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INDIAN CORN CULTURE IN MICHIGAN

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THE Indians were extensive cultivators of the soil. Many different tribes were agriculturists. What they cultivated besides corn does not particularly enter into the subject of this dissertation; but bean, squash and pumpkin culture received attention from them. Smoking was a universal ceremony. Tobacco, therefore, must have been one of their garden and field products. It is reported that in Eaton County, where the city of Charlotte now stands, was an extensive corn-field.¹ Large corn-fields are referred to by C. Popleton, in Oakland County.² A more specific reference to the same county is that, in Avon Township, the hills were arranged in rows and the stones had been picked from the surface of the ground.³

There was, a few years ago, evidence of old planting grounds of five or six acres not far from St. Ignace. Notes given me by Professor J. B. Steere, upon Montcalm County, state that in Section 9, Cato Township, just west of Tamarack Lake, in passing through in 1865, he noticed numerous little mounds, perhaps three feet apart, a foot and a half in diameter and five or six inches high. There was an acre or more of them. Several burial mounds were near by from eight to ten feet in diameter and from three to five feet high. On still higher ground were a number of pits several feet in depth, which he thought must have been corn pits.

In Macomb County, six and one-half miles northeast of Romeo, are still discernible a few acres of old Indian corn-fields, described to me by Dr. R. M. Greenshields. In Barry County,

¹ Edward A. Post, *Michigan Pioneer Collections*, 3: 379.

² *Michigan Pioneer Collections*, 14: 516.

³ *History of Oakland County*, 1877, p. 135.

on the prairies along the Thornapple River, when the land was first "taken up," were several acres of corn-hills, "not in rows, but haphazardly."⁴

In Ingham County there were many Indian planting grounds. One was at Okemos. Another, of ten or fifteen acres, was on the south branch of Cedar River where it is crossed by the Grand River Trail, west of Williamston.⁵

Kent County had numerous and extensive Indian corn-fields. In Ada Township, at the mouth of the Thornapple, upon both sides of the river, were many acres of old corn-hills. On a high hill, south from these, were numbers of pits. There were also many acres of Indian corn-fields on the west side of the river where Grand Rapids now stands.⁶

During the past two or three years, members of the Museum staff of the University of Michigan have located old Indian corn-fields in various parts of the state: one in Manistee County, Brown Township, northwest quarter, Section 30, along the bluff of Manistee River; another in Kalkaska County, Clear Water Township, Section 8.

Ionia County was a prehistoric agricultural district. In Pewamo Township, a half-mile north of Pewamo village, was a village site and large corn-field. Very many other fields were scattered along the Grand, Maple, Lookingglass and Flat rivers, but the information is vague as to the sections of land upon which they were found.

In Kalamazoo County, Portage Township, Mr. Edward J. Stevens gives a record of "A tract three or four miles square with greater length northwest to southeast, many of them very regularly laid out."

In nearly every part of Livingston County there "were old 'Indian fields' in which they would plant their seeds for many successive years."⁷

Mr. Fred Dustin of Saginaw, a very accurate observer and

⁴ Charles A. Weissert, *Michigan Historical Collections*, 38: 662.

⁵ Adams, *Pioneer History, Ingham Co.*, p. 481.

⁶ *History of Kent Co., Michigan*, 1881, p. 813.

⁷ *History of Livingston Co., Michigan*, 1880, p. 10.

the best informed man upon the archaeology and ethnology of the Saginaw Valley, under date of November 26, 1926, gives the location of thirteen corn-fields, "very ancient," the most of them in the fertile valleys of the Saginaw, Tittabawassee, Cass, Shiawassee and Flint rivers. One "of about one hundred acres" was on Section 33, Taymouth Township, east side of Flint River near mouth of Pine River. These sites are now all under cultivation as the soil upon which they were situated, being very fertile, was the first to be taken up by white farmers, in the thirties, who have not allowed a single vestige of an Indian corn-hill to remain, but Mr. Dustin's records are thoroughly dependable and verified. He has the only specimens of "some prehistoric corn cobs" from the state that are known to the writer. These charred cobs were "washed out by high water from some three or four feet below the surface, last spring" (1926).

The Indians cultivated a field in the northwest quarter of Section 12, Saio Township, Washtenaw County. This plot was by the side of the Huron River and, seventy-five years ago, showed unmistakable evidence of having been tilled for a long time. There were distinct signs of a very old village upon this tract until it was submerged by the damming of the river for power purposes, fifteen years ago.

