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STONE TIPI RINGS IN NORTH-CENTRAL MONTANA AND THE ADJACENT PORTION OF ALBERTA, CANADA: THEIR HISTORICAL, ETHNOLOGICAL, AND ARCHEOLOGICAL ASPECTS

By THOMAS F. KEHOE

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INTRODUCTION [1]

The casual visitor to certain parts of Montana and Alberta, Canada, will often wonder about the original purpose of stone circles encountered here and there on the open plains. When one leaves the well-traveled highways and strikes off across country unbroken by the plow, clusters of stone circles are likely to appear, often in considerable numbers. These circles are formed of small boulders placed at intervals to form rings ranging from 5 to over 40 feet in diameter. These rings will in most cases be deeply embedded in the sod, suggesting that a considerable period of time has elapsed since they were originally laid down. Local residents long ago adopted the name "tipi rings" for these phenomena.

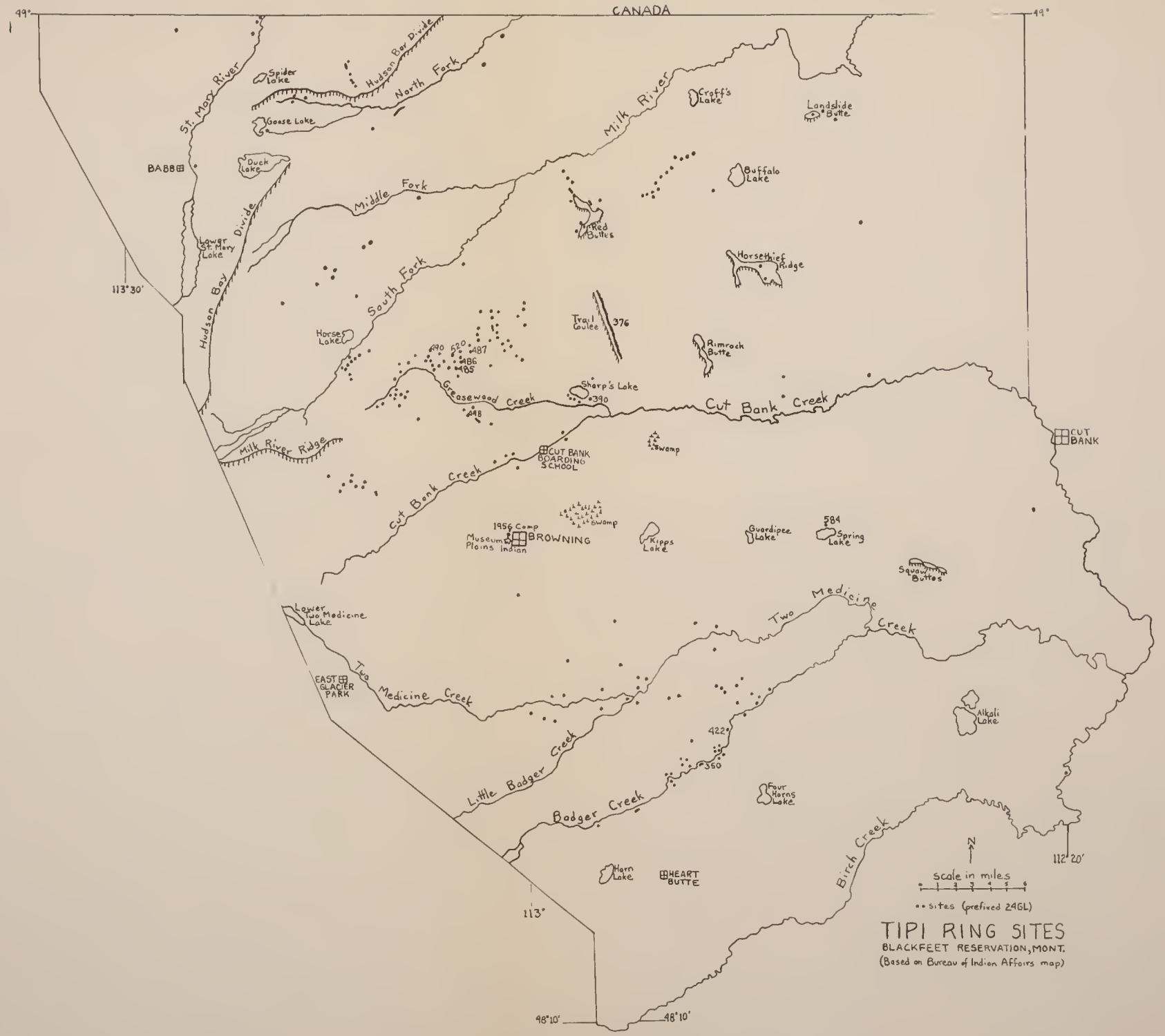
Scrutiny of the writings of contemporary archeologists reveals confusion and uncertainty concerning the function of tipi rings. In the first review of Montana prehistory, Mulloy (1952, p. 137) classifies them as "manifestations of unknown relationships." He regards "it as implausible that they were used to secure the edges of a skin lodge, even though they are repeatedly referred to as having this function." He is led to this decision by variability in size and a lack of habitation

[1] I wish to extend my appreciation to the following persons who have greatly aided me in this study: Dr. Claude E. Schaeffer, former curator of the Museum of the Plains Indian, who called my attention to the problem and contributed suggestions from his own experience in Plains ethnography; Dr. Schaeffer and John C. Ewers, who carefully reviewed the historical and ethnological sections; Dr. Douglas Osborne, who did the same for the archeology; and Drs. Osborne, William Elmendorf, and William Massey, who read the manuscript in its entirety.

I am also indebted the Bureau of Indian Affairs, the Museum of the Plains Indian, and the Louis W. and Maud Hill Family Foundation for making possible the 4 years of research on tipi rings.

Sincere thanks are due to Peter H. Baez, Verl P. Brady, and Carl Shaddox, formerly with the Soil and Moisture Conservation Office; to Charles Gerard, of the Forestry Office of the Blackfeet Indian Agency; to Kenneth Galbreath, of Browning; and especially to F. Earl Turner, of the Geology Department of the Union Oil Company of California, for their assistance in locating tipi ring sites.

Finally, I wish to express my gratitude to those who helped me in the excavations involved in this project: Donald and Jerry Ziegler, Edward and Phyllis Jay, and my wife Alice.



MAP 2.—Map of the Blackfeet Reservation showing sites.

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remains in their vicinity. Factors contributing to the latter premise are (1) the rare occurrence of fire remains within the circle, (2) the lack of packed floors, and (3) more frequent location on high river terrace fingers than in sheltered lowlands. Mulloy further notes that the stone circles range from isolated individual rings to groups of several hundred, sometimes intersecting one another or occurring in eccentric forms. In the Dakotas, he points out, they are found as merely circular depressions in the sod. Mulloy refuses to commit himself as to the original purpose of the circles, but believes that they are related to the so-called "medicine wheels," an example of which is found high on a mountain peak in the Big Horn Mountains of Wyoming.

In a review of the book containing Mulloy's comment cited above, Wedel (1953, p. 179) states the following:

> Other interesting and puzzling subjects include tipi rings, various boulder alignments and configurations, and petrographs. Mostly these are still unassigned culturally, because associated cultural-diagnostic materials are rare or absent. I am inclined to agree with Mulloy that a good many of the tipi rings are probably of ceremonial, rather than practical, purpose.

Previously Wedel (1948, p. 48) had discussed the origin and significance of tipi rings and included a useful statement on their distribution:

> The so-called tipi rings, whose true purpose and significance are still obscure, are abundant and apparently highly characteristic. They occur in limited numbers in northern Colorado and extreme western Nebraska, and more frequently in the Dakotas eastward approximately to the Missouri from Fort Randall northward, but the greatest number of such sites seem to lie in Wyoming, Montana, and northward. It is possible that they correlate with a relatively late hunting occupation, perhaps partly at least involving Shoshonean peoples.

In a recent study of tipi rings in Montana, the Dakotas, and Wyoming, Hoffman (1953, p. 2) observes that their "nature and use is highly controversial." He lists what he terms the most common theories concerning their purpose: (1) Occupational remains, (2) ceremonial or religious remains, (3) remains once associated with games, and (4) a combination of (1) and (2). As occupational debris, Hoffman believes that they represent the site of the recent conical skin lodge or a crude hogan of earlier times. In connection with a ceremonial or religious function, he speculates on their use in a "medicine getting" ritual, on the basis of statements made by a "Lacotah Sioux Indian" named Judge Zahn, of Fort Yates, S. Dak. Judge Zahn remarked that "a person would go up a hill and build a circle of rocks in which he would sit and pray and fast until he got his medicine" and added that "tipis were never held down by rocks, always staked." In this connection it would be useful to know the identity of the judge quoted and the authority for his assertions. Hoffman goes on

to cite other instances in which Kutenai, Flathead, and Upper Pend d'Oreille Indians have ventured similar information on rock-shelter fasting places. He concludes (p. 5), "These points can lead us to only one definite conclusion: the nature and use of tipi rings is highly conjectural."

Carling Malouf (personal letter dated November 7, 1953), who has a number of ideas incorporated in the Hoffman paper, believes that the rings are both domestic and ceremonial, and that they are associated with some sort of conical structure. He says that none or few of them seem to have been occupied for any length of time, since hearths and specimens are lacking. In an unpublished manuscript on Montana archeology, Malouf adds:

> Although their presence has been widely recognized very little is really known about them [tipi rings]. It is not even certain that they had any connection with the use of a tipi. Ethnographical accounts fail to give any sound information on them, hence, they must be of considerable age. Yet, archeology indicates that some of them were made in recent times.

In a recent review of Plains prehistory, Jennings (1948, p. 69) states that "too little is known of these features [tipi rings] to permit very intelligent speculation about them, so no mention of them appears elsewhere in the text." In a glossary, however, the same author admits, "These stones have been interpreted as evidence that a skin tipi had been erected at the spot, the stones having been used to hold down the edge of the tent."

Survey work in Alberta has given Wormington this view on the topic, as reported by Krieger (1956, p. 450):

> Near Neutral Hills, Mulloy and Judd were shown a number of large groups of stone rings similar to those found in Montana and Wyoming and commonly called "tipi rings." Wormington, however, doubts that they represent habitations and suggests they had ceremonial significance.

These varied opinions expressed on the function of tipi rings call for a reexamination of the evidence. It is clear that certain of these students have brought together, under the name of tipi rings, dissimilar prehistoric remains from diverse areas and attempted to assign to them identical functions.

Despite the recent increase in archeological knowledge of the Northern Plains, the question of the origin and function of stone "tipi rings" seems as far from solution as ever. This is particularly true in respect to the original purpose which these seemingly mysterious stone circles served. Modern students of Plains prehistory hesitate to assign a use to them or else waver between practical and esoteric types of utilization. Sufficient information exists in historical and ethnological records, it is believed, to reveal their function, if not their ethnic origin. The latter remains a task for the archeologist or ethnohisto-

rian. It is the theme of this study that "tipi rings," in one part of the Northern Plains, at least, represent just what their popular name suggests: rings of stone employed by former resident Indians to hold down the periphery of their skin lodges. In support of this thesis we have assembled in this paper evidence from documentary and traditional sources as well as from archeological work clarifying the significance of these stone circles.

HISTORICAL EVIDENCE

From the beginning of the 17th century, when the earliest European visitors first entered the Northern Plains, the area has been traversed by a constant stream of explorers, traders, trappers, and pioneers who provided eyewitness descriptions of the native peoples in various stages of acculturation. From some of these early visitors we obtain the first accounts of tipi rings or circles of boulders. The use of stone or other weights by the Blackfoot and their neighbors to hold down their lodges is established by a number of references in the literature, several of them by first-hand observers.

Maximilian (1906, p. 104), who saw the Blackfoot at Fort McKenzie during the summer of 1833, has left a very concise account of their method of holding down lodge covers. In this case they appear to have used blocks of sod rather than stone, possibly because of the scarcity of stone in the vicinity. He writes:

> When these tents are taken down, they leave a circle of sods, exactly as in the dwellings of the Esquimaux. They are often surrounded by fifteen or twenty dogs, which serve, not for food, but only for drawing and carrying their baggage.

