

1890

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Recommended Citation

Pettigrew, F. W. (1890). A Pre-Historic Indian Village. *Journal of the Minnesota Academy of Science, Vol. 3 No.3*, 348-355.

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A PRE-HISTORIC INDIAN VILLAGE.—*F. W. Pettigrew.*

There are about Sioux Falls, South Dakota, numerous indications of former Indian villages, belonging to that class of aborigines familiarly known as the "mound builders." These villages were located along the Sioux river covering a distance of fifteen miles north of Sioux Falls, and twelve miles southeast, occupying for the most part, some high point of prairie overlooking the surrounding country for many miles around. The confluence of small creeks, or on the opposite side of the river in a semi-inaccessible location such as a people would naturally select for a fortress, seemed to be the favorite location.

For the most part, these village sites which are marked by irregular groups of mounds of earth varying in height from one to ten feet are of interest only to the archæologist, there being altogether of these mounds about three hundred and seventy-five. Many of them have been defaced by the plow, and others by the spade and shovel in the hands of unskillful relic hunters, who at different times since the country has been settled by whites, have dug them over, thus making the work of scientific investigation difficult. It was not until the season of 1889 that the writer made a careful examination of the different localities, and for the first time brought to public notice the location of these villages, the most prominent and interesting of which is located ten miles southeast of Sioux Falls, on the east side of the Sioux river, on Sec. 25, T. 100, R. 49 at the river crossing of the B., C. R. & N. R., at the mouth of Spring Creek, that comes in from the east, and opposite Nine Mile creek, that comes in from the west. The river valley at this place is narrow, not more than one-half mile wide, the bluffs on either side are high, and in many places rise abruptly. The village was located on prairie bench which bears N. E. and S. W. and extends for two miles. The accompanying diagram [See Fig. 1, Pl. VII.] shows a portion of the village containing about twenty acres just north of the railroad track on the land owned by Mr. Peterson; fortunately this is the original prairie sod and has been undisturbed except where the mounds have been dug into in search for relics. On this account, this is the most interesting portion of the village which extends across the adjoining forty acres on the northeast belonging to a Mr. Iverson, to Spring Creek, thence across, covering about fifty acres belonging to a Mr.

Nelson. These last two pieces have been plowed over and the stones which composed the "Hut circles" have been picked up and carried away. To the southwest across the railroad track, the fields have all been plowed over, yet, for a mile, scattered here and there, are the mounds plainly to be seen, and every year as the fields are plowed over, a fresh lot of stone implements, such as mauls or hammers, axes and grinding stones are brought to the surface. On the tract owned by Mr. Peterson, near the railroad track, earthworks are plainly traceable, enclosing about ten acres; inside of the circle stretches a trench in places two feet deep, with breast-works made on the outside, and about the same in height. At the north side of this circle and composing a part of the embankment, is a mound about thirty feet across, and four feet high. Several years ago this mound was opened, and a skeleton of a man seven feet in length was taken out. Mr. Peterson says there must have been a president buried there. To the east, about eighty rods are the hills, which are steep and high. On the summit of the two highest, which hold a commanding position, overlooking the country for many miles, are seven mounds, where the faithful sentinels or members of their families were buried. Several years ago, Mr. Iverson says, two of these mounds were dug into and several skeletons of human beings were found, also two stone axes. Recent excavations in the same mounds have revealed nothing except a few bones.

To the northwest of the village, about one mile, the bluffs are very steep, and hard to climb. On the summit, at the highest point of a ridge which bears northwest and southeast, we come to some more mounds. The first one is, or was, sixty feet across and five feet high; extending along the ridge are twenty-one more smaller mounds. The first one and four others were opened by me and proved very interesting. A person standing upon this ridge, can see in all directions for miles away. The view of the winding river, skirted with timber, and the undulating prairie, affording an unobstructed vision for miles in all directions, is truly a handsome picture. These two high points were where the scouts and sentinels were stationed with their families, and kept faithful watch both by night and by day, and if game should be seen, appropriate signals were given, and if the enemy should appear, timely warning was also sent to the villagers below. A deep worn pathway leads direct from these mounds down the hill-

side to the river, evidently made by the faithful women and slaves carrying wood and water to their lodges on the hill.