Dr. M. L. Leach refers to "gardens of no mean extent" in the Grand Traverse region. Some were in the vicinity of Harbor Springs, others upon the peninsula between the two arms of Grand Traverse Bay, but his descriptions are indefinite as to exact locations.⁸ The late Mr. I. D. Watkins, who took a lively interest in pioneer and local Indian history, in a manuscript left by him says: "There was not a township in southern Michigan without one or more trails with camping grounds and corn-fields."

Blois makes the statement, "The remains of ancient corn-fields are of frequent occurrence (1838) in all those parts of Michigan previously occupied by the Indian."⁹

According to a map (1840) to accompany the report of Cap-

⁸ *History of Grand Traverse Region*, 1883.

⁹ *Gazetteer of Michigan*, p. 173.

tain C. D. Kram on the boundary between Michigan and Wisconsin, there were extensive planting grounds upon the Menominee River below Lac Vieux Desert.

Bela Hubbard, describing a trip he took down the Shiawassee River in 1837, when the natives had felt little of the fatal spell which falls upon them with the very beginnings of white settlements, gives the following memorandum: "Many of the Indian clearings stretched for several continuous miles, and many acres bordering the river were covered with luxuriant maize—the chief cultivated food of the natives." He refers also to caches for hiding provisions. At the time of this observation Hubbard was somewhere in Shiawassee County below Byron and above Corunna.¹⁰

Schoolcraft, writing about Mackinac Island in 1827, said: "Old green fields appeared in spots, which have been formerly cultivated by Indians."¹¹ *The Journal and Michigan Advertiser*, November 9, 1831, published in Detroit, reported: "The largest corn I ever saw was raised on these prairies," referring to lands adjoining the Grand River, where the correspondent claimed to have resided for ten years.¹² Friendly Indians settled about all the frontier forts and missions and had their planting grounds for corn.¹³

Were one to take the time to survey the lands of the state that have not come under the plow, to look into every old newspaper file and "Pioneer Record," and to have personal interviews with "old timers," making inquiry about Indian planting grounds and to chart the results in red upon a blank outline map, he would be greatly surprised to see the white of his map turn red.

From September 22 to 26, 1926, I visited Haynes Township, Alcona County, and found on Sections 22 and 27 many acres of old corn-hills (see Fig. 1). The quarter-section post on the boundary of these two sections is about in the center of the tract. The

¹⁰ *Memories of a Half-Century*, p. 70.

¹¹ *Mississippi*, p. 59.

¹² Fuller, *Economic and Social Beginnings of Michigan*, p. 415.

¹³ Lanman, *History of Michigan*, 1852, p. 62.