The circles of earth indicating the former position of lodges were again noticed by Maximilian while at Fort Union, at the mouth of the Yellowstone, October 16, 1833. The abandoned camp was probably left by Assiniboin or Cree. He noted (1906, p. 199):

> The little prairie fox was so hungry, and, therefore, so tame, that it often visited the environs of the fort, and we found these pretty little animals among the circles of turf which were left on the removal of the Indian tents. [2]

The expedition under Henry Y. Hind exploring west of the Red River noticed, in the summer of 1858, both numerous groups of Cree hunters and former camps of that tribe. The narrative mentions (Hind, 1860, vol. 1, pp. 338–341):

> Immediately on the banks of the Qu'appelle Valley near the "Round Hill" opposite Moose Jaws Forks, are the remains of ancient encampments, where the Plains Crees, in the day of their power and pride, had erected large skin tents, and strengthened them with rings of stones placed round the base. These circular remains were twenty-five feet in diameter, with the stones or boulders

[2] Speck (1928, pp. 39, 40) photographed Sioux standing before their lodges, which appear, although the details are not too clear, to be held down by sod piled on the lower edge.

being about one foot in circumference. They wore the aspect of great antiquity, being partially covered with soil and grass. When this camp ground was occupied by the Crees, timber no doubt grew in the valley below, or on the prairie and ravines in detached groves, for their permanent camping grounds are always placed near a supply of fuel. . . .

Buffalo Pound Hill Lake, sixteen miles long, begins near Moose Jaws Forks, and on the opposite or south side of this long sheet of water, we saw eighteen tents and a large number of horses. . . . On the banks of the valley the remains of ancient encampments in the form of rings of stones to hold down the skin tents are everywhere visible, and testify to the former numbers of the Plains Cree. . . . The largest ancient encampment we saw lies near a shallow lake in the prairie about a mile from the Qu'appelle Valley. It is surrounded by a few low sandy and gravelly hills, and is quite screened from observation. It may have been a camping ground for centuries, as some circles of stone are partially covered with grass and embedded in the soil.

Bushnell (1922, p. 21) comments briefly on the origin of the circles of stones observed by the Hind party:

This is a simple explanation of small circles of stones now encountered in different parts of the country, but in other localities, where stones were not obtainable, masses of sod were used for the same purpose, and these in turn may have caused the small earth circles which are now discovered in the lower Mississippi Valley and elsewhere.

That the use of boulders to secure lodge covers was still extant by 1866 is attested to by Dr. Washington Matthews, in a discussion of the paper, "Stone Monuments in Southern Dakota," by T. H. Lewis, read at the meeting of the Anthropological Society, February 5, 1889 (Lewis, 1889, pp. 164–165):

Dr. Matthews said that . . . he could not speak for the particular circles of stones to which Mr. Lewis refers; but he was certain that many stone circles in Dakota were to be attributed to the former use of bowlders in holding down the edges of skin tents. He had seen bowlders used for this purpose in Dakota twenty-three years ago, while the Indians still followed the nomadic life. The fact that some circles were only eight feet in diameter did not militate against this theory, since the Indians used small lodges as sweat-houses and for sacerdotal purposes.

In the paper that elicited this discussion, Lewis mentioned (Lewis, 1889, p. 162):

The Indians claim that the stone circles mark the places where in former times the tepees of their people were located, and that the bowlders held down the edges of the skin tents in place.

A subsequent article on the same general subject contained this statement (Lewis, 1890, p. 274):

There can be no doubt that the Indians used bowlders and stones to hold down the edges of their tents or tepees.

Lewis also quotes an observation made by J. N. Nicollet, who "visited southern Minnesota in 1838" (Lewis, 1890, p. 272), on page 12 of his "Report Intended to Illustrate a Map of the Hydrographic

Basin of the Upper Mississippi River" (Washington, January 11, 1845) (ibid.):

One mile from the *Traverse des Sioux*, and on the bank of the river, are the remains of an Indian camp; the circular area of which is still indicated by the heaps of stones around each lodge.

While engaged in fieldwork for the Geological Survey of Canada, George M. Dawson [3] made the following note from observations in the Sweet Grass Hills in 1874 (Dawson, 1875, p. 297):

The country surrounding the Buttes [Sweet Grass Hills] is said to have been for a long time a neutral ground between various tribes of Indians. That it has been so is evidenced by the almost complete absence of the circles of stones marking camping places. The region is at present a debatable ground between the Blackfeet, Peigans and the Bloods of the west; the Sioux and the Assiniboines of the east, and the Crows and other tribes of the Upper Missouri. It is not passed through save by war parties strong in numbers and travelling rapidly. Ten miles north of the Middle Butte the bodies of over twenty Crow Indians were found unburied on the scene of a conflict.

Sir Cecil Denny, an original member of the Northwest Mounted Police and Agent of the Blood Reserve in 1881–82, came west in 1874. In an unpublished manuscript (pp. 148–149) he notes the abundant occurrence and the original purpose of tipi rings found on the prairie:

Rings of boulders or smaller stones will be found in hundreds on the prairie, and the curious will often wonder as to their origins. The stones will in most cases be covered by sod, showing that long periods of time must have elapsed since they were placed there.

Long ago, before the Indians of the plains obtained steel axes and hatchets, they were unable to cut and sharpen the stakes and to fasten down their lodges. These stones picked up on the prairie were used for this purpose, and on the tents being moved these rings of stone were left, and in the course of ages became covered with soil. Often if the inside of these rings be dug over, stone arrowheads and other stone implements will be discovered.

Upon visiting the Blackfoot and Blood tribes near Fort Macleod in the summer of 1880, John McLean became acquainted with those Indians' practice of weighting down their lodge covers with rocks. He described the custom and notes the erroneous explanation of the origin of the rings by inexperienced travelers in the region (McLean, 1896, p. 577):

Riding carelessly over the prairie with a young man who had lately arrived from the Old World, my companion called my attention to a circle of stones. "That is a mark," said he, "placed there to commemorate a great battle that was fought between different tribes of Indians." Oftentimes had I seen these circles on the prairie, and knowing the cause of their construction, I was amused at this display of apparent wisdom. These circles are to be found on our western prairies. As the Indians traveled on their hunting expeditions, they placed stones around the edges of the lodges when they camped, to prevent the wind from over-turning them, and to keep them warm. This is shown by the outer circle of stones. In

[3] I am indebted to Hugh Dempsey, Calgary, Alberta, for the Dawson and Denny references.

the centre of the lodge the fire was made, and to keep the fire from spreading and to adapt it for cooking purposes, a small circle of stones was placed which confined the fire. When the camp was moved the circles of stones were left, and that which we saw was one of the circles. . . .

In the brush fringing the rivers of the west stone circles, deeply imbedded in the soil, are found, linking the past with the present.

An eyewitness account of the use of stones by the Blackfoot to hold down lodge margins was given by John R. Barrow, a Wisconsin youth in Montana in 1880–82. The camp was that of Running Rabbit and his followers (Phillips, 1927, p. 9):[4]

The typical tepee was a conical lodge of specially tanned elkskin stretched over a framework of perhaps twenty-five skin peeled lodge-pole pine. The bottom of the tepee was held down by stones.

Schultz, who lived in Montana during the last decades of the 19th century, speaks of stone circles marking the encampments of winter hunters (Schultz, 1907, p. 63):

You have perhaps noticed on the northwestern plains, circles of stones or small boulders, varying in size from twelve to twenty and more feet in diameter. They were used to weight the lower edge of lodge skins, to prevent the structure being blown over by a hard wind, and when camp was moved they were simply rolled off the leather. Many of these circles are found miles and miles from any water, and you may have wondered how the people there encamped managed to assuage their thirst; they melted snow; their horses ate snow with the grass; buffalo chips were used for fuel. The stone circles mark the place of an encampment of winter hunters in the long ago. Some of them are so ancient that the tops of the stones are barely visible above the turf, having gradually sunk into the ground of their own weight during successive wet seasons.[5]

George Bird Grinnell talked to the older men of the Blackfoot tribes in the years immediately preceding 1890. He collected the following data on circles of stones (Grinnell, 1892, p. 198):

In ancient times, before they had knives of metal, stones were used to hold down the edges of the lodge, to keep it from being blown away. These varied in size from six inches to a foot or more in diameter. Everywhere on the prairie, one may now see circles of these stones, and, within these the smaller ones, which surrounded the fireplace. Some of them have lain so long that only the tops now project above the turf, and undoubtedly many of them are now buried out of sight.

The age of the use of stones as lodge-cover weights is indicated by the fact that it has become an intimate part of Blackfoot astronomy. Brings-Down-the-Sun, an old Blood ceremonialist, in relating the "Star Husband" tale to McClintock (1910, p. 500) pointed out that the constellation known as the Spider Lodge was thus named because of the arrangement of its stars, suggesting a tipi ring:

The half circle of stars to the east (Northern Crown) is the lodge of the Spider Man, and the five bright stars just beyond (in the constellation of Hercules) are

[4] Claude E. Schaeffer, Portland, Oreg., kindly brought this reference to my attention.

[5] In a letter dated March 25, 1954, John C. Ewers commented on this passage, "The use of stones to hold down tipis in winter could be a survival in historic times from a common (perhaps year-round) custom in the protohistoric. Undoubtably it would be quite a task to drive pegs into frozen ground in the winter season."

his five fingers, with which he spun the web, upon which So-at-sa-ki was let down from the sky. Whenever you see half-buried and overgrown circles, or clusters of stones on the plains, marking the sites of Blackfeet camps in the ancient days, when they used stones to hold down the sides of their lodges, you will know why the half-circle of the stars was called by our fathers, "The lodge of the Spider Man."

In another place (McClintock, 1910, p. 492) Brings-Down-the-Sun, in discussing the origin of the Sun Dance, pointed out:

We know not when the Sun-dance had its origin. It was long ago, when the Blackfeet used dogs for beasts of burden instead of horses; when they stretched the legs and bodies of their dogs on sticks to make them large, and when they used stones instead of wooden pegs to hold down their lodges.

During the years immediately preceding 1909, Clark Wissler recorded information on the material culture of the Blackfoot Indians. He notes (Wissler, 1910, p. 108):

During the winter, or even at any time, the cover of the tipi was often held down by stones laid on its edges. Circles of such stones are to be seen in many parts of the Blackfoot country, marking the sites of former camps or burial tipis.

Wissler (1913, p. 430) takes the following from Duvall's notes on the construction of the Ma'toki dance structure made from lodge covers, with rocks to weight down the bottoms:

The ma'toki dance but once a year when the camp circle is formed. Their ceremony lasts four days. First they make a shelter somewhat like the one used for the sun dance. A tipi pole is set up in the center, with a peculiar cross piece near the top. A number of travois are set in a circle around this pole and joined together by tipi poles tied along the top, making a single railing all the way around. Then other tipi poles are tied to this and to the cross piece on the center pole, forming rafters like in the sun dance shelter. On the sides and over the top are stretched tipi covers. At the bottom they are weighted with stones. Along the sides within blankets are suspended.

It has been noted that another neighbor of the Blackfoot, the Crow Indians to the south, used rocks to weigh down their lodge covers. During visits to the Crow Reservation during the period 1907–16, Lowie (1922, p. 224) obtained the following information concerning the practice:

Bear-Crane stated that long ago rocks instead of pegs were used to weigh down the bottom of tipi covers; another informant restricts the practice to the winter season.

There are, perhaps, other documentary references to the topic that have escaped my attention, but those cited are numerous enough, it is believed, to indicate that the Blackfoot, Cree, Crow, Dakota, and probably other tribes in the northwestern Plains employed stones or occasionally sod as lodge-cover bottom weights. Our references cover the period from 1833 down to contemporary times, when stones are rarely seen, and the wooden tent peg appears to be ubiquitous.

ETHNOLOGICAL CONSIDERATIONS

BLACKFOOT INFORMANTS

Several elderly Blackfoot Indians were questioned about tipi rings and taken into the field to locate and identify them. All of the informants were certain that they were used by their ancestors as weights to hold down lodge covers.[6] Each gave independent testimony that the rings were used in this way and additional information when asked what he knew about the practice.