THE VILLAGE.

To obtain a correct diagram of the village, [consult again figure 1, Pl. VII.] I divided the land into squares of one hundred feet and by measurement was able correctly to place the hut rings and mounds upon the plat. There are seventy-six of these circles and twenty-seven mounds. The circles are made of stones varying in size from one foot to two feet in diameter, and were placed around the outside of their houses to hold the skins in place. This was a permanent village and contained many people. The houses were built with a view to a winter as well as a summer residence the doorways facing uniformly to the southeast; the stones forming the rings are now half buried, the soil having accumulated about them to the depth of eight inches. There seems to have been no great degree of regularity in laying out the village. The smaller circles would indicate the lodges, while the four oblong circles, the council chambers, and places for holding winter sports.

THE MOUND BUILDERS.

Who were the mound builders is a question that has been often asked. It is generally conceded that they were a race who once inhabited the United States but were supplanted by the present race of American Indians, who now know nothing of them. Recent investigations, however, are convincing, and the best informed now believe that they were but the forefathers of present races, and that by changes in mortuary customs, and moving about from place to place, they are unable even to maintain traditions of their ancestors. The mounds were but the burial places of the dead, the largest ones not necessarily indicating a great chief, for more than one skeleton is often found in the same mound. There is a tradition among the Omahas, Ponkas, Osages and Kansas, that many hundred years ago, their tribes and several other cognate tribes traveled down the Ohio river to its mouth and separated on reaching the Mississippi, and that some went up the river and some went down. The above named tribes were the ones that went up the Mississippi. At the mouth of the Osage river, the Kansas separated, and the Omahas, Ponkas and Iowas proceeded by degrees through Missouri, Iowa and Minnesota till they reached the neighborhood of the Red Pipestone quarry; thence

they journeyed toward the Big Sioux river, where they made a fort. They remained in that country a long time. Game abounded. By and by the Dakotas made war upon the three tribes and many Omahas were killed by them, so at last the three tribes went west and southwest to a lake near the head of Choteau creek, now known as lake Andes, there they cut the sacred pole. It is claimed by the Omahas that it is two hundred years since the sacred pole was cut. Tradition also says that they built dirt lodges wherever they went, and lived in them. In vain have I searched for any evidence of dirt lodges. There are no traces of them in this locality, and it is quite plain to my mind that there never were any. The earthworks above described may be the fort alluded to in the story; it was undoubtedly the work of the same people who lived in the village, and built the mounds, and built the fort at the same time.

Several years ago I examined the ancient diggings at the great Red Pipestone quarry, also at subsequent times have noticed that the accumulation of vegetable mould in the pits as well as on the rubbish heaps, denote great age; the sod and vegetable mould is of the same thickness as that which covers the mounds in the village.

The picture writing cut into the smooth weather-worn surface of overlying quartzite at the great Red Pipestone quarry exhibits many curious and grotesque forms among which can be traced the turtle, fox, skunk and bear of which tradition tells us nothing, nor can any of the present races of Indians enlighten us upon that subject. The peculiar dry moss that grows so slowly upon smooth rock surfaces which has so persistently spread itself over and upon these picture writings, would undoubtedly require the same lapse of time that it would require to form the vegetable mould upon the mounds, in the pits and on the rubbish heaps.

Whatever and whoever these people were, that quarried the pipestone, made the pictures on the rocks, built the mounds and made the fort, I am unable to say; but I do believe it was all done by one class of people at about the same time, and that they were the mound builders from the Ohio or their kindred tribes.

MOUND ENCAVATIONS.