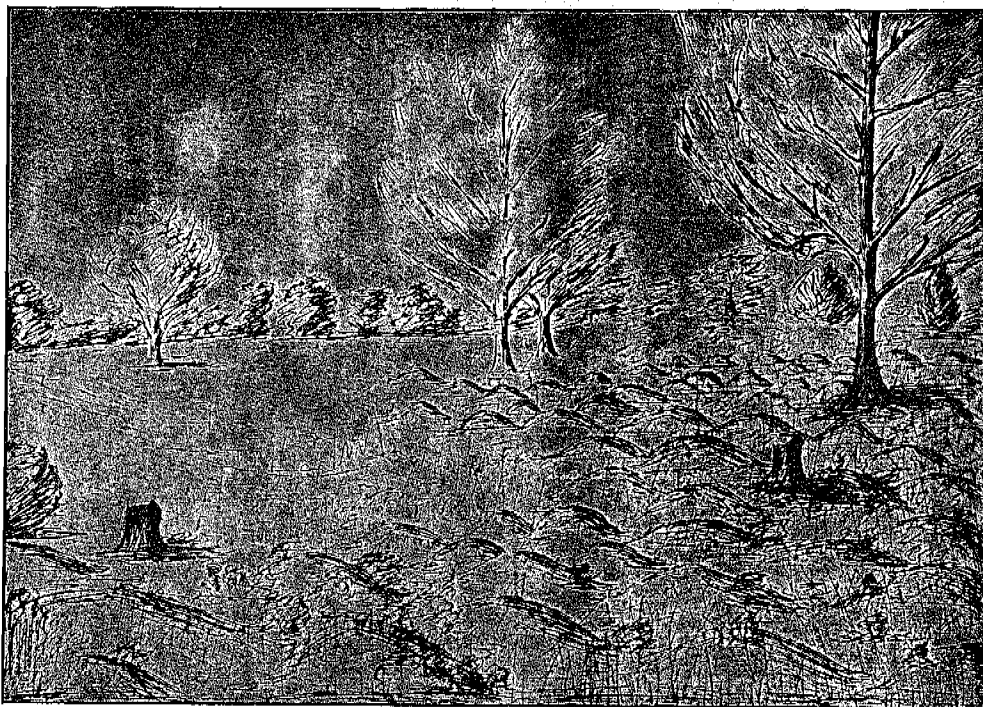


FIGURE 1

Old Indian corn-field still to be seen in Haynes Township, Alcona County, Michigan

hills showed very distinctly among the wild strawberry vines and grasses of a cow pasture, which comprised at least seventy-five acres. In other parts of this large pasture field corn patches were found. By actual measurement, with surveyor's tape, one block of the hills figured out eighteen and one-half acres. In all, there are at least twenty-five acres of distinct hills. An old settler, Mr. William Armstrong, stated that forty years ago he plowed up twenty acres of Indian corn-fields upon the same section line, Section 28. The hills, which are conical, average two feet in diameter at the base and from six to twelve inches high. The distance from hill to hill is about four feet. One small area, which had been laid out with unusual regularity, measured four feet and four inches from hill to hill both ways. The usual alignment is quite irregular; the irregularity in the rows is due in part, no doubt, to the necessity of avoiding trees and obstructions that were not leveled down.

I was informed by old lumbermen, still residing in the locality, that they had seen just as extensive and exactly similar fields elsewhere in that and adjoining counties. This crude agriculture flourished at the time when the Indian was a hunter and before he had been much, if at all, influenced by white men.

The finding of unusual numbers of stone artifacts lends force to the belief that this region, which is skirted upon the north by a branch of Black River and sixty or more rods to the south by a range of low gravelly hills, was inhabited by Indians still in their native culture-stages. The pictures of Indian corn-hills in Massachusetts, given by Dr. Wilder, very accurately resemble those in Michigan just described.¹⁴

It would appear that each squaw who was the "head of a family" had her own garden, and adjoining it was the garden or small field of another. It is a question whether the tilling of the soil was cooperative; that is, carried on by all the community in common, or whether each family, whose chief gardener was of course the woman, had its own allotment. The latter conjecture is the more probable, although in some sections of the country there was cooperative gardening, and sometimes the vigorous

¹⁴ *American Anthropologist*, July-Sept., 1920, p. 212.

men helped a little. Old men, reired from aggressive life, and children assisted the women. It is not likely that an area as large as a hundred acres was under cultivation at the same time. Fields would, however, sometimes lie fallow for a year or more; there is no evidence upon the ground to indicate how it was. The land has never been plowed or the striking features now observable would have been completely obliterated. There are numerous pine stumps, the remains of trees that were lumbered forty years ago. Stumps of hardwood are more common. The hardwood was removed twenty-five years ago. The pines upon this place were large, but there were wide openings among them. The pine openings were filled in considerably with maple and birch. I am of the opinion that this hardwood has made its growth since the Indians abandoned the corn-field. At any rate, the shade was not so dense as to prevent a fair growth of corn. As stated, the ground is completely turfed over and overgrown with low vegetation. Two years ago the fields were entirely burned over. After the fire had cleared up the ground, the corn-hills were strikingly conspicuous. In the early spring after the snow has packed down the previous year's herbage, the irregular rows can be observed for a distance of forty rods. In September, they were not discernible for more than half that distance. A considerable number of artifacts, such as farmers call "flints," "skinning stones," and hatchets have been gathered, many of which are preserved in small collections in the vicinity. No doubt village sites and burial grounds will be found if the land comes under cultivation. These plats of corn-hills are said, by men who assisted in the clearing off of the timber, to have had the same appearance among the trees that they now have among the stumps.

The Ojibways of L'Arbre Croche raised corn to supply the canoe men at Michlemacknac, but that was after they had adopted a good many traits from the mission that had been established at their village.¹⁵ They knew how to raise corn and the marketing idea was not new to them.