My ethnographic notes on tipi rings were collected during the summer of 1953 from both Northern and Southern Piegan. Two aged North Blackfoot living near Gleichen, Alberta, interviewed during the fall of 1956, revealed that their tribe had similar customs.

Most of the data came from Southern Piegan located in and about Browning, Mont. These informants were Annie Calf Looking (age 51), Chewing Black Bones (age 87), Jim White Calf (age 89), Cecile Black Boy (age 67), and Adam White Man (age 81). One informant, Bull Head (age 84), from Brockett, Alberta, provided information on North Piegan practices. My interpreters for these Indians were Calvin Boy, Louis Bear Child, and George Bull Child. The North Blackfoot were Pete Little Light (age 78), from Gleichen, whose remarks were translated by Mrs. Rosie A Young Man, and Mrs. Duck Chief (age 92), of Cluny, Alberta, whose relative, a younger woman, served as interpreter.

Bull Head (a North Piegan from Canada) stated that people of his tribe used the rock rings:

> My father, Dog Head or Bull Head (born about 1820, died about 1900), and my grandmother, Red Painted Feet, told me this. It was my great-grandfather's generation, the people that never had the horse and used the dog for traveling, that used the rock rings. They were the people that just had dogs and had to use buffalo traps for a way of getting food.
>
> Now, both the horse and the dog people used the rocks for tipi weights. The horse people used both wooden pegs and rocks to help weigh down the lodge to protect it from the wind.
>
> The outer rocks were used as weights to hold down the tipi for protection from the wind because the tipis were right in the open. These tipi rings were called *iskiman*, "something to hold down the lodge."
>
> The inner rocks in the center of the large ring were the fire hearth. They were about two feet in diameter and used to protect the fire from spreading on the ground. The center rocks were called *áppskitan*, "confine the fire."

Chewing Black Bones testified that the early Piegan did not have tools to use in sharpening tent pegs. They were able to construct a

[6] Hugh Dempsey secured similar information during the summer of 1955 in Alberta (Dempsey, 1956, p. 177).

better-shaped lodge after they obtained tools from white traders and could make tent pegs:

I heard my grandfathers, Carries Braid and Middle Sitter, say that their ancestors, the dog-pony people, did not use pegs for their lodges. The reason was that they did not have the instruments to use in sharpening pegs then. They used rocks to hold down the lodge skin in keeping out the wind. The stone circles were known as a "wind break." When the pony came they switched to using just pegs and only rocks continued to be used in the center for the fireplace. [7] When they learned to use pegs the tipis were put up in fine shape.

Jim White Calf said that wooden tent pegs were a later innovation among the Piegan:

The first people were very poor and lacked everything. They piled rocks on the outside of the lodge cover because they had no pegs then. They did not have wooden pins to fasten the lodge together—they just tied it. Wooden pins and pegs are a new style. After they had completed piling the rocks on the outside of the lodge, they gathered more for inside in order to build a fireplace. These rocks were not placed all around, but a space was left blank at the rear. [8] I do not know the reason for this. Also, there was a space at the door of the lodge where no rocks were placed.

Cecile Black Boy contributed the following:

We were near Landslide Butte with Spotted Bear and we saw those rock rings. We asked him about them and he told us that the old-timers of our tribe used them to hold down the lodge cover.

One informant, Annie Calf Looking, was able to associate the use of tipi rings with a particular Piegan band:

My grandmother, Elk Yells in the Water Bear Chief (90 years old at her death in 1946), told me this: the Blackfoot never used pegs to hold down the lodge in the old days. They used rocks and that is why you see the rocks on the prairies today. My grandmother said that her people, the Don't Laugh band, used the rock rings.

Adam White Man, describing the method of tying the skin lodge cover to pegs, also told of anchoring the lodge to the ground against the wind by the use of logs as weights:

The old-timers always talk about the first people. The people that used the rocks were the ones that used the dogs. The only way of packing their things in those days was by dogs and their backs. The rings are all over, so all the tribes must have used them.

The rock circles found today on the Reservation were caused by people using rocks to hold down their lodge covers. Ever since the Blackfoot got the horse they pegged their tipis. When they began to use pegs they even used to tie a

[7] Ewers, in his letter of March 25, 1954, expands this information by suggesting that the true cause of the shift from rocks to wooden pegs was not the horse, but the metal ax, which was an early fur trade importation and thus was first used at about the same time that the horse was obtained by the Blackfoot.

[8] A view of the interior of Mad Wolf's lodge, photographed by McClintock (1910, p. 30) sometime after 1896, shows a boulder-lined fireplace with rocks missing from one side, supporting Jim White Calf's testimony. At the 1956 Blackfoot encampment, Cecile White Man (lodge 23) used 12 rocks placed in a U, with the gap to the west, for her fireplace. A boulder-lined fireplace similar to these, with rocks missing in the west portion, was also excavated on the Reservation (see pl. 48, *a*).

stone in a skin. The stone and the skin were then tied to the peg. They pegged their tipi but still continued to use rocks as weights. The wind was sometimes so strong that our people even put a pole or logs between the pegs and the tent to hold down the lodge.

At this point the interpreter, George Bull Child, interrupted to say that he himself had even seen rocks employed to hold down lodge covers:

I myself have seen rocks being used to hold down lodge covers. Adam can take you down on Badger Creek where his father put up his tipi and you can see his tipi ring. Old Man Running Crane had a tipi ring and it is still there. It still shows there like the others of the old stone-age people. Their rings are there, too.

Adam took me to his allotment on the north side of Badger Creek to show me his father's (White Man or Eagle Calf) tipi ring (site 24GL422, fig. 29). The circle of boulders was situated on a low terrace, about 100 yards from Adam's ranch buildings and an equal distance from the edge of the terrace bank. The ring was 16 feet in diameter and made up of stream- or glacial-rounded boulders ranging in size from 3 inches to 1 foot. One-third of the rocks were deeply embedded in the grass roots and humus. When I photographed the ring, Adam stood in what he called the doorway, a space 2½ feet wide located toward the east (see pl. 48, *b*). He also pointed out two

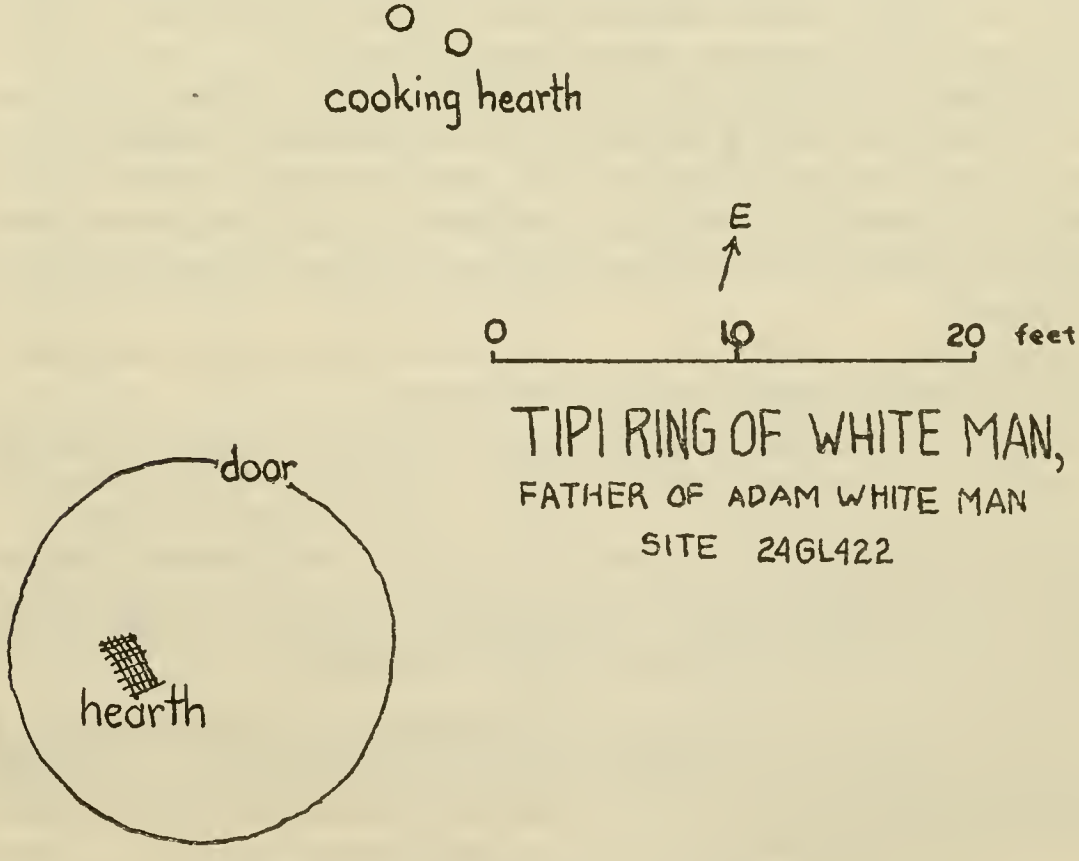

FIGURE 29.—Site 24GL422 (tipi ring of White Man).

cooking hearths. One was in the center of the tipi ring, but nearer to the west than to the east side. It was not lined with rocks and was visible only by a slight discoloration of the soil. It would have gone unnoticed if not identified to me. The other fire hearth was located 21 feet east of the tipi ring, and consisted of two large rocks about 2 feet apart. Adam said that his father's family cooked inside the lodge only during bad weather, using the outside fireplace most of the year. This, he said, was the reason for the absence of a rock-lined hearth or charcoal remains inside the tipi ring. According to Adam, this tipi ring was then 41 years old.

Next, Adam White Man located the tipi ring of Running Crane, chief of the Lone Eater band (site 24GL427). This was a circle of stones 20 feet in diameter located on a very low, wide stream terrace on the south side of Badger Creek. Adam said that Running Crane's lodge had been pitched here 60 to 75 years ago.

Later, Adam took me to the site of a Sun Dance performance held in his youth. About 1891, when Adam was 19 years old, the Canadian Cree and the Piegan gave a joint Sun Dance. There were two Piegan sacred women, Berry Woman and Hit on Top Woman, each with her own lodge. Adam said, "At the time of this Sun Dance, only the sacred women used the rocks to hold down their lodge covers in the old-fashioned way. The rest of the people used pegs." The tipi rings of these lodges are still visible one-half mile west of Highway 89, on the north side of Badger Creek.

The same informant pointed out several other tipi ring sites that he had first seen during his youth, but was unable to associate them with any particular individual. He believed that they were much too old for such identification. The stones of these rings were more deeply embedded in the ground than were the ones identified by the informant.

Bull Head was able to locate his father's tipi ring on the North Piegan Reserve because he still protected it:

> One of my father's tipi rings is still west of my place. It is like a keepsake to me and I am protecting it from cattle and whatever else might destroy it. There are other rings belonging to my father, but I am just protecting one. I remember that an uncle had a ring there, too. The cattle scattered them and there are very faint traces of them, so I cannot give you the exact number of rings. If you come to Canada, I will take you to the spot and show you the ring that I am protecting and that belonged to my father.[9]

[9] Although I was not able to visit this ring, I did see, guided by Charlie Strikes With Gun, a North Piegan from Brockett, Alberta, the tipi ring which, according to a plaque, marks the site of Chief Crowfoot's last lodge, April 1890. This ring is located a quarter of a mile east of the Blackfoot Crossing Monument near Cluny, Alberta, and is protected by a cement and pipe railing constructed around it. The ring is approximately 20 feet in diameter.

Several of the Indians were able to give information on the general location of Blackfoot camp sites during the time when tipi rings were used. Bull Head located the camps in the open, near water, and some little distance from buffalo drive sites when the people were using the drives:

The camp was located some distance from buffalo traps so the buffalo would not be disturbed. It was usually in a place where they could get water and in the open. More of these rings are found in the open.

Chewing Black Bones said, "They had to camp on hills and did not move very far—just from buffalo jump to buffalo jump." Annie Calf Looking also stated that her people camped in high places for safety and in order to observe the enemy:

The word for camp is *mámapis*. In the summer they camped on the hills or in high places so that they could look for the enemy.