I opened one mound which was forty-five feet in diameter and four feet high, composed of coarse gravel and clay; after re-

moving the south half, came upon a human skeleton six feet two inches in length, in a good state of preservation. This body was buried face upward, full length stretched out, feet pointing about twelve degrees east of south; head was raised about three inches higher than feet; hands were placed over abdomen, so that the bones of right thumb dropped between second and third vertebræ of the spine. A necklace of light blue glass beads was around the neck, so thoroughly decomposed that but three of them were taken out entire. I was able to save the whole skeleton except a few bones of the feet. The skeleton was seven feet east from center of mound, and was evidently a male of about forty-five years of age. A few ashes to the left of the body, some broken pottery and some animal bones notably of the buffalo and wolf, were all the mound contained.

Another mound contained a skeleton, face upward stretched out at full length, feet pointing south forty-five degrees east. The skull was near the center of mound and was well preserved: most of the other bones were badly decayed. One stone hammer a few pieces of broken pottery and ashes were found.

I opened a mound fifty feet in diameter, six feet high, and found after working one whole day with team, plow and scraper, one stone hammer, broken pottery, numerous indications of fire-places, and ashes and animal bones.

Another which was sixty feet across and five feet high, had been opened partially in 1886, and one full length skeleton removed and sent to Clinton, Iowa. I found on more full excavation at different depths, from two to four feet from top of mound, parts of several skeletons of both male and female and children, also bones and teeth of animals, clam shells, vertebræ of fishes, small copper serpent, [Fig. 11, Pl. VII.] ceremonial stone [Fig. 12], and hair beads.

In another mound copper bracelets encircled the ulna and radius of the left arm of probably a full grown female; also copper beads around the neck.

There is no evidence of cannibalism in any of the mounds opened; neither are there any indications of cremation. Some of the mounds contain decayed bark which had been used to cover the body at time of burial. A list of some of the articles found either on the village site, or in the mounds is as follows: Three stone axes, three celts, two buffing stones made of coarse sandstone, two ground sandstone arrow shaft straighteners, three

pipes made of catlinite; two copper serpents; thirteen copper beads; one copper bracelet; one bead of catlinite; one bead from shell; four bone hair beads; one pipestone slab on which is engraved a bird; several small grooved stones for war clubs; a great number of grinding stones and stone hammers; fragments of pottery; one bone stiletto; one iron knife; five cut stones called nut holders; one pair grooved sandstone, use not determined.

MORTUARY CUSTOMS AND RELIGIOUS WORSHIP.

But very few relics are ever found in the mounds or otherwise to denote religious worship, and in this respect the village has yielded up more than an average amount, and after careful examination of the mounds and other evidences we would be justified in arriving at the conclusion that these people were sun worshippers. There has been so many hundred mounds opened in the United States and skeletons found facing the east, the south and the west, and never to the north; some buried sitting and some at full length.

The theory I would advance is that at the hour of the day when the body was placed for burial, should the person be raised to his feet he would face the sun; thus, if burial took place in the morning, the person must face the east, and if at eleven o'clock, as was undoubtedly the case with the full length skeleton, then the person being brought to his feet would face the sun, a few degrees east of south, and the recurring days and seasons would bring the sun to occupy the same position in the heavens on that day when the body should be called forth to meet the great giver of life and warmth to receive its new lease of life.

The lodges in the village seem to be in groups. Probably families or "gens" thus arranged themselves and whenever a death occurred in a family after the body was prepared for burial, a place was selected but a few feet from the lodge, and the body placed upon the ground; a fire was built beside the body over which was cooked the feast, which was to be partaken of by the friends and relatives of the deceased during the long ceremony which was to follow. The mound was built by casting earth upon the body, covering it, and the fire, and the remainder of the feast, and such implements as were the favorite of the individual who died. When the ceremony was over the mound would be round and oval on top, when another member of the same family died,

the body would be placed on top of the same mound, or to one side and ceremony repeated as before. Several persons might be buried in the same mound at the same time, as in battle, since parts of fifteen skeletons were found in one small mound. All Indian tribes have many religious rites or ceremonies commonly called dances, and in conferring the several medicine degrees, the different medicine stones [see Fig. 9] and ceremonial stones [Figs. 3 and 12] would all come of use in driving out evil spirits which are supposed to exist in the body of deceased persons.