¹⁵ Alexander Henry, *Travels and Adventures in Canada, and the Indian Territories, between the Years 1769, and 1776*.

The amount of corn that was raised in prehistoric times cannot be estimated by the amounts raised after the chroniclers began to make note of things, for then different conditions obtained and primitive culture had been considerably changed, but trade in some form is essential to community life or at least to the maintenance of continuous populations. Corn must have been a commodity that was exchangeable with distant tribes and, where it was raised, produced with the intention of bartering. Short crops and crop failures, due to many causes, affected Indian welfare the same as they affect farmers of the present time. Years of plenty, years of just enough, years of no yield, had their effects, only more keenly, the same as now.

Indians have the reputation of being profligate, consuming to excess in times of surfeit, suffering to starvation in years of famine. How far this notion would have been borne out by the facts, could they have been observed, it is difficult to say. But they certainly had the idea, which is called instinct with lower animals, of harvesting and hoarding; hence they had places and constructed means for the preservation of supplies.

There is much evidence to substantiate the contention that the Algonquins subsisted more upon vegetable foods than upon the results of the hunt. In Michigan, corn was the staple. Around Green Bay and in the northwestern part of the state, wild rice, to the amount of several bushels per family, was gathered annually.¹⁸

For a hundred years after the Great Lakes districts were traversed by French and English traders — and every trader and traveler was a fur-dealer — hunting fur-bearing animals was encouraged by all possible means. The Indians began to hunt for gain. Usually a bundle of skins was exchanged for enough watered whisky for a two-days' carousal. As the collection of skins increased, and the consumption of the byproducts of trapping, the flesh of captured animals, also increased, the raising of corn received less attention as a necessary employment. White contact, for a time, made the tribes greater hunters than they were in the primitive state.

¹⁸ Jenks, *Report of the American Bureau of Ethnology*, 19, Part II, 1013.

I have not made any reference, in mentioning places where the Indians grew corn, to the "garden beds" that Bela Hubbard, Schoolcraft and several other writers upon the antiquities of Michigan have described, because there is doubt if they were corn-fields. If they were, they show very distinctive types of tillage from the conical hills.

The Indians built the first corn-cribs. Crib among the southern Indians were built upon posts, of poles, bark, intertwined twigs, and small sticks, which are said to have been plastered over. Cyrus Thomas says: "It is from the southern Indians that the farmers of today derived the method of constructing cribs on posts."¹⁷ Bailey¹⁸ quotes from Pickering's *Chronological History of Plants*: "About 1002 A.D. Thorwald, brother of Lief, wintered in Vineland and on an island far westward, saw a wooden crib for corn." The common farm cribs, built upon "stilts" or posts so that rats and mice may be more easily prevented from doing damage, are copies. There were no common rats and house mice here before the whites introduced them, but chipmunks, field mice, gophers, and other small native rodents could do much damage to stored grain and goods.

The natives of this part of the country stored a considerable part of their corn in pits in the ground. They also, when absent from their usual haunts, secreted their belongings in similar caches to prevent their being stolen. "It is quite a part of an Indian's code of morals not to steal from his friends, but it is quite equally a virtue to steal from his enemies."¹⁹ Ground storage would not appear to be a hindrance to vermin. Galeb Atwater says, "Further . . . they often buried rice [wild rice] and maize in the ground to keep it from being stolen." He further adds, "Ottoways buried in ground granaries in birch boxes."²⁰

The most common evidence of Indian work in the ground to be found in Michigan, whether mound, embankment or other

¹⁷ *Report of the American Bureau of Ethnology*, 12: 619.

¹⁸ *Cyclopaedia of American Agriculture*, 2: 404.

¹⁹ Jenks, *Report of the American Bureau of Ethnology*, 19, Part II, 1071.

²⁰ *Indians*, p. 102.