Adam White Man pointed out that the camps were located in higher terrain along the streams during the late spring because of the danger of flooding:

When you see these tipi rings along the creeks and in the valley bottoms, they are the winter camps. In the spring when it floods they move up on the benches and high ground.

The interpreter, George Bull Child, interrupted here to say that there were different places to camp during certain seasons:

I heard the old people of our tribe say that our people camped in the brush of the sheltered valleys near the buffalo drives in the winter. The winter camps were in the brush and the summer camps on the flats above the streams.

The Indians were questioned concerning the size and plan of the camp, as well as about a camp circle. They all agreed that their people used a camp circle, but usually split up into smaller hunting groups in the fall. Bull Head said:

Yes, I heard that they used the camp circle but they usually did not travel in large groups. They were in search of food and that is why you find these places with rock rings—sometimes one, only two, and then sometimes five in one spot. They were small groups of people in search of food.

Annie Calf Looking said:

My grandmother told me that her people planned to meet together in the summer and had a large camp circle. In the winter there was no larger camp circle, but each band did have a small circle in the winter camp. The band broke up in the winter time after they got their meat. She also told me that her people camped more in groups after they got the horse. The chief would have his ring in the center of the camp circle. He would be the one with the most wives and would have the big tipi ring.

My husband, Paul, tells me that he saw a single tipi ring recently out on Birch Creek. It must have been a jealous man who camped out alone like that. He did not know why it was single in the old Skunk People's (his band) camp.

The informants were questioned as to the size of the tipis when their ancestors used the tipi rings. They all agreed on the fact that the tipis were not large before their people acquired the horse. Several of them said that they heard of large tipis or tipi rings with two fireplaces during "horse days"; this tipi had to be taken apart when moving. George Bull Child, the interpreter, had interesting information on the size of the precontact lodge:

> The tipis were not very large before my people got the horse. The dogs were bigger then, but they could not carry very much even though the travois made a load lighter. A certain dog would have to carry a tipi skin alone. The lodge poles would be smaller in those days, so that a dog could pull them. A big cover would be only ten skins then. Some fellows would say, "My tipi is six skins." A big chief would have ten skins. Later on, when they got the horse, eighteen to twenty skins was average. [10]

Adam White Man said that small tipi rings occurring in a camp of larger rings may have resulted from the smaller dwellings of widows, elderly people, and from children's play tipis.[11]

All the informants were asked whether or not their people ever returned to the same campground and occupied the same tipi ring. Several of them thought that it was not the usual practice for their people to return to the same ring. Bull Head agreed with this but added, "It was not the usual practice for people to come back to the same ring, but my father did return to the one I am protecting. There is no reason to believe that my father considered he owned the tipi ring that he returned to." Information contrary to this was given by Annie Calf Looking:

> Yes, my grandmother said that her people, the Don't Laugh band, would leave their rock ring and mark it.[12] No, she did not tell me where they camped but she did tell me that they marked their camp. They marked their own stone ring and they could not take another person's ring. If you wanted someone's ring, you would have to pay dearly for the spot.[13] You would have to give robes, dogs or horses if you came and wanted to take someone's ring away. There was quite a dispute when someone came and took another person's camping ground. Each person would know right where their ring was located. When a person died, their brother could take the ring, give it to someone else, or leave it blank. People kept from taking a person's ring because they were afraid of the dead.

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[10] In his letter of March 25, 1954, Ewers believes "the estimate given by this informant on the *average* size of the Blackfoot lodges in posthorse period to be excessive. My informants (independently) seemed to agree very well with Wissler that the average sized tipi was twelve to fourteen skins." (Italics mine.)

[11] A photograph confirming Adam White Man's statement was published by McClintock (1936, p. 10), in which two children are shown playing in a small tipi, the sides of which are held down by rocks. A modern example of this play tipi was photographed by the writer at the 1956 Blackfoot encampment (pls. 55, *a*; 56, *b*; 61, *a*).

[12] Cecile Black Boy claimed that the tipi ring was marked by buffalo horn cores left among the rocks of the ring.

[13] Annie Calf Looking may be here confusing ownership of the ring (as a collection of rocks) with ownership of the right to camp in a certain position in the camp circle (see, e. g., Grinnell, 1892, p. 224).

Regarding the practices of the North Blackfoot, Little Light, elderly member of that tribe, told that:

> In the dog days they just used rocks on the edge of the tipi cover, to hold it down. They didn't use pegs because they had no axes. When the white men brought axes they made pegs. In the old days they used hide liners, tied to the lodge covers, and held down with stones.

Mrs. Duck Chief, the oldest resident of the North Blackfoot Reserve, explained why rocks are not used on the modern tipi:

> Where old Indians pitch their tipis, they put the rocks around the tipi to keep it down, so when it's windy the pegs won't come out. They don't do it now-a-days; only old people with hide tipis used them, when the tipis were used often, for every day. The hides stretched more than canvas, so the rocks didn't roll off as they would from tight canvas.

In summary, the statements of all the informants bear out that tipi rings represent just what their name suggests: rings of stones employed by earlier Indian residents to hold down the sides of their skin tents. At least one of the early white observers, as well as several elderly Indians still living on the reservations of Montana and Alberta, actually witnessed these tipi rings in use in a Blackfoot camp. (The Museum of the Plains Indian has in its files a photograph, taken in 1910, showing Tom Horn, a Blackfoot, standing before his tipi, the Otter Lodge, with his wife, Different-Kind-of-a-Gun-Woman, and their children. The bottom of the cover, although pegged, is weighted with rocks, several of which have been made heavier by logs placed over them (pl. 61, *b*)). It was possible to identify a few rings in the field, but most of them were claimed to be too old for such knowledge to be retained by the informants.

Every informant was certain that tipi rings resulted from the use of rocks to hold down skin lodge covers, and that they were needed as weights to prevent the lodge from being overturned by the strong winds, as well as to keep it warm by fixing the cover close to the ground. When found inside a tipi ring, a smaller ring was the result of rocks having been used to confine a fire, but such was not the inevitable practice, for cooking was sometimes done outside during good weather. A third cause of rock rings was the practice of weighting down the inner liner with stones;[14] however, Mrs. Duck Chief remarked that filled parfleches were also employed for this purpose.

The informants testified to the use of tipi rings both during protohistoric times before the acquisition of the horse, and during historic times. All agreed that the protohistoric tipi was small, and that the tipi became exceedingly large after the horse was obtained. They thought that transportation problems had a direct bearing on the size of the lodge, as did the practice of polygyny. Tipis at one time

[14] A tipi liner held down by stones was photographed at the 1956 Blackfoot encampment (pl. 57, *a*).

were often so large that two fireplaces were needed inside, and the covers had to be split in two parts upon moving.

The Indians had heard that the earlier Blackfoot, when hunting buffalo, located their camps near the jumps but not so close as to disturb the animals. Many times the camps were placed in the open, on high places or hills, yet near water. One informant said that this was customary in order to observe the enemy, while another believed that it was to escape spring floods. In the winter, camps were located in the sheltered valley floors; it was in summer that they would be pitched on the flats above.

The informants all believed that the size and plan of the camp depended upon the annual subsistence cycle and the ceremonial observances during the summer. Small tipi rings in a camp of larger rings were probably the lodges of widows or elderly persons, or children's play tents.

There was a division of opinion among informants on whether or not the earlier members of their tribe returned to the same tipi rings in the process of migration during the annual subsistence cycle.

INFORMANTS OF OTHER TRIBES

In addition to elderly Blackfoot informants, members of other tribes were questioned when they came to Browning on visits or for celebrations.

Dave Frenchman and Edward L. Martell, from the Cree Reserve (Moosemen Reserve), Saskatchewan, 22 miles north of North Battleford, had been told by the old people of their tribe that the stones of tipi rings were used to hold down the edges of lodge covers. Sometimes there would be a large ring in the middle of the camp circle, and this would be the location of the chief's tipi, that is, of the best warrior and the leader of the tribe. These informants had never heard of a hearth in the center of a tipi ring.

Ethel Potter (age 50), an Arapaho from the Wind River Reservation, Wyo., said that her father, Mike Goggles (age 74), had shown her a place where rock rings were located, as they were traveling through the mountains, and had told her that they had been used by the people of his tribe to hold down the skin covers of lodges. She had not heard of these circles of stones in connection with ritualistic practices and knew nothing of "medicine wheels."

(Sister M. Inez Hilger (1952, p. 93), in a study of Arapaho child life and the milieu in which these children lived, discovered that when signs of a hard winter or an approaching storm were noticed, "The old men would tell their wives to weight down the edges of the tipis

with plenty of rocks to keep the tipi covers down and thereby the cold out.")[15]

An employee of the Blackfeet Agency Headquarters in Browning, Mont., Stanley Pugh, an Oglala Sioux from the Pine Ridge Reservation in southern South Dakota, repeated what his grandmother, Alice Palliday (now deceased), had told him of the origin of tipi rings:

> My grandmother told me that in winter time they would cut fine willows and straw or marsh grass. They would place it between the pegged skin cover and the ground in order to keep the lodge warm. Rocks were placed on top of the lodge cover in order to keep the willows and straw from blowing away. The rocks used were of a size easily carried by a woman. After the tipi was taken down the rocks were left remaining as tipi rings. I have many times seen tipi rings in that country. Charcoal and scattered cooking stones remained, showing where fire hearths had been in the center of the ring.

(George E. Hyde (Will, 1924, p. 294, footnote 2) speaks of a similar practice of making large bundles of long grass, to pile up around the lodge for warmth in winter, in the traditions of the Cheyenne, who when they moved west into the short-grass country substituted sod for the grass bundles.)

Ambrose Rider (age 47), a Gros Ventre of Fort Belknap, stated that old people of his tribe claimed that tipi rings were made by "Ute" peoples who once roamed that area (there is probably confusion on the part of this Indian between the Ute and the related Shoshoni tribe). He further said that there are a large number of tipi rings in the Fort Belknap area, and that some of them occur on high places. Large, about 20 to 25 feet in diameter, the rings do not appear in camp circles, but are scattered.

ARCHEOLOGICAL CONSIDERATIONS

INTRODUCTION

The area in which the archeological investigations took place was the modern Blackfeet Indian Reservation, located in north-central Montana immediately east of the Rocky Mountains. Its boundaries are formed by, on the north, the forty-ninth parallel (the Canadian border); on the south, Birch Creek (lat. 48°10′); on the east, the Cut Bank meridian (long. 112°10′); and, on the west, Glacier National Park (long. 113°40′). This encompasses an area approximately 50 miles on each side, containing 2,384 square miles, slightly larger than the State of Delaware. Of this, only 230 square miles, or one-tenth, had been broken by the plow at the time of these investigations (1953). However, this figure does not include the irrigation ditches, dams, roads, and other activities, such as the building of rock shrines by sheepherders, that destroy tipi rings. Nevertheless, the proportion

[15] I am indebted to W. S. Campbell of Norman, Okla., for bringing this reference to my attention.

of disturbed land is considerably less on the Reservation than on most of the rest of the northern Great Plains, or of the State of Montana.

Because this area represents one of the last regions in which many of the aboriginal aspects of the Great Plains may still be observed, being relatively unaffected by farming, and in which many of the older inhabitants retain a first-hand knowledge of native Indian customs, it is a critical area for anthropological study.

ENVIRONMENTAL FACTORS

The environmental setting is of importance in interpreting the archeological sites of the Blackfeet Reservation. It was a major factor determining the manner in which the early inhabitants of the region lived, whether they must be nomadic, and what materials were available to fulfill the needs which their culture stimulated.

The geology of the Reservation (Alden, 1912) is complex, and has given considerable variety to the topography. Much of its character is due to glaciation: the terminal moraine of the Keewatin ice sheet can be seen lying across the eastern portion of the Reservation, and the piedmont glaciers, remnants of which still flow in Glacier National Park, sculptured the western edge. In addition, stream erosion further modified the pre-Pleistocene "Blackfoot Peneplain," the ancient level of which is marked by buttes and ridges rising several hundred feet above the present rolling plain. (The edges of these eminences, dropping steeply and abruptly, were utilized by the Indians for bison drives; beneath many of them the depth of the bison bones testifies to their effectiveness in slaughter.) The rock of these ridges is Cretaceous sandstone and shale.