PIPES.

The discoidal pipes of peculiar pattern are made of catlinite. The village has furnished three, and there is but one other so far known, and that was found in Kentucky. A cast may be seen of it at the National Museum in Washington. Figure 10 will represent the largest one of the three, and may be regarded as the "peace pipe" and the disk, or face of the pipe in which the stem was inserted, as emblematic of the sun.

COPPER SERPENTS.

The two copper serpents found in the mound on the ridge to the northwest of the village; the third spadeful of earth brought the larger one to the surface; the other was two feet from the top of mound. Figure 11.

Before the advent of the whites the Indians knew nothing about smelting or fusing metals, and all copper implements, and ornaments were pounded out. The smaller serpent three and one half inches long, was first made into a sheet and rolled up, then bent. The larger one, seven inches in length, was a wire drawn out and bent to represent a moving serpent, about one eighth of an inch at one end bent around to represent a head. In looking upon this simple emblem which cannot be made of any use in supplying the necessities of life, we must search further for the meaning of it, as we know that among savages, every article has its useful purpose, and the natural conclusion is, that unless intended for utility or ornament, they must be connected with some form of religious worship. Can it be that they regarded the serpent as emblematic of one of the deities? If so then we must look for some simple natural cause, the most probable of which would be a comparison of the wriggling motion of the serpent to the zigzag appearance of the lightning, thereby accepting the

serpent as a Totem of the god of rain. This is matter of speculation, but would not seem to be altogether unreasonable, when we take into consideration the mythology of all other barbarous tribes.

The people of this silent city were peaceful and depended largely upon agricultural pursuits for a livelihood; selecting their location for a village with a view to natural barriers, placing their sentinels on the commanding places on the top of bluffs, and building a fort for a place of last resort, when forced to retreat by the enemy. The great quantity of grinding stones and stone hammers found upon the ground would all tend to show that they were not a war-like people. The villages being located on high ground so far from water, it was necessary to have some means of carrying water, which was done in earthen vessels. These vessels were of so frail a nature, and were so frequently broken, that it is quite probable, the majority of the women of the tribe were well up in the ceramaic art.

Fragments of pottery are found everywhere, but no whole vessels; the fragments show that the clay was mixed with coarse sand or pounded shells and dried in the sun. Some pieces exhibit cord markings; other pieces were ornamented with a sharp stick or bone, and is not unlike Indian pottery generally.

Much more could be said about this Indian village, a minute description of the various excavations having been omitted. It is hoped, that as years roll by, enough light will be shed upon the past, to give us a clearer conception of the origin of these as well as other tribes of American Indians.

THE GROWTH-PERIODICITY OF THE POTATO TUBER.—

Conway MacMillan.

While a vast amount of research has been expended upon the physiology of tubers, bulbs, corms and fleshy roots, it is not clear that any extended observations have ever been made upon the method of growth of such an organ as the potato tuber. It is a well known fact that the growth in length of upright stems and various aerial organs is not regular, but exhibits a marked daily periodicity, the time of greatest average growth being not far from three o'clock in the morning, and most stems show a clearly marked diurnal period, unless this period is modified or obliterated

PLATE VII

1. Map of a Pre-historic Indian village.
2. Stone hammer (small).
3. Stone (2x8½ in.) probably used by medicine men in ceremonial.
4. Fragment of a water jar.
5. Double grooved stone ax.
6. Stone hammer.
7. Grinding stone.
8. Stone ax.
9. Medicine stone.
10. Peace pipe made of catlinite.
12. Copper serpents.
12. Ceremonial or monumental stone from a mound (grave).
13. Arrow shaft straightener of sandstone.
14. Flint spear point.
15. Bone stiletto.