digging, unless it be burial graves, is pit holes. They are found in great numbers in the vicinity of the old corn-fields just described, as well as in other parts of the state. If they were mostly, as observers generally contend, for the purpose of corn storage, they may be taken as a guide to the distribution of corn culture and would indicate, as stated before, its very extensive distribution. On a knoll northeast of the fields in Haynes Township, Alcona County, and practically adjoining, are seven pits arranged in a circle twenty feet across. In the center of the circle is an old fire-place. Two of the pits were cleared out with great care. They were both of the same dimensions and of identical construction. Across the top of the pits it is seven feet. The side walls are five feet, going down into the gravel perpendicular. The pits are flat upon the bottom with a smaller pit in the center eight inches in diameter and twelve inches deep. They contain fragments of decayed and charred wood and ashes. Other pits were found haphazard over the clearing, which comprised at least one hundred acres. Charlevoix, writing from River St. Joseph, August 16, 1721, gives the following description of the Indians' treatment of corn in that section of the state: "Their corn and other fruits are preserved in receptacles, which they dig in the ground and which are lined with large pieces of bark. Some of them leave the maize in the ear . . . and hang them on poles over the entry of their cabins. Others thresh it out and lay it up in large baskets of bark, bored on all sides to hinder it from heating: but, when they are obliged to be from home for any time or when they apprehend some irruption of the enemy, they make great concealments under ground where these sorts of grain are exceedingly well preserved."²¹ A note by L. P. Kellogg, the editor of Charlevoix's Journal, says: "The process of making these hiding places was an interesting one. The white hunter soon learned it from the Indians and adopted it to preserve furs as well as provisions. The hunter's term for these hiding places was 'cache.'"

Alexander Henry, upon the Missouri River near Knife River, North Dakota, wrote (1806), referring to the Mandanians: "It is ²² Charlevoix, *Journal of a Voyage to North America*, II: 112-113.

customary in the fall, after harvest when the grain is well-dried in the sun, to take it off the cob, and deposit it in deep pits about the villages. These holes are about eight feet deep; the mouth is just wide enough for a person to descend, but the inside is hollowed out to any size and the bottom and sides are well-lined with dry straw. Such caches contain from twenty to thirty bushels of corn and beans, which are thrown in loose and covered over with straw and earth. . . . Grain stored in this way will keep for several years without injury. . . . So numerous about the villages are these pits . . . that it is really dangerous for a stranger to stir about after dark, as the natives never take the precaution to cover them over when empty."²²

In some places, pits seem to show a degree of studious arrangement upon the part of their diggers. Reference has been made to a circular arrangement in Alcona County. In another location, in the same county and township, to the northeast and a mile from the shore of Lake Huron, is an arrangement of pits on the top of a hill in three rows so dug that in the middle row the pits come midway between or alternate with those of the other rows. The same pattern of pits is to be observed upon Section 35, Lincoln Township, Isabella County. Mr. G. W. Beaver of Alcona County says he can locate over a hundred pits in Harrisville Township, which is immediately south of Haynes. Probably no plant had a wider distribution upon the continent than corn. This is certainly true of domesticated plants. Nearly all the tribes in the territory now called United States, with the possible exception of some of those living west of the Rocky Mountains, cultivated it more or less, and more consumed corn than raised it, because non-producers are known to have procured it by trade.

General Sullivan and his officers, in their expedition against the Iroquois in the autumn of 1779, report destroying immense quantities of the Indians' corn. One report says about 1,200,000 bushels, another, 160,000 bushels, "with a vast quantity of vegetables of every kind." These reports will not stand cold ver-

²² *The Manuscript Journals of Alexander Henry and of David Thompson*, edited by Elliott Coues, p. 350.

cations by arithmetic and counter checking. It would require a "bin" 114 feet long, 114 feet wide and 114 feet high, or a crib 8 feet wide, 12 feet high and 2.95 miles long to hold all the corn Sullivan claims to have destroyed. Another big yarn or the same yarn about quantities of corn stored by the Indians in Seneca County, New York, is given by the Marquis De Noville, who claims to have destroyed in 1687 the identical number of bushels as reported by General Sullivan eighty-two years later. Sullivan's command no doubt did find and destroy enough of the grain to establish the fact that the New York Indians cultivated corn extensively and intensively.²²

Morgan says corn was ever the staple food of the Iroquois which they preserved with husks braided together, and shelled and stored in bark barrels. "They excavate a pit, make a bark bottom and sides and having deposited their corn within it, a bark roof, water tight, was constructed over it and the whole covered up with earth."²³

The agricultural is above the hunter stage of humanity. The soil could not be tilled by people who were perpetual wanderers in pursuit of game. There are two times in the year when planters have to be upon or near their fields. One is at planting, the other at harvest time. While cultivation of the crop after planting was crude, in order to obtain much of a yield, there must have been hoeing and weeding. There were a great many animals and birds that preyed upon the fields, some to dig up the seeds, others to eat the growing and matured grain. The scare-crow, traps, and other devices to keep away robbers were parts of the system of cultivation. The corn growers were more or less sedentary with fixed abodes, but they could leave the fields after gathering and storing the grain for the next season's use and go upon the autumnal hunt.