The mountains of the Lewis Front Range of the Rockies form Glacier National Park. From them issue numerous streams, running north, east, or south from the Hudson Bay and Continental Divides in the Park. These streams are now found both in deep gorges and in broad flat valleys, sometimes with gravel-capped terraces. The surface appears as a treeless plain, gently rolling in the east, and becoming hilly as it approaches the mountains in the west. The stream valleys are abruptly encountered in this plain; only in them and in the foothills on the western margin of the Reservation do trees grow (cottonwoods in the former, aspen and pine in the latter).

As the topography influenced the inhabitants of the Reservation in selecting dwelling sites, so the climate determined to a large degree which topographic settings were chosen for the different seasons. Climate is one of the most important factors to consider in deciding

whether or not rocks would be necessary to anchor skin lodge covers.[16]

The area about the Blackfeet Indian Reservation is, as a whole, characterized by fairly warm summers with abundant sunshine, winters that are cold and dry, and considerable windiness throughout the year. Throughout 1952, the average wind velocity at the closest weather station, Great Falls, was 13 miles per hour, with the prevailing direction southwest. Seasonal variations ranged from a low of 10 miles per hour for August to a high of 18.3 miles per hour for January.[17] However, as Smith (1925, p. 413) has pointed out, "Averages do not tell the whole story. Averages rarely happen. The freaks of the season decide man's chances." The greatest wind velocity in 1952 at Great Falls was 66 miles per hour, in July. Over an 8-year period from 1945 to 1952, there were extremes of 65 to 73 miles per hour nearly every year, with a prevailing southwest direction; every month of the year showed a development of extreme winds. On the eastern edge of the Blackfeet Reservation, at Cut Bank, gusts of slightly over 100 miles per hour were recorded more than once.

When the spring floods forced the Indians out of the sheltered stream valleys where they were wintering, the wind on the open uplands would be so strong as to necessitate the use of rocks for tent weights, for with such gusts it would not otherwise be possible to hold down a skin lodge cover.

This mountainous region, then, around the headwaters of the Missouri River on the western margin of the High Plains, was the habitat of comparatively many tribes, offering them plentiful game and, though the winters are severe, providing shelter against the climate in the numerous valleys.

ETHNOLOGICAL BACKGROUND

The history of the region of the Blackfeet Reservation is important in understanding the archeological material found on it, as well as in relating it to historical and ethnographic considerations.

In the area of the Reservation, a number of different tribes representing various linguistic stocks, cultural traditions, and with diverse geographic connections were to be found at different periods. In early and middle prehistoric times, no doubt, nomadic tribes, some subsisting chiefly by hunting and others by both hunting and gathering, occupied the region. Excavations at two sites on the Reservation have produced points and artifacts reminiscent of types found at

[16] Mae Williamson, a prominent middle-aged Blackfoot (president of the Blackfeet Arts and Crafts Association), reports that in her girlhood she asked the old people of her tribe why the tipi rings are often located in what she would consider a poor camping spot, and that they replied, "You young people are too particular about where you camp. We would camp wherever we had to, many times. We might have had to make camp when we were caught in a blizzard, and that is why you see those tipi rings in places that would not normally be used for camping, if we had a better place."

[17] Data summarized from the U. S. Weather Bureau's tables for Great Falls, Mont., in 1952.

early Middle Period sites in the Plains: at the Billy Big Spring site, one McKean and several Hanna type points (the former dated by radiocarbon at 3445 ± 120 years before present at Signal Butte) were discovered with geological implications that suggest considerable antiquity (Kehoe, 1955, p. 2).

It seems likely that some of these early groups may have been Athapaskan bands, or perhaps affiliated with these. They may, as Gordon Hewes (1948, p. 7) suggests, have lingered on in the region in late prehistoric times. (For the purposes of this paper, the protohistoric is assumed to have begun with the introduction of white trade goods about 1728 (Lewis, 1942, p. 16) and the historic period with Thompson's exploration in 1800 (Ewers, 1944, p. 20)). The close of the prehistoric saw the Shoshoni occupying the territory of the present Reservation, and ranging far north on the Plains into Saskatchewan, where the Blackfoot were encountered in the Eagle Hills; horses obtained from Spanish colonies in New Mexico via the Comanche gave the Shoshoni this mobility soon after 1705 (Ewers, 1955, p. 6).

Close to the Shoshoni, in this period, were the Kiowa and Kiowa-Apache, according to their traditions at the headwaters of the Yellowstone and Missouri Rivers. Mooney considered the Kiowa-Apache an Athapaskan group coming to join the Kiowa from the north, possibly through the region of the Blackfeet Reservation (Hewes, 1948, p. 7).

Before the southward movement of the Blackfoot in the late 18th and early 19th centuries, the Kutenai and two Salishan tribes, the Flathead and the Pend d'Oreille, hunted in the territory of the present Reservation, in conjunction with the powerful Shoshoni, from whom they obtained horses, but it has not been determined whether they ventured from the mountains before they had acquired the horse (Ewers, 1949, p. 356).

About the middle of the 18th century the Blackfoot began migrating south from the Eagle Hills of southern Saskatchewan. By 1800 these mounted warriors, equipped with firearms, had become masters of the vast territory between the North Saskatchewan River and the headwaters of the Missouri, stretching east from the Rockies about 10 degrees of longitude (Swanton, 1952, p. 396). The Piegan, southernmost of the Blackfoot tribes, have thus occupied the area of their Montana reservation for over a century and a half.

ARCHEOLOGICAL FIELDWORK

A preliminary survey of tipi-ring sites was undertaken in October of 1952, after regular excavation projects were completed. At this time, 23 sites were examined before severe weather set in. During the fall of 1953, a further survey was undertaken to examine reported sites and to locate others. In these two seasons a total of 210 tipi-ring

sites were discovered within the limits of and in the various portions of the Blackfeet Reservation, comprising well over 1,000 individual tipi rings. Subsequent travel over the Reservation has brought to notice at least 150 additional tipi rings, but they have not been closely examined; this study is confined to the intensive survey of 1952–53.

Since it was not possible to fully test the majority of these sites, this report is preliminary in nature and will include only summary descriptions and brief comparisons of the data collected. Furthermore, the significance of the data in its fullest implications cannot be extracted from the evidence at this time: only by much future archeological fieldwork and extensive comparisons both with sites in other localities and with ethnographic materials can these Reservation sites be defined culturally and chronologically.

Proportion of tipi rings to other sites.—The 210 surveyed tipi-ring sites comprise 72 percent of the total number of archeological sites found on the Blackfeet Reservation through 1953. This figure compares with the 22 tipi-ring sites forming 42 percent of the total number of sites reported by Bliss (1949, p. 10) at the Tiber Reservoir on the Marias River, southeast of Shelby, Mont. Bliss' work at other reservoir sites indicates that six tipi-ring sites, forming 19 percent of the total surveyed, were found at the Canyon Ferry reservoir on the Missouri River near Helena, Mont.; only six tipi-ring sites, or 14 percent, at the Glendo Reservoir in southeastern Wyoming; nine tipi-ring sites (12 percent) at the Boysen Reservoir in Wyoming; and none in the Oregon Basin, 8 miles southeast of Cody, Wyo. (Bliss, 1949, pp. 8–10). These surveys indicate that the region of the Blackfeet Reservation may possibly represent a cultural hearth for tipi-ring sites.

Location of tipi-ring sites.—Tipi rings were found in nearly all parts of the Reservation, although an intensive survey was not made of every locality. The rings occur at elevations of from 3,500 to 5,000 feet above sea level, in both valley bottoms and as much as 600 feet above the valleys on the intervening flat-topped ridges.

Going to the east, the first occurrence of tipi rings is 4 to 6 miles from the front range of mountains, and about 3 to 5 miles from the massive ridges bordering the principal valleys heading in the range. At this point, the rings are placed on the elevated pediments and elongated ridges extending from the mountains, on the abrupt edges of the flat-topped ridges, and in the river bottoms or on the terraces of varying heights. Continuing east, the elevated pediments give way to buttelike eminences; the tipi-ring sites are found along the escarpment edges and on the fingers of these buttes, and on the more gradual marginal slopes (see pl. 49, *a*), as well as, still, on the stream terraces and in the valley bottoms.

All the local topographic settings on the Reservation favorable to camping reveal tipi rings, both large and small. However, the rings occurring on elevated areas seem to average smaller in size than those found in low situations, suggesting a possible correlation between the size of a ring and its topographic setting. Withers (1950, p. 11) notes a similar observance in Colorado:

> We also saw sites of the stone circle type. Following a suggestion I got from Bliss, I think we can probably work out two occupations from the stone circle sites, one with fairly small circles located on the bluffs above the river bottoms, and one represented by the larger circles found consistently on the valley floors.

This difference would be difficult to explain, other than by either supposing a preference for smaller tipis on the higher locations (owing perhaps to the force of the winds there), or by postulating different cultural occupations, as Withers suggests, during one of which, possibly, a climatic change flooded the bottoms (detailed geological studies have not been reported on the paleoclimatology of the Reservation, which, because of its proximity to the glaciers of Glacier National Park, undoubtedly experienced many unique local variations in climate).

Camp plans.—There may also be a relationship between the camp plan and the topographic setting, caused by seasonal subsistence cycles and ceremonial observances. However, although there were different tent arrangements in the larger tipi-ring sites, and several vaguely defined camp patterns were worked out, a definite correlation between plan and setting has not yet been determined.

When three rings were present, they were either in a single row or forming a triangle. In clusters of four or more rings, they were arranged in single lines, double alternating lines, V, semicircle, or circle. But in many cases the group of tipi rings was haphazardly arranged or scattered—either it was impossible for the writer to pick out the camp plan or there had been no intended arrangement in these cases.

Although immediate topographic features, as well as the number of lodges in the group, would to some extent determine tent arrangement, some choice was possible on camp plan. The following table gives the number of sites and of tipi rings for each of the several camping arrangements:

TABLE 1.—*Camp plan or pattern*

Plan	Number of sites	Number of rings
A. Single isolated ring	63	63
B. Two rings	24	48
C. Three-ring triangle	5	15
D. Single row	16	110
E. Double alternating row	3	199
F. V arrangement	1	31
G. Semicircle	4	38
H. Circle	5	112
I. Haphazard or scattered	16	134
Total	137	750

In most of the 137 tipi-ring sites closely examined on the Reservation, the rings were single isolated rings, in small groups of two or three, or in clusters of from 4 to 55 rings. One site, however, contained 170 individual tipi rings placed in a double alternating line extending for 4½ miles along an escarpment. The rings were usually 5 to 50 feet apart and the same distance from the abrupt edge of the flat ridge. Since they overlooked Trail Coulee, they may possibly have been connected with the Old Whoop-up Trail.

All these arrangements except the triangle (C) occur in all the different local topographic settings on the Reservation. The sites containing only three rings are found on flat-topped ridges, including their edges, in saddles between hills, and on escarpment fingers.

Those occurring as isolated single tipi rings ranged from 12 to 24 feet in diameter and averaged 17.3 feet. At the sites containing two rings only, the tipi rings were between 7.5 and 25 feet in diameter, averaging 15.9 feet. Three rings in one site varied from 10 to 27 feet in diameter, and also averaged 15.9 feet; a total of 12 sites contained only three rings. In the 38 sites in which the tipi rings are found in clusters of from 4 to 170, the rings ranged in size from 10 to 29 feet in diameter. The complete range of diameters of tipi rings on the Blackfeet Reservation is thus between 7.5 and 29 feet, and the average for a sample of 108 sites was 15.8 feet. It can be seen that the size of the tipi rings, though somewhat variable, is circumscribed within narrow limits; and both the range and the average correlate very well with the sizes of conical lodges used as dwellings by the tribes of historic times.

Shape of tipi rings.—No eccentric forms of tipi rings were found—just circles such as would result from rocks used to hold down lodge covers. No tipi rings found suggested a ceremonial use. Neither partial nor overlapping rings were observed, indicating that the people may have returned to the same rings, or at least would not disturb an older ring to use the rocks in erecting a new lodge.

The late H. P. Lewis, in an unpublished manuscript on buffalo kills in Montana, briefly discussed the tipi rings he discovered in north-central Montana, and came to the same conclusion, that even though rocks may have been scarce, the rings were not re-used for another tipi. He states, "Strangely enough I cannot remember ever seeing such rings appearing as though they had been disturbed, or worked over, or any part of the circle lacking" (Lewis, MS., chap. X, p. 27).

Depth of rocks.—There seems to be a correlation between the size of a ring and the depth to which the stones are embedded in the ground. Depth below surface was recorded in 65 sites containing a total of 391 tipi rings, and in this large sample the size of the tipi

rings seems to diminish in proportion to the depth to which the stones are embedded. However, in comparing individual sites or rings, the depth of the embedded rocks would be a poor criterion for chronological classification or dating, for conditions such as erosion, deposition, frost action, and cultural variations in lodge sizes, reflecting occupants' status or similar factors, would affect each site differently. Table 2 summarizes the data on sites and depth:

TABLE 2.—*Rock depth and tipi-ring size*

Proportion below surface	Average size (feet)	Number of sites	Number of rings
One-quarter	18.3	4	58
One-half	17.2	22	100
Three-quarters	16.7	32	165
Nearly below	14.6	7	68
Total		65	391

A further relationship can be noted from table 2, between the number of tipi-ring sites and the depth of the embedded rocks. Eighty-three percent of the sites in the sample had rocks one-half to three-quarters embedded in the ground; comparison with the number of sites in which rocks are nearly below the surface is invalid, because of the difficulty of discovering these sites, but the presumably more recent sites, with rocks near the surface, are readily observable. There thus appears to be an increase in the number of sites and of tipi rings with an increase in the depth of the rocks of the rings below the surface. It may be supposed that the rings in which the rocks largely uncovered by sod are found postdate the period in which the Blackfoot lived exclusively in tipis, and they may therefore have been built only for the annual summer ceremonies.

Door gaps.—Very few of the tipi rings have an area in which rocks are absent, presumably the gap left at the lodge door, where rocks were not needed to hold down the cover. In only 11 of the 85 sites closely investigated in this regard did door gaps, ranging from 2.5 to 8 feet across and averaging 4.8 feet, occur.[18] A total of 14 individual tipi rings had door gaps. The rings with door gaps varied from 13 to 19 feet in diameter and averaged 15.8 feet. In all cases except two, the door gap faced approximately east; in one it faced northeast and in the other, south. One site of six rings 12 to 13 feet in diameter contained in it three rings with door gaps, all facing east.

[18] Many lodges did not have a door extending to the ground, but only a narrow hole about 1 foot above it. The cover would have to be held down under this opening, but, since there was usually no interior lining at this point to be also secured, there would be fewer rocks in the ring here. However, Mae Williamson (see footnote 16) stated that she was told that in cold weather the gap at the door might be lined with a robe, or a second hide door might be constructed, or the door itself might be pulled down and inside under the tipi edge, all of these contrivances necessitating rocks as weights; at the least, parfleches could be placed against the unlined, drafty door bottom, and even these might require rock weights. Allowing for these practices, the absence of a door gap so often noted in tipi rings is not surprising.

Quantity of rocks.—Although there was variation in the quantity of rock material used in tipi rings, it always seemed in proportion to that needed in weighting down a lodge cover. Thus, when smaller rocks had been employed, a greater number appears to have been used, as would have been required.

In many cases, clusters of tipi rings of large diameter seem to contain fewer rocks. It may be that pegs were used to supplement rocks (see pl. 61, *b*) during the period when these larger rings were used.

Rock type.—The unique array of rock exposures and glacial drift gave to the Indians of the Blackfeet Reservation area a wealth of raw materials for lodge-cover weights. In the great majority of the sites (206), glacial drift or stream boulders make up the rock rings. This material ranges in size from cobbles 3 inches in diameter to boulders 1½ feet long and about 6 inches to 1 foot in diameter. The stones may be partially rounded, but are mostly subangular, with some faceted and striated. The preponderance of mostly subangular rocks can be explained partly by the natural profusion of these rocks and partly by a preference for rocks that would not roll. The material seems to be wholly derived from the mountains and heterogeneously mixed; it was principally quartzite (white, yellowish, banded pink, and red), with pebbles of maroon argillite and of diorite. In most cases it was not necessary for the rocks to be carried more than a few feet; they could be carried by women.

Four sites had rings composed of sandstone and conglomerate slabs from nearby outcrops. The tipi rings were 15 to 18 feet in diameter, but the slabs were much larger than the usual rocks—from 10 inches to 1½ feet in diameter. However, the only difference between these rings and the more common ones of boulders was that, because of the larger size and more angular shape of the slabs, fewer were needed. These four sites were located on the edge and the marginal slopes of flat-topped ridges, close to the Cretaceous rock exposures.

These rock types represent the use of available materials, as in the unglaciated prairies to the east, where turf or sod was used to hold down the lodge covers (Bushnell, 1922, p. 28, quoting Maximilian; Will, 1924, p. 293).

Rock concentrations in center.—Only 23 of the 144 sites on the Reservation closely examined for this feature revealed definite clusters of stones in the center of the rock rings. These are presumed to be former fire hearths. No site was noted in which all the rings in the site had definite center rock clusters. Usually there were one or two such rock clusters in a site of from 3 to 50 tipi rings.

These clusters of stones were between 1 to 4 feet in diameter. Many times they were haphazardly arranged, sometimes appearing

to result from putting the fire out by throwing stones on it. These hearthstones occasionally are discolored by fire, but are seldom fragmented, suggesting rather temporary use. Most commonly, these rocks are smaller than those of the outside ring, and therefore it is possible that, in a deeply embedded ring, they are nearly or entirely below the ground surface. When only a few of the tips of the rocks are visible above the surface, they have the appearance of stones naturally scattered on the ground, though in a good many cases, they very probably had had some connection with a fire hearth.

Outside fire hearths.—In five sites, outside fire hearth remains were noted. Adam White Man has stated that his people would cook inside the tipi only during bad weather, and pointed out the outside fireplace belonging to his father's tipi ring (see p. 432).[19]

Inside fire hearths.—Six tipi rings, in six different sites, had definite rock-ring fire hearths. These hearths contained six to eight rocks each. Since so few fire hearths occur, it seems probable that cooking was done outside in many cases, as suggested in the paragraph above. A report on the excavated hearths follows.

Excavations.—Because of the nature of tipi-ring sites, which must be on or very near the surface to be visible, and because both archeologists and reputable collectors[20] have reported that occupational remains are rarely found in excavations of rings, it was decided that excavation would be a relatively minor aid in the solution of the problem of the origin and use of tipi rings, and therefore this activity

[19] At the 1956 Blackfoot encampment, the occupants of Lodge 1 constructed a hearth 6 feet southeast of their tipi, on which tin cans, bottles, etc. give evidence of cooking. The placement of this outside hearth concurs with a description of such cooking hearths obtained by Mae Williamson (see footnote 16), during her girlhood from older Blackfoot. McClintock (1910, pp. 226–227) also mentions and pictures an outside cooking hearth.

[20] Mr. Carle Leavitt, Conrad, Mont., an amateur collector who is both a serious student and a conscientious observer, excavated a tipi ring several years ago. The ring was located on Leavitt's own property, 20 miles northeast of Conrad, and was about 12 feet in diameter. A fire hearth in the center gave evidence of burning and was surrounded by bone fragments. Although the entire ring was excavated to the original ground level 2.5 inches below the surface, most of the interior of the ring was found to be empty. However, besides the material in the center, the area 1.5 to 2 feet inside the rock circle contained numerous bone fragments and one arrowpoint, with three (side- and basal-) notches, which in Leavitt's experience is unique in this region, except for one other found in a bison kill west of Kevin, Mont. Leavitt recalls that "the point was neither obsidian nor agate—some kind of flint."

S. Victor Day, of Sunburst, Mont., another reputable collector, reports having found worked flakes of petrified wood and moss agate in tipi rings: "I'll show you dozens of places at the tipi rings on my place where they dropped their rejected pieces." In addition, he discovered a full-grooved stone maul "leaning against the inside edge of a rock ring," and several arrowpoints both inside and just outside rings.

The Museum of the Plains Indian has in its collection two stone mauls, both full-grooved, found associated with tipi rings: M. P. I. Nos. 63L and 917L. The first is a stream-rounded boulder 15.1 × 11.7 × 6.8 cm., with a pecked groove 2 to 2.5 cm. wide encircling the center. One end shows considerable use. This maul was found by Richard Sanderville, a leading Blackfoot often relied upon as an interpreter, on Two Medicine Creek "near old tipi rings." No. 917L is a pecked maul triangular in cross section, 15.1 × 8.2 × 8.2 cm., with a pecked groove 2 to 2.5 cm. wide extending around it 4 cm. from the base, which shows evidence of considerable use and tapers to a rounded point also exhibiting the marks of use. This maul was found by L. F. Tenney of Kevin, Mont., on the Milk River Ridge 10 miles west of Warner, Alberta; it was associated with tipi rings and possibly with a bison drive site, and there was a good spring nearby.

was not expanded beyond the complete excavation of one ring and the testing of several others.

It is pertinent to the problem of tipi rings that the nomadic peoples presumably using them possessed very few imperishable material belongings, occupied camps for only short periods, and, since they carried always little more than the bare essentials for living, were able to abandon very little in moving. Ewers (1955, pp. 130–131) states, "Experience made the Blackfoot efficient in packing their belongings quickly in the morning camp was to move. . . . Each family was responsible for its own belongings. Every article had its assigned place and means of transportation." These factors make it improbable that the excavation of tipi rings will reveal much of value in solving the problem of the rings.

Site 24GL390.—This site consists of three tipi rings, averaging 17.3 feet in diameter, situated on a long, flat escarpment finger parallel to and above the north bank of Greasewood Creek. About one-fourth of a mile southeast of Sharps Lake, it is nearly centrally located on the Reservation. The area of occupation is 700 feet, east to west.

Ring 1 (refer to fig. 30) measures 15 feet north-south and 17 feet east-west. The circle of rocks is 1 foot wide with its scattered rocks 6 to 8 inches in diameter. Three-quarters of each rock is embedded in the ground, leaving approximately 2 inches protruding above the surface. There seem to be more rocks on the north side of the ring, and they are more distinct. Since the ring is located on a very slight slope. there may have been more deposition on the south side, covering that part of the ring to a greater extent. One rock is embedded in the interior of the ring 6 feet from the west side. The pattern of a 5-foot section of the ring is seen in figure 30.

Ring 2 is 16 feet in diameter. As in Ring 1, the circle of rocks is 1 foot wide and the stones range from 6 to 8 inches in diameter, being three-quarters embedded in the ground, with about 2 inches protruding. On the east side of this ring a gap of 8 feet in which no rocks occur is present; presumably this marks the doorway to the lodge.

In ring 2, slightly off center (6 feet from the east side, 8 feet from the west, and midway between the north and south sides of the ring), could be seen a rock-ring fire hearth. The hearth was 2 feet in diameter, and its rocks range from 3 to 6 inches in diameter, considerably smaller than those of the tipi ring proper. Excavation of this rock-ring hearth disclosed only five small charcoal particles the size of a pinhead. These fragments were embedded near the base of the rocks, and probably were the last remnants of the charcoal which had been almost all blown out. A gap to the west of the fire ring gave it a U

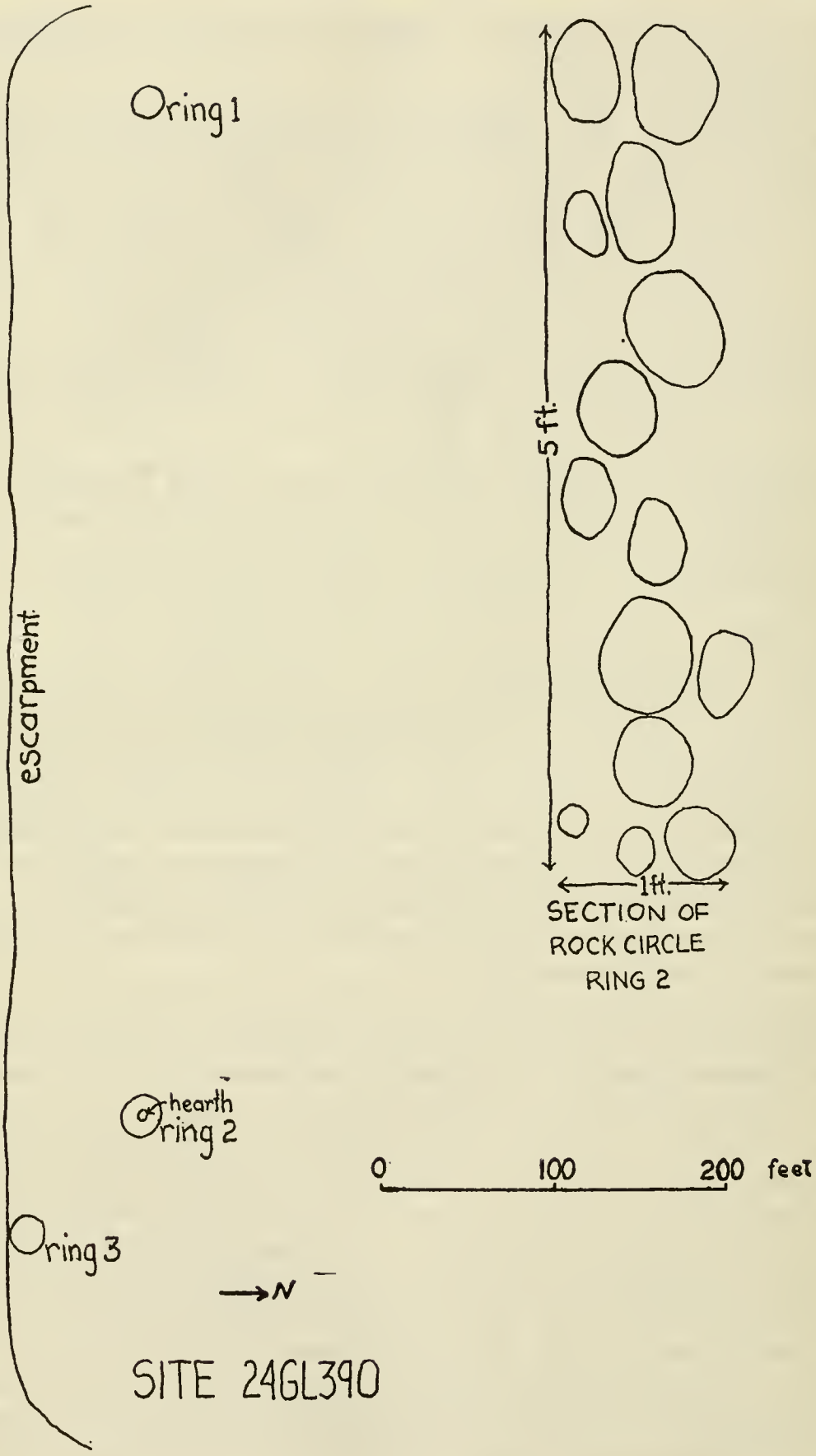


FIGURE 30.—Site 24GL390.

shape. On this point, it can be noted that this occurrence tallies with information given by Jim White Calf, an elderly Blackfoot, previous to the excavation:

> After they completed placing the rocks on the outside to hold down the lodge cover, they gathered more for the inside to build the fireplace. These rocks are not placed all around, but a space is left blank at the rear or toward the back of the lodge. I do not know the reason for this.

It will be remembered that the "back of the lodge" was to the west, since the door always faces east.

Ring 3 is 19.4 feet north-south and 21 feet east-west. The circle of rock is spread over an area 1 to 1.5 feet wide, but the individual rocks still range from 6 to 8 inches in diameter and again are embedded approximately three-quarters deep with 2 inches above the ground surface. These rocks, like those of the first two rings, are glacial boulders of pink quartzite and sandstone. The greatest concentration of rocks is on the northeast side of the ring, but since it is on a slight slope, greater deposition on the southwest side may have led to this impression. There are no rocks inside the ring, and no evidence of a fire.

Site 24GL490.—Two tipi rings, one 11 feet in diameter and the other 17 feet, comprise this site on the edge of the escarpment forming the south side of Milk River Ridge, in the northwest portion of the Reservation. A fire hearth (pl. 49, *b*) occurs in the smaller ring, and was briefly tested, yielding a handful of charcoal, unworked fragments of both burnt and unburnt bone, and four unworked obsidian flakes, 1.2 cm., 1 cm., 0.7 cm., and 0.5 cm. (Obsidian is not known to occur naturally on the Reservation.)

Site 24GL584.—On the north shore of Spring Lake (the middle Mission Lake), in the eastern half of the Reservation, is an area seven-tenths of a mile long and 50 to 100 yards wide, containing approximately 100 tipi rings. These overlook the lake. At the writer's suggestion, Phyllis Jay, then assistant curator at the Museum of the Plains Indian, and her husband, Edward Jay, a trained archeologist, measured several of the tipi rings and excavated one hearth, which is diagrammed in figure 31. Five of the tipi rings were, respectively, 16, 16.7, 16.7, 18, and 19 feet in diameter.

The fireplace of ring 5 was excavated. In it charcoal was discovered at approximately 3 inches below the surface. Although no artifacts were found, the structure of the fireplace was very distinct: it was composed of nine rocks arranged in a U shape roughly in the center of the tipi ring. The nearest neighboring ring was about 15 feet to the west.

Site 24GL486.—The south slope of Milk River Ridge, in the northwest portion of the Reservation, is dissected by intermittent streams,

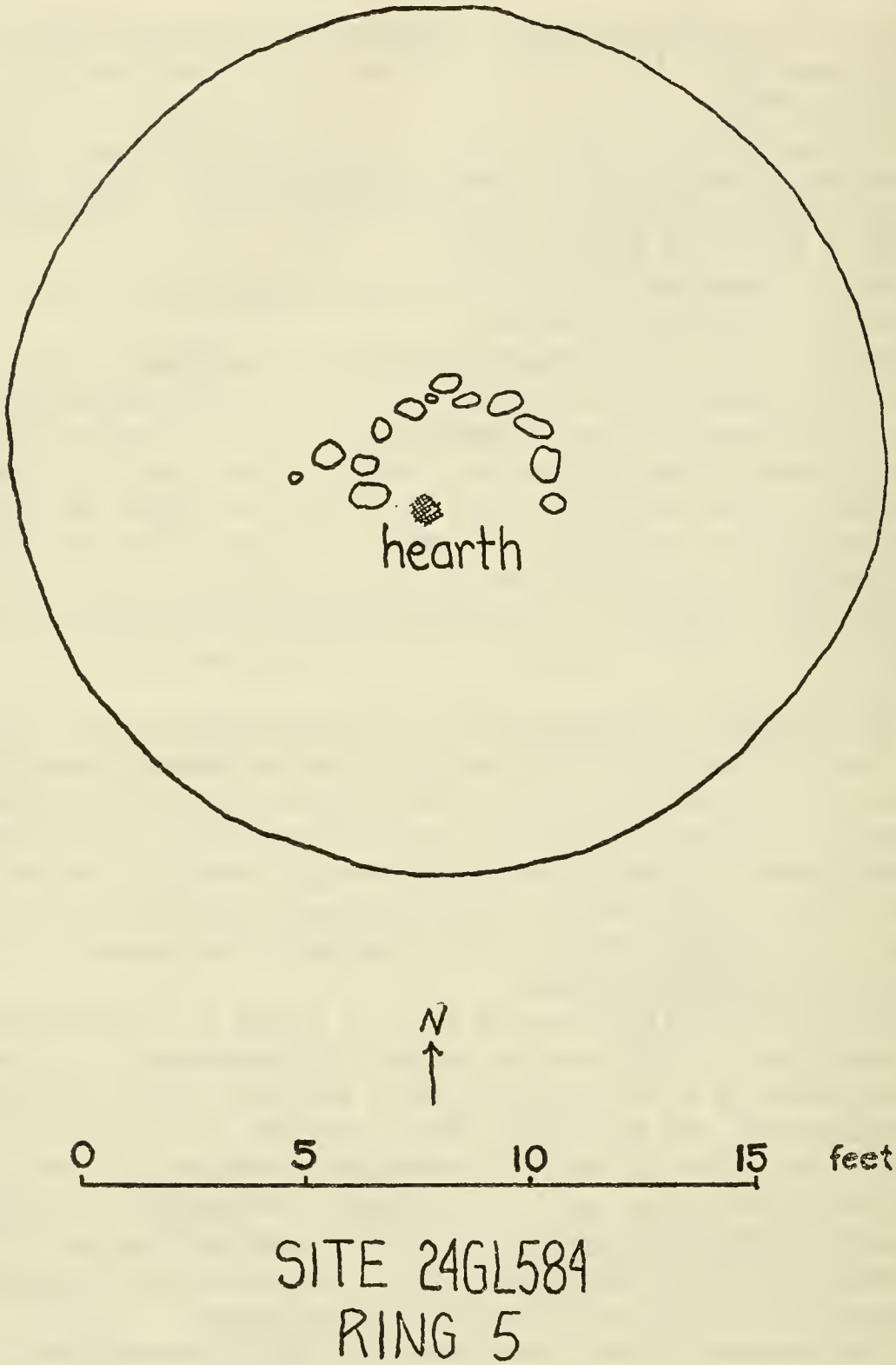


FIGURE 31.—Site 24GL584, ring 5.

leaving smaller ridges or fingers extending at right angles to the Ridge (pl. 50, *a*). These flats are excellent camping spots, affording good drainage, observation of the country, and proximity, during certain seasons, to running water. One portion of the Ridge contains 12

sites in an area 2 miles long, encompassing this dissected slope (see pls. 50, *b*, 51, *a*; refer also to fig. 32).

On one of these flat fingers, eight-tenths of a mile southeast of the Milk River Ridge, 400 feet lower than it and 250 feet above the valley

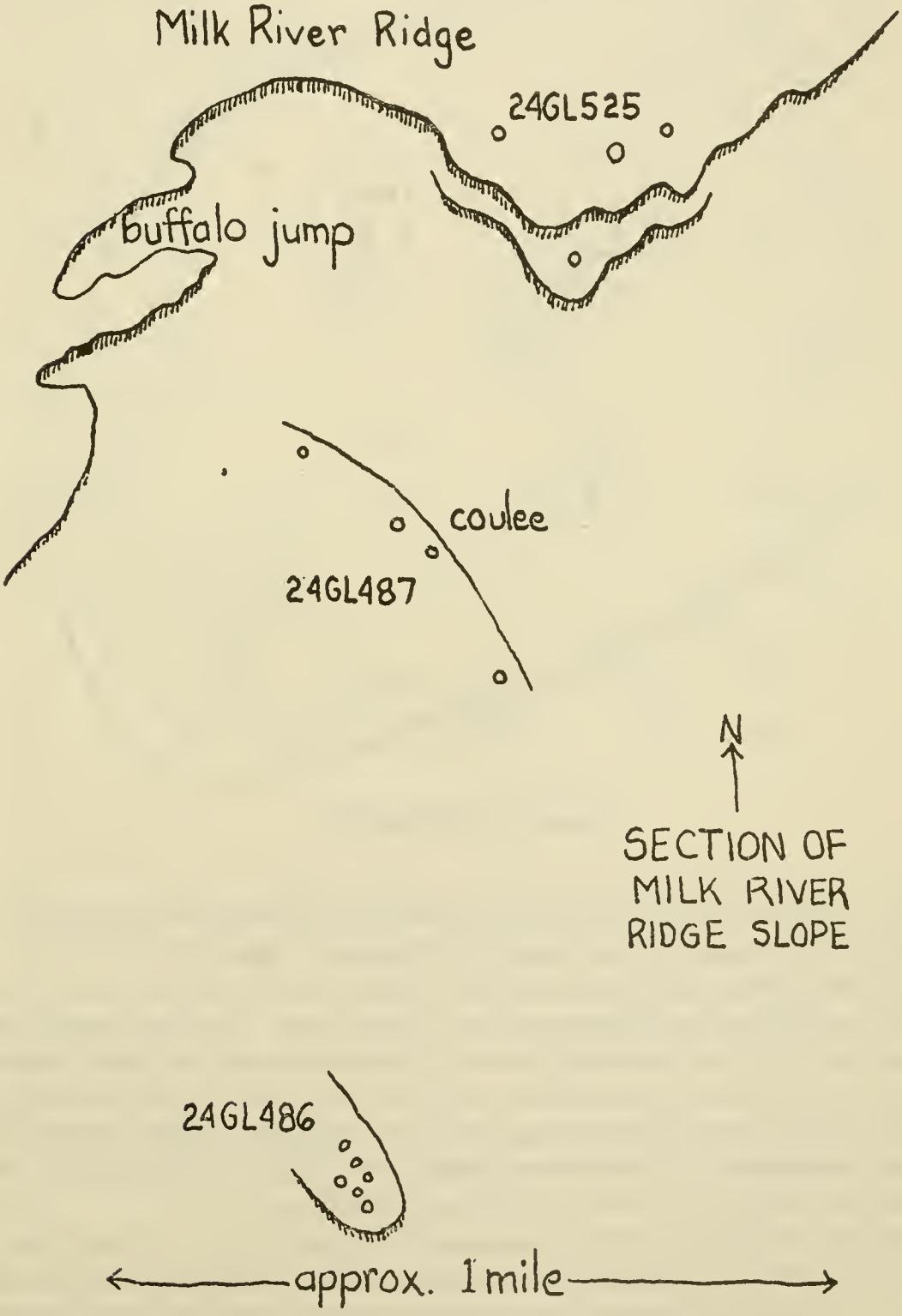


FIGURE 32.—Section of Milk River Ridge slope with three tipi-ring sites.

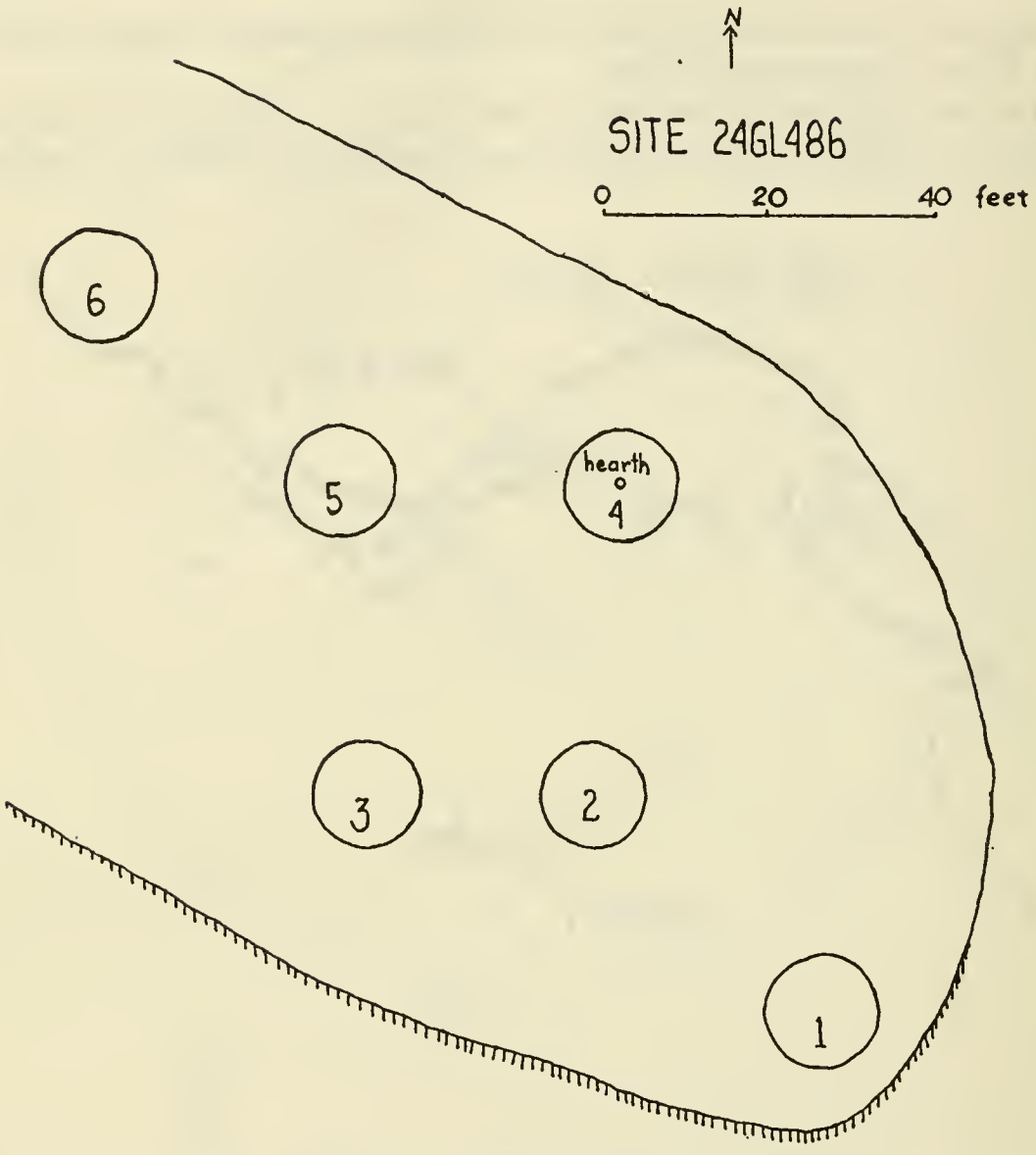
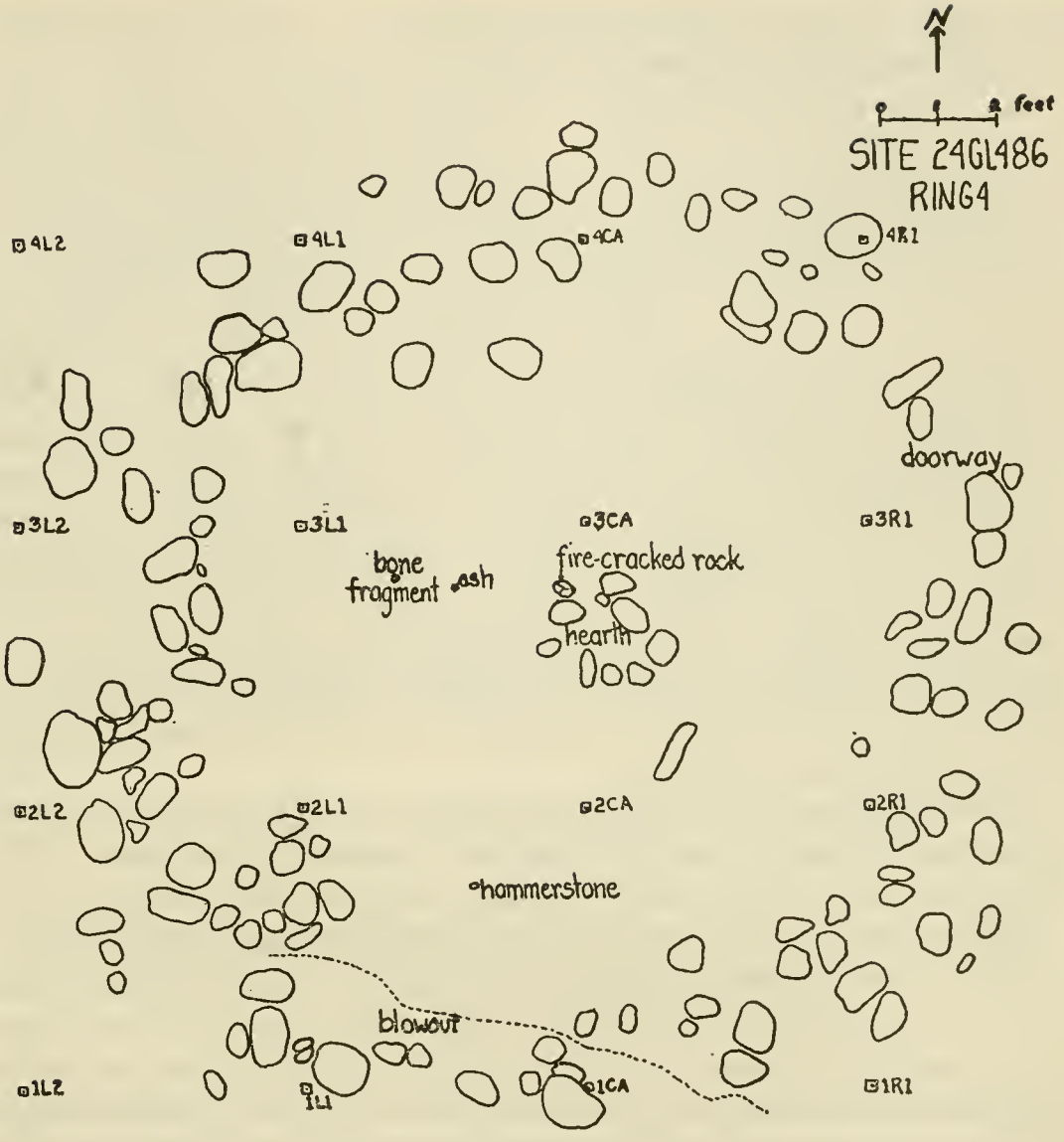


FIGURE 33.—Site 24GL486.

floor, is site 24GL486, which consists of six tipi rings ranging from 13 to 14 feet in diameter, and placed as pictured in figure 33.

In 1953, when this site was first visited, several of the rings were whitewashed and photographed from the Ridge. Except for the displacement of a few rocks on the south sides of a couple of rings, undermined by soil having been blown out, the rings are in good condition. (The wind is exceedingly strong at this site during some months of the year; excavation in October and early November of 1956 had to be discontinued at times because of the powerful gusts.)

A large number of rocks make up each tipi ring; they range from 0.3 to 1.3 feet in diameter, but most are of considerable size and weight. They must have been gathered from the hill crest, where these red glacial boulders are thickly scattered—the only bare spots



Site 34.—Site 24GL486, ring 4.

are the interiors of the tipi rings. Ring 4 was the only one of the six to possess a fire hearth, composed of a rock ring.

The excavated ring, ring 4, measures 13.5 feet north-south by 14 feet east-west (see pl. 51, *b*; fig. 34). The east-northeast side of the ring presents a gap 1 foot wide, probably a doorway. The circular band of rocks in the ring covers an area about 3 feet wide and consists of 124 rocks, 0.3 to 1.3 feet in diameter.

The tipi ring was staked out in 5-foot squares, with the central axis oriented along the (magnetic) north-south line through the center of the ring, almost bisecting the fire hearth. The southernmost row of stakes was labeled 0N(orth), the next 1N, etc.; numbered left or right of the central axis, square designations were derived from that of the stake in the southwestern corner of each.

Square 2L1, which included a segment of the fireplace, was taken down 0.1 foot, to the base of the rocks in the fireplace ring, presumably

the original floor of the tipi (see pl. 52, *a*). The fill consisted of a fairly loose yellowish-gray sandy soil, but at the 0.1-foot level a compact, hard gray layer was encountered. Whether this compact layer, on which lay the rocks of the tipi ring as well as the hearth, resulted from the occupation of the tipi (either from the trampling of the inhabitants, or from the effects of sod destruction, leaving the soil unprotected), or is a natural feature of the region, a hardpan such as is common on the Plains, is uncertain: local soil scientists were unable to settle the question, nor, since the region is undisturbed range, could the experience of farmers be sought. While this layer does appear to extend beyond the tipi ring, it would still remain within the camp area, and so could have been subject to the same trampling that may have packed it within the tipi. Extensive testