 per cent, and the female population by 28.4 per cent. The ratio of males to females in 1920 was 110.8 to 100, as against 107.3 to 100 in 1910.

The distribution of the population according to color in 1920 was as follows: White, 3,601,627; Negro, 60,082; Indian, 5,614; Chinese, 792; Japanese, 184; all other (Filipino, Hindu, Hawaiian, and Korean), 113. The corresponding figures for 1910 were: White, 2,785,247; Negro, 17,115; Indian, 7,519; Chinese, 241; Japanese, 49; all other (Filipino), 2. During the decade the white population increased by 29.3 per cent, while the Negro population increased by 251 per cent.

The foreign-born white population numbered 726,215 in 1920, as against 595,524 in 1910. This element constituted 19.8 per cent of the total population in 1920, as against 21.2 per cent in 1910.

## APPENDIX D

URBAN AND RURAL POPULATION OF COUNTIES: 1920, 1910,  
AND 1900

[A minus sign (-) denotes decrease.]

COUNTY	POPULATION					
	1920		1910		1900	
	Urban	Rural	Urban	Rural	Urban	Rural
<b>Michigan...</b>	<b>2,241,560</b>	<b>1,426,852</b>	<b>1,327,044</b>	<b>1,483,129</b>	<b>952,323</b>	<b>1,468,659</b>
Alger.....	5,037	4,946	2,952	4,723	.....	5,868
Allegan.....	6,805	30,735	6,231	33,588	2,667	36,145
Alpena.....	11,101	6,768	12,706	7,259	11,802	6,452
Barry.....	5,132	16,251	4,383	18,250	3,172	19,342
Bay.....	47,554	21,994	45,166	23,072	40,747	21,631
Berrien.....	29,982	32,671	20,277	33,345	16,004	33,161
Branch.....	6,114	17,883	5,945	19,660	6,216	21,595
Calhoun.....	48,788	24,130	35,336	21,302	27,452	21,863
Cass.....	5,440	14,955	5,088	15,536	4,151	16,725
Charlevoix.....	4,284	11,504	7,734	11,423	.....	13,956
Cheboygan.....	5,642	8,349	6,859	11,013	6,489	9,027
Chippewa.....	12,096	12,722	12,615	11,857	10,538	10,800
Clinton.....	3,925	19,185	3,154	19,975	3,388	21,748
Delta.....	18,056	12,853	17,405	12,703	12,929	10,952
Dickinson.....	12,784	6,672	14,190	6,334	13,412	4,478
Eaton.....	8,169	21,208	7,779	22,720	4,092	27,576
Emmet.....	5,064	10,575	4,778	13,783	5,285	10,646
Genesee.....	94,106	31,562	38,550	26,005	13,103	28,701
Gogebic.....	25,372	7,853	17,404	5,929	13,616	3,122
Grand Traverse.....	10,925	8,593	12,115	11,669	9,407	11,072
Gratiot.....	10,578	23,336	2,757	26,063	.....	29,889
Hillsdale.....	5,476	22,685	5,001	24,672	4,151	25,714
Houghton.....	18,689	53,241	26,842	61,256	20,317	45,746
Ingham.....	57,327	24,227	31,229	22,081	16,485	23,333
Ionia.....	10,846	22,241	9,149	24,401	8,491	25,838
Iron.....	7,689	14,418	3,775	11,389	3,231	5,759
Isabella.....	4,819	17,791	3,972	19,057	3,662	19,122
Jackson.....	48,374	24,165	31,433	21,993	25,180	23,042
Kalamazoo.....	48,487	22,738	39,437	20,990	24,404	19,906
Kent.....	137,634	45,407	112,571	46,574	87,565	42,149
Lapeer.....	4,723	21,059	3,946	22,087	3,297	24,344
Lenawee.....	11,878	35,889	10,763	37,144	9,654	38,752
Livingston.....	2,951	14,571	.....	17,736	2,518	17,146
Macomb.....	9,488	28,615	7,707	24,899	6,576	26,668
Manistee.....	9,694	11,205	12,381	14,307	14,260	13,596
Marquette.....	30,637	15,149	32,411	14,328	30,248	10,991
Mason.....	8,810	11,021	9,132	12,700	7,166	11,719
Mecosta.....	4,558	13,207	4,519	14,947	4,686	16,007
Menominee.....	8,907	14,871	10,507	15,141	12,818	14,228
Midland.....	5,483	11,754	2,527	11,478	.....	14,439
Monroe.....	11,573	25,542	6,893	26,024	5,043	27,711
Montcalm.....	4,304	26,137	4,045	28,024	3,381	29,373
Muskegon.....	46,084	16,278	24,062	16,515	20,818	16,218
Oakland.....	49,163	40,887	14,532	35,044	9,769	35,023
Ottawa.....	19,388	28,272	16,346	28,955	12,533	27,134
Presque Isle.....	2,789	9,342	2,702	8,547	.....	8,821
Saginaw.....	61,903	38,383	50,510	38,780	42,345	38,877
St. Clair.....	32,879	25,130	25,266	27,075	25,530	29,698
St. Joseph.....	11,204	15,614	8,707	16,792	3,550	20,339
Schoolcraft.....	6,380	3,597	4,722	3,959	4,126	3,763
Shiawassee.....	15,247	20,677	9,639	23,607	8,696	25,170
Tuscola.....	2,704	30,616	.....	34,913	.....	35,890
Van Buren.....	3,829	26,886	3,577	29,608	4,009	29,265
Washtenaw.....	26,929	22,591	21,047	23,667	21,887	25,874
Wayne.....	1,124,010	53,635	485,895	45,696	295,460	53,333
Wexford.....	9,750	8,457	8,375	12,394	5,997	10,848
All other counties <sup>1</sup>	.....	265,809	.....	290,140	.....	268,074