Nearly every tribe had its hunting ground, which friends were ready to respect, but tribal enemies had to be watched and

²² *Journals of the Military Expedition against the Six Nations*; also A. C. Parker, *Iroquois Uses of Maize, etc.*; *Educational Dept. Bull. of N. Y.*, Nov. 1, 1910; *Documentary History of N. Y.*, 1: 238.

²³ *League of the Iroquois*, 1: 311.

fought away. Poaching and robbing led to many a bloody fight and, in fact, were the causes of extensive wars. Sometimes the hunting places were far distant from the summer abodes and necessitated long tramps over the trails and the establishment of temporary camps or villages. The accoutrements of the chase and lodges had to be transported wearily by canoe or on foot or both ways. The trails were retraced after the hunt, frequently for maple sugar making before corn planting.

With all their crude but necessary farming, the Indians of the timber belts and the majority of those upon plains and mountains were in the hunter stages of culture, but were not so much given to roving as is generally supposed to have been the case. In the dense pine and hemlock woods, it is not probable there was any cultivation. A very large part of the pine land, since lumbering, is not sufficiently fertile to produce paying field crops. Hundreds of white farmers have failed to make livings upon them, have permitted their titles to lapse for non-payment of taxes, and are moving away. "The openings, prairies, hardwood belts and river valleys are productive, and the distribution of corn culture over the state is about the same for the white as it was for the red man.

After centuries of unconscious selection, the Indians had developed varieties of corn with wonderful adaptation to the climatic condition in which they were grown. In the southwest among the Pueblos there were drought-resisting kinds. In the north, where the seasons were short, there were varieties that matured early after planting. There were kinds that would do well in the half-shade of open woods. It made no difference to the Indian, as it does to the white farmer, if the stalks or "fodder" were froshitten. The kernels of corn are ripe while the foliage is yet quite green. A crop was safe for the Indians, who used only the ears, before the farmers who place great value upon the entire plant would consider it time to harvest the stalks, because they can transmute the stalks into profit by feeding them to growing live-stock.

Jenks says, "The Ojibways at La Pointe, in Chiquamegan Bay, Lake Superior, which is four miles south of the parallel

47° raised corn and pumpkins."²⁵ John Tanner refers to the Indians planting corn more than a hundred years ago upon the Red River of the North and upon the Assiniboin which is much farther north than this.²⁶ Any time after the "green" or "milk" stage, even if frosted, corn had food value; especially is this true of the wrinkled or "sweet" varieties. Green corn was dried and if the ears were advanced to the stage of "glazing," by careful curing, could be preserved upon the cob.

It is a fact that by selection of early maturing seed or of seed that made yields under adverse circumstances, the Indians had accomplished much more in adapting corn to soil and climate than the white farmers did before the time of agricultural experiment stations.

The yields of corn can only be guessed at. One familiar with corn growing, barring extremely wet seasons, severe droughts, hail-storms and other unusual behavior upon the part of Providence, by observing the soil, can make fairly close estimate upon how many bushels per acre may be expected. Cultivation after planting has very much more to do with growing corn than with any other cereal. The old cone-shaped hills indicate that much attention was given to hoeing. Early observers state that they saw bounteous growths; others that the promise in mid-season of much of a crop was small. Mr. George Will, an ethnologist of high standing and a specialist in corn growing, says that, among the Sioux and the Cheyennes, twenty bushels per acre was a fair yield.²⁷

Mr. M. L. Brown²⁸ writes that the average yield of corn in Iowa with good white man's tillage has varied from 14.8 to 45.8 bushels per acre, taking the state together, the wide difference being due to weather conditions. For Michigan, in 1924, the average yield per acre was 26 bushels. I should say, being somewhat familiar with the soils of Michigan and corn-raising,

²⁵ *Report of the American Bureau of Ethnology*, 19, Part II, 1040.

²⁶ *A Narrative of the Captivity and Adventure of John Tanner during Thirty Years Residence among the Indians in the Interior of North America*, 1830, p. 180.

²⁷ *Corn among the Indians of Upper Missouri*, p. 142.

²⁸ *Corn Growing, Judging, Breeding*, p. 74.

that for the Indians, after the predatory animals and birds had taken their toll, fifteen bushels of ears to the acre was a "paying" crop.

When I commenced this dissertation, I had in mind only a description of those old planting grounds and storage pits of Michigan with which I am familiar. But the subject has become so absorbing to me that I venture to submit the following comments and compilations upon the corn-plant and its development. I should also like to mention and describe briefly the religious and social ceremonies and celebrations that different tribes had and held at planting and harvesting, the different ways of preparing corn for the "table," and the long list of names given to the numerous preparations, which is also an absorbing subject and would show that many words have been taken over from the Indians' language into ours. To do all that comes to mind would consume a volume and after all would be largely a repetition of what is already known.

Corn is usually referred to as maize or *Zea mays*, especially by those who write technical treatises. Abroad, the word corn is used to designate all cereals, as wheat, rye, barley, rice, millet and buckwheat, and causes confusion when applied specifically. In an account written more than seventy years ago is the following: "Some time since in one of the counties of Pennsylvania a man, having been indicted for stealing so many bushels of corn, exception was taken by his counsel that this was not a perfect description of Indian corn. The exception was, however, overruled by court, who thus decided that in American jurisprudence 'corn' was the established name of Indian corn."²⁹

Corn is one of the "most intriguing mysteries" of the new world. For perhaps five thousand years it has been a differentiated grain very like what it is today.³⁰ It has been developed by Indians from some very dissimilar grass of Middle America, which had no value as human food. In a tangled mass of botanical evidence, the probabilities are that the parent plant is what is called *teococotli*,³¹ a Mexican grass grown in some parts for its

²⁹ *United States Magazine*, Vol. II, June, 1855.

³⁰ *Kempston, Maize and Man*, p. 35.

³¹ *Kroeber, Anthropology*, p. 353.

fodder, which is very much more dissimilar in its fruit to corn than rose hips are to "northern spics." Although the intermediate forms are extinct, corn, as developed under cultivation, has been identified in a grass that presents but the remotest resemblance to it. One need not be surprised at this because there are many other examples of equally wide differences between domesticated plants and their wild originals. "Who would have thought that the peach and the nectarine came from one stock? Who would have thought that the cabbage, cauliflower, broccoli, and kohlrabi are derived from one species; and rape, colza, turnip and probably ruta-baga from another species?"²¹

The preparation of foods from poisonous roots and the making of edible meals and food starches from acrid bulbs by boiling and treating them with alkalis are complexes involving the knowledge of their dangerous properties in the raw state and much technical manipulation. Cassava, as it comes from the ground, "carries a deadly charge of prussic acid" and requires special preparation to make it palatable, but, when prepared, was a staple food of the Indians of a large part of South America and is used in almost every household now, under the trade name of tapioca.²²

So far as evidence goes, all the corn-growing tribes used about the same methods of cultivation. A description of the "technic" in one locality practically describes them all, although on the New England coast and probably in some other places fertilizers were used and, in the southwest, irrigation. The early settlers of eastern Massachusetts speak of the great quantities of alewives in the rivers, which the Indians could easily take in abundance. One or two alewives were put into a hill. The whites imitated the Indians in this particular, and it is possible that the use of "animal fertilizer" was originated by the aborigines.²³

Captain John Smith's description (1606) of corn cultivation

²¹ Asa Gray, *Derivations*, 1876, p. 111.

²² C. F. Cook, *Food Plants of Ancient America*; and *Smithsonian Report for Year Ending June, 1903*.

²³ W. H. Whitson, *American Anthropologist*, July-Sept.; also, G. E. Ellis, *The Redman and the White Man in North America*, p. 175.

in Virginia summarized, is: Ground is prepared by girdling the trees to kill them. Fire is applied at the roots to prevent their sprouting. The next year, "With a crooked piece of wood they beat up the weeds by the roots and in that mould they plant their corn—they make a hole in the ground with a stick and into it they put four grains of wheat [meaning maize] and two of beans." The holes are about four feet apart and when the corn is "grown middle high" they hill it up like a "hop-yard." "What they plant in April they reap in August; for May in September; for June in October." I should say his description of the preparation of the ground by killing the trees, cultivating, and hilling would apply to the old plantings of Alcona County, Michigan, as well as to Virginia.

Professor L. A. Chase of Marquette gives an illustration of Indian corn-plots in Wisconsin in which the rows are in ridges instead of conical hills.²⁴

The following is from Darwin: "The varieties also differ in precocity and have different powers of resisting dryness and the action of violent wind. * * * The tall kinds grown in southern latitudes, and therefore exposed to great heat, require from six to seven months to ripen their seed; whereas the dwarf kinds, grown in northern and colder climates require only from three to four months. * * * in proceeding from south to north, the plants steadily diminish in bulk."²⁵ Seeds brought from latitude 37° in Virginia and sown in latitude 43°-44° in New England produce plants that will not ripen their seed, or will ripen them with the utmost difficulty. Seed taken from New England to latitude 45°-47° in Canada behaved the same way. After some years of painstaking culture, southern kinds can be readily ripened in northern localities. This is somewhat analogous to the conversion of summer or spring wheat into winter wheat. The differences in the growth of corn are very great. Darwin states

²⁴ *Michigan Agriculture: Historical Background*.

²⁵ *The Variation of Animals and Plants under Domestication*, I: 339-340.

²⁷ The last statement in the quotation is based upon P. Kalm, *Description of Maine*, 1752. The first three sentences following the quotation are paraphrased from Darwin's digest of Kalm.

the height varies from 15-18 feet to only 16-18 inches, and the size, color and length of cob, the size and shape of the kernel also display as great variation. There are kernels so large that Indians eat them separately like grapes³⁸ and others small as grains of wheat like pop corn. In shape of kernel there are wrinkled or puckered, dent, beaked, and rounded varieties. The color of the varieties varies from white, through yellow, red, purple, blue to almost black. The arrangement upon the cob if in rows is from eight to twenty, and with some kinds the kernels are not rowed at all.³⁹ In general, it may be said that if we go north or south from a given latitude a season becomes one day later or earlier for each ten miles of travel.⁴⁰ Taking this as a kind of rule, one can figure out very accurately the limit of Indian corn culture and draw his own isotherm, bearing in mind that the shortest growing season for any variety must be ninety days without frost.

Upon archaeological evidence it can be proved to a reasonable degree of certainty that corn culture was practiced a very long time by the prehistoric occupants of Michigan. Many beautiful specimens of mortars and pestles, no doubt made for reducing corn kernels to meal, have been collected within the state. Some of these mortars are made of hard glacial boulders, show excellent workmanship both upon the outside and within, weigh as much as sixty pounds, have grinding holes six to ten inches deep and will hold three quarts or more. Stone pestles are much more common than mortars. Some of those "of the roller type" are two feet long, many eighteen inches and over. Generally, these pestles are beautifully wrought out of hard stone.⁴¹ It does not seem that any people would take so much pains to work out milling implements unless they were of very important practical use. A thesis could and should be prepared upon the workmanship, uses and distribution of mortars and pestles in Michigan. Large,

³⁸ J. H. Kempton, *Maize and Man*, p. 42.

³⁹ Darwin, *The Variation of Animals and Plants under Domestication*, 1: 338-340; also *Maize and Man*.

⁴⁰ T. F. Hunt, *Cereals in America*, p. 203.

⁴¹ See illustrations in *Primitive Man in Michigan*, by W. B. Hinsdale.

deep, wooden mortars were made by gouging out one end of a solid log, usually birch or soft maple, to the depth of from ten to fifteen inches. Each mortar had a double-ended pestle usually made of ironwood about four feet long. Such "Indian mills" are in occasional use today among the Chippewas and Ottawas. They appear to be reproductions, in wood, of the old stone mortars, and have about the same cubical capacity.

The late Professor W. J. Beal, having an intimate knowledge of Indian ways, referring to Lenawee and Hillsdale counties says: "Indians killed up corn and planted each succeeding crop in the same old hills. They made primitive grist-mills in this way: 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."⁴²

The Indians of the Michigan country are classified culturally as having been in the hunter stage but, in fact, they were equally dependent upon agriculture. The men did the hunting; the women cultivated the fields. The entire technique of the Indian woman's corn culture has been taken over by the white planters; the method of planting in hills or drills, hoeing or weeding, husking, storing in cribs, milling and the conversion of the shelled grain into mush, hominy, cakes, "green corn" and ingredients of breads and broths.

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⁴² *Pioneer Life in Southern Michigan in the Thirties, Michigan Pioneer Collections*, 32: 257.