<sup>1</sup> Comprises all counties in which there were no incorporated places having 2,500. Benzie, Clare, Crawford, Gladwin, Huron, Iosco, Kalkaska, Keweenaw, Lake, Ontonagon, Osceola, Oscoda, Otsego, Roscommon, and Sanilac.

APPENDIX D—Continued

PER CENT URBAN IN TOTAL POPULATION			PER CENT OF INCREASE IN —				Rural population per square mile: 1920
1920	1910	1900	Urban population		Rural population		
			1910 to 1920	1900 to 1910	1910 to 1920	1900 to 1910	
61.1	47.2	39.3	68.9	39.3	-3.8	1.0	24.8
50.5	38.5	.....	70.6	.....	4.7	-19.5	5.4
18.1	15.6	6.9	9.2	133.6	-8.5	-7.1	36.9
62.1	63.6	64.7	-12.6	7.7	-6.8	12.5	11.6
24.0	19.4	14.1	17.1	38.2	-11.0	-5.6	29.2
68.4	66.2	65.3	5.3	10.8	-4.7	6.7	49.6
47.9	37.8	32.6	47.9	26.7	-2.0	0.6	57.4
25.5	23.2	22.4	2.8	-4.4	-9.0	-9.0	36.0
66.9	62.4	55.7	38.1	28.7	13.3	-2.6	34.8
26.7	24.7	19.9	6.9	22.6	-3.7	-7.1	30.3
27.1	40.4	.....	-44.6	.....	0.7	-18.1	28.0
40.3	38.4	41.8	-17.7	5.7	-24.2	22.0	11.5
48.7	51.5	49.4	-4.1	19.7	7.3	9.8	8.1
17.0	13.6	13.5	24.4	-6.9	-4.0	-8.2	33.6
58.4	57.8	54.1	3.7	34.6	1.2	16.0	11.0
65.7	69.1	75.0	-9.9	5.8	5.3	41.4	8.6
27.8	25.5	12.9	5.0	90.1	-6.7	-17.6	37.1
32.4	25.7	33.2	6.0	-9.6	-23.3	29.5	21.8
74.9	59.7	31.3	144.1	194.2	21.4	-9.4	48.2
76.4	74.6	81.3	45.8	27.8	32.5	89.9	6.9
56.0	50.9	45.9	-9.8	28.8	-26.4	5.4	18.4
31.2	9.6	.....	283.7	.....	-10.5	-12.8	40.3
19.4	16.9	13.9	9.5	20.5	-8.1	-4.1	38.0
26.0	30.5	30.8	-30.4	32.1	-13.1	33.9	52.2
70.3	58.6	41.4	83.6	89.4	9.7	-5.4	43.8
32.8	27.3	24.7	18.5	7.7	-8.9	-5.6	38.4
36.7	24.9	35.9	103.7	16.8	26.6	97.8	12.0
21.3	17.2	16.1	21.3	8.5	-6.6	-0.3	31.1
66.7	58.8	52.2	53.9	24.8	9.9	-4.6	34.2
68.1	65.3	55.1	22.9	61.6	8.3	5.4	40.5
75.2	70.7	67.5	22.3	28.6	-2.5	10.5	52.8
18.3	15.2	11.9	19.7	19.7	-4.7	-9.3	31.6
24.9	22.5	19.9	10.4	11.5	-3.4	-4.1	48.3
16.8	.....	12.8	.....	.....	-17.8	3.4	25.7
24.9	23.6	19.8	23.1	17.2	14.9	-6.6	60.6
46.4	46.4	51.2	-21.7	-13.2	-21.7	5.2	19.9
66.9	69.3	73.3	-5.5	5.2	5.7	30.4	8.1
44.4	41.8	37.9	-3.5	27.4	-13.2	8.4	22.3
25.7	23.2	22.6	0.9	-3.6	-11.6	-6.6	23.1
37.5	41.0	47.4	-15.2	-18.0	-1.8	6.4	14.1
31.8	18.0	.....	117.0	.....	2.4	-20.5	22.2
31.2	20.9	15.4	67.9	36.7	-1.9	-6.1	44.6
14.1	12.6	10.3	6.4	19.6	-6.7	-4.6	36.1
73.9	59.3	56.2	91.5	15.6	-1.4	1.8	32.3
54.6	29.3	21.8	238.3	48.8	16.7	0.1	46.1
40.7	36.1	31.6	18.6	30.1	-2.4	6.7	50.0
23.0	24.0	.....	3.2	.....	9.3	-3.1	13.8
61.7	56.6	52.1	22.6	19.3	-1.0	-0.2	46.4
56.7	48.3	46.2	30.1	-1.0	-7.2	-8.8	35.4
41.8	34.1	11.9	28.7	145.3	-7.0	-17.4	31.0
63.9	54.4	52.3	35.1	14.1	-9.1	5.2	3.0
42.4	29.0	25.7	58.2	10.8	-12.4	-6.2	37.1
8.1	.....	.....	.....	.....	-12.3	-2.7	37.0
12.5	10.8	12.0	7.0	-10.8	-9.2	1.2	43.6
54.4	47.1	45.8	27.9	-3.8	-4.5	-8.5	32.1
95.4	91.4	84.7	131.3	64.5	17.4	-14.3	86.5
53.6	40.3	35.6	16.4	39.7	-31.8	14.3	14.7
.....	.....	.....	.....	.....	-8.4	8.2	15.2

inhabitants or more in 1920. These counties are Alcona, Antrim, Arenac, Baraga, Leelanau, Luce, Mackinac, Missaukee, Montmorency, Newaygo, Oceana, Ogemaw,

APPENDIX E  
URBAN AND RURAL POPULATIONS 1920, 1910, AND 1900 \*

CLASS OF PLACES	1920		1910		1900		PER CENT OF TOTAL POPULATION		
	Number of places	Population	Number of places	Population	Number of places	Population	1920	1910	1900
	Total population...	...	3,668,412	...	2,810,173	...	2,420,982	100.0	100.0
<i>Urban territory</i> .....	93	2,241,560	79	1,327,044	71	952,323	61.1	47.2	39.3
Cities and villages of: 500,000 inhabitants	1	993,678	...	.....	...	.....	27.1	.....	.....
100,000 to 500,000 inhabitants	1	137,634	2	578,337	1	285,704	3.8	20.6	11.8
50,000 to 100,000 inhabitants	3	210,829	1	50,510	1	87,565	5.7	1.8	3.6
25,000 to 50,000 inhabitants	9	372,480	6	211,022	3	95,153	10.2	7.5	3.9
10,000 to 25,000 inhabitants	14	179,991	15	203,817	14	212,890	4.9	7.3	8.8
5,000 to 10,000 inhabitants	32	225,476	24	166,749	22	158,649	6.1	5.9	6.6
2,500 to 5,000 inhabitants	33	121,472	31	116,549	30	112,362	3.3	4.1	4.6
<i>Rural territory</i> .....	...	1,426,852	...	1,483,129	...	1,468,659	38.9	52.8	60.7
Cities and villages of: less than 2,500 inhabitants	357	286,645	357	285,955	311	261,539	7.8	10.2	10.8
Other rural territory.	..	1,140,207	...	1,197,174	...	1,207,120	31.1	42.6	49.9

\* The Census Bureau defines urban population as that residing in cities and other incorporated places having 2,500 inhabitants or more, and rural population as that residing outside such incorporated places. The summary presents, for the last three censuses, figures showing the urban and rural population of the State distributed among places grouped according to specified limits of population. The classification for each census is based on the population of the various places as shown by the returns of that census. Consequently the territory comprised within any one class of cities or that designated as urban or as rural does not remain fixed, because any given place may, through the growth or the decline of its population, pass from one class to another at successive censuses. The proportion of the population of Michigan living in places of 2,500 or more increased from 39.3 per cent in 1900 to 47.2 per cent in 1910 and to 61.1 per cent in 1920.

APPENDIX F

CROPS—FOURTEENTH CENSUS: 1920

VALUE OF CROPS	1919	1909	The value of all crops harvested in Michigan in 1919 was \$404,014,810. Corn was valued at \$67,633,385, wheat at \$45,722,488, oats at \$31,412,962, rye at \$18,252,291, and dry beans at \$17,329,268. The value of hay and forage was \$105,280,992; of potatoes, \$49,055,600; of sugar beets, \$11,793,836; of apples, \$11,686,542; of peaches, \$1,232,495; and of grapes, \$5,793,575. As compared with 1909, the total value of crops for 1919 shows an increase of 165.6 per cent; corn, 128.6 per cent; wheat, 175.7 per cent; oats, 69.7 per cent; rye, 362.7 per cent; dry beans, 78.4 per cent; potatoes, 394.8 per cent; and sugar beets, 194.1 per cent.
ACREAGE AND PRODUCTION OF PRINCIPAL CROPS	1919	1909	
All crops	\$404,014,810	\$152,102,869	
Cereals	170,897,885	70,544,250	
Other grains and seeds	23,442,687	12,069,046	
Hay and forage	105,280,992	36,949,801	
Vegetables	65,096,550	16,201,328	
Fruits	26,129,793	12,599,720	
Other crops	13,166,903	4,638,724	
Corn	1,269,155 acres	1,589,596	
	45,088,912 bushels	52,996,842	
Wheat	1,056,687 acres	802,137	
	20,411,825 bushels	16,025,791	
Oats	1,514,808 acres	1,429,076	
	36,956,425 bushels	43,869,502	
Rye	912,951 acres	419,020	
	12,168,182 bushels	5,814,394	
Dry beans	314,673 acres	403,669	
	4,332,317 bushels	5,282,511	
Hay and forage	3,644,952 acres	2,715,447	
	6,345,510 tons	3,634,196	
Hay crops	2,866,726 acres	2,625,193	
	3,172,012 tons	3,247,282	
	418,031 acres		
Corn cut for forage,		Not reported	
	566,932 tons		
Other forage crops, including silage,			
	360,195 acres	90,254	
	2,606,566 tons	386,914	
Potatoes	280,538 acres	365,483	
	23,929,560 bushels	38,243,826	
Sugar-beets	106,450 acres	78,711	
	1,025,550 tons	706,990	
Apples	5,615,905 trees	7,534,343	
	5,843,271 bushels	12,332,296	

## APPENDIX F—Continued

ACREAGE AND PRODUCTION OF PRINCIPAL CROPS	1919		1909	
Peaches . . . . . trees	2,010,022	2,907,170		oats was 1,514,808
bushels	448,177	1,686,576		acres in 1919 and
Grapes . . . . . vines	11,097,734	11,913,576		1,429,076 in 1909; of
pounds	115,871,465	120,695,997		rye, 912,951 acres in
				1919 and 419,020 in
				1909; and of dry
				beans, 314,873 acres
				in 1919 and 403,669

in 1909. The average yield of corn per acre in 1919 was 35.5 bushels; of wheat, 19.3 bushels; and of oats, 24.4 bushels. The corresponding figures for 1909 are 33.3 bushels of corn, 20.0 bushels of wheat, and 30.7 bushels of oats.

In 1919, 3,644,952 acres were in hay and forage, including 655,784 acres in timothy, 1,852,789 acres in timothy and clover mixed, 120,299 acres in clover, 348,254 acres in silage crops, and 418,031 acres in corn cut for forage. The total production of hay and forage was 6,345,510 tons, of which 2,551,806 tons were silage. The total acreage in hay and forage in 1909 (not including corn cut for forage) was 2,715,447 acres and the total production 3,634,196 tons.

There were 280,537 acres in potatoes in 1919, as compared with 365,483 acres in 1909, representing a decrease of 23.2 per cent. The production was 23,929,560 bushels in 1919, as against 38,243,826 bushels in 1909. The average yield per acre was 85.3 bushels in 1919 and 104.6 bushels in 1909.

The acreage of sugar beets in 1919 was 106,450, as compared with 78,711 acres in 1909, an increase of 35.2 per cent. The production in 1919 was 1,025,550 tons, as against 706,990 tons in 1909, an increase of 45.1 per cent.

The production of apples in 1919 was 5,843,271 bushels; of peaches, 448,177 bushels; and of grapes, 115,871,465 pounds.



APPENDIX G

LIVE-STOCK AND LIVE-STOCK PRODUCTS—FOURTEENTH CENSUS: 1920

DOMESTIC ANIMALS ON FARMS		JAN. 1, 1920	Of the 196,447 farms in Michigan in 1920, 186,354 reported domestic animals. Horses were reported by 176,259, mules by 2,852, cattle by 173,417, sheep by 35,454, and hogs by 138,170.
Horses	605,509	186,354	The number of horses on these farms in 1920 was 605,509, which included 563,813 horses 2 years old and over, 24,170 colts from 1 to 2 years old, and 17,526 colts under 1 year old. The value reported for horses was \$56,433,765, an average of \$93.20 per head. The number of horses on April 15, 1910 (excluding spring colts, in order to make a fair comparison with the figures for January 1, 1920) was 602,410.
Colts under 1 year old	17,526	17,526	
Colts 1 year old and under 2	24,170	24,170	
Mares 2 years old and over	284,014	284,014	
Geldings 2 years old and over	277,806	277,806	
Stallions 2 years old and over	1,993	1,993	
Mules	5,884	2,852	
Colts under 1 year old	290	290	
Colts 1 year old and under 2	429	429	
Mules 2 years old and over	5,165	5,165	
Asses and burros	145	145	The number of mules in 1920 was 5,884, including 290 colts under 1 year old, 429 colts from 1 to 2 years old, and 5,165 mules 2 years old and over. The total value was \$661,115, an average of \$112.36. The number of mules in 1910 (excluding spring colts) was 3,638.
Cattle	1,586,042	1,586,042	
Beef cattle	329,901	329,901	
Calves under 1 year old	100,592	100,592	
Heifers 1 year old and under 2	3,660	3,660	
Cows 2 years old and over	50,617	50,617	
Steers 1 year old and under 2	91,265	91,265	
Steers 2 years old and over	43,928	43,928	
Bulls 1 year old and over	4,839	4,839	
Dairy cattle	1,256,141	1,256,141	
Calves under 1 year old	263,911	263,911	The total number of cattle in 1920 was 1,586,042, including 329,901 beef cattle and 1,256,141 dairy cattle. Beef cows numbered 50,617 and dairy cows
Heifers 1 year old and under 2	165,364	165,364	
Cows 2 years old and over	802,095	802,095	
Bulls 1 year old and over	24,771	24,771	
Sheep	1,209,191	1,209,191	
Lambs under 1 year old	359,175	359,175	
Ewes 1 year old and over	809,125	809,125	
Rams and wethers	40,891	40,891	
Goats	1,607	1,607	
Swine	1,106,066	1,106,066	
Pigs under 6 months old	687,089	687,089	
Sows and gilts for breeding	184,556	184,556	
Boars for breeding	14,199	14,199	
All other hogs	220,222	220,222	
COMPARATIVE FIGURES,			
LIVE-STOCK ON FARMS		JAN. 1, 1920	APR. 15, 1910
Horses	605,509	*602,410	
Mules	5,884	*3,638	
Cattle	1,586,042	*1,261,773	
Sheep	1,209,191	*1,545,241	
Chickens	10,913,645	9,698,401	
Hives of bees	93,348	115,274	
* Excluding spring colts, calves, and lambs.			

APPENDIX G—*Continued*

LIVE-STOCK PRODUCTS	1919	1909	802,095. The value reported for cattle was \$101,717,971. The number of cattle in 1910 (excluding spring calves) was 1,261,773.
Milk .....gals.	382,822,631	352,858,180	The 1,209,191 sheep reported in 1920 included 359,175 lambs under 1 year old, 809,125 ewes, and 40,891 rams and wethers. The sheep were valued at \$13,688,379, an average of \$11.32. The number of sheep in 1910 (excluding spring lambs) was 1,545,241.
Wool .....lbs.	7,835,558	11,965,405	
Eggs .....doz.	55,986,999	59,915,851	
Chickens raised.....	12,441,555	12,877,537	

The 1,209,191 sheep reported in 1920 included 359,175 lambs under 1 year old, 809,125 ewes, and 40,891 rams and wethers. The sheep were valued at \$13,688,379, an average of \$11.32. The number of sheep in 1910 (excluding spring lambs) was 1,545,241.

Of the 1,106,066 swine on farms in 1920, 687,089 were pigs under 6 months old, 14,556 sows for breeding, 14,199 boars for breeding, and 220,222 other hogs. The value reported for swine was \$19,621,714.

The total production of milk in 1919 was 382,822,631 gallons, as compared with 352,858,180 in 1909. The production of wool in 1919 was 7,835,558 pounds; of honey, 1,321,447 pounds; of eggs, 55,986,999 dozen; and the number of chickens raised was 12,441,555. The value of all dairy products, excluding home use of milk and cream, was \$71,074,727; of eggs, \$23,514,540; and of chickens raised in 1919, \$11,446,231.

Domestic animals kept in village barns, city stables, and elsewhere not on farms were reported as follows: Horses, 58,474 in 1920, as compared with 100,238 in 1910; mules, 894 in 1920 and 700 in 1910; cattle, 42,061 in 1920 and 47,385 in 1910; hogs, 23,970 in 1920 and 13,894 in 1910.

APPENDIX II  
PURE-BRED LIVE-STOCK—FOURTEENTH CENSUS: 1920

BREED	FARMS REPORTING			NUMBER OF PURE-BRED ANIMALS REPORTED		
	Total	Reporting Males	Reporting Females	Total	Males	Females
		.....	.....		.....	.....
Pure-bred live-stock of any kind.....	21,873	.....	.....	.....	.....	.....
HORSES, total.....	1,293	.....	.....	2,779	1,004	1,775
Belgian.....	213	160	86	478	221	257
French Draft.....	18	15	5	45	15	30
Hackney.....	6	1	5	14	1	13
Percheron.....	755	455	447	1,636	579	1,057
Shire.....	40	27	17	59	28	31
Standard Bred.....	111	43	77	205	59	146
Clydesdale.....	63	36	36	123	41	82
All other.....	125	51	86	219	60	159
CATTLE, total.....	14,301	.....	.....	62,800	13,942	48,858
<i>Beef breeds</i> , total.....	4,461	.....	.....	16,267	5,423	10,844
Aberdeen Angus.....	257	232	108	1,519	441	1,078
Hereford.....	334	296	131	1,825	504	1,321
Polled Durham.....	311	244	155	1,067	326	741
Shorthorn.....	3,550	2,881	1,676	11,712	4,099	7,613
All other.....	42	35	18	144	53	91
<i>Dairy breeds</i> , total.....	10,004	.....	.....	46,533	8,519	38,014
Ayrshire.....	79	48	55	291	69	222
Brown Swiss.....	135	96	76	429	121	308
Guernsey.....	988	720	516	3,369	908	2,461
Holstein-Friesian.....	6,561	4,468	4,240	32,702	6,048	26,654
Jersey.....	2,121	799	1,817	8,296	1,122	7,174
All other.....	252	164	176	1,446	251	1,195

## APPENDIX H—Continued

Breed	Farms Reporting	Number of Animals	Breed	Farms Reporting	Number of Animals
<b>SHEEP, total</b> .....	2,639	21,342	<b>SWINE, total</b> .....	7,656	33,527
Cheviot .....	9	24	Berkshire .....	321	1,618
Dorset Horn .....	13	72	Chester White .....	2,104	7,869
Hampshire Down .....	250	1,910	Duroc Jersey .....	2,744	12,842
Leicester .....	18	100	Hampshire .....	159	1,023
Lincoln .....	70	268	Poland China .....	2,276	8,739
Merino .....	341	4,998	Spotted Poland China	57	249
Oxford .....	516	2,800	Tamworth .....	17	135
Rambouillet .....	107	2,267	Yorkshire .....	55	376
Shropshire .....	1,266	7,942	All other .....	113	676
Suffolk .....	6	42			
All other .....	100	919			

Approved:  
 W. L. AUSTIN,  
 Chief Statistician for Agriculture.

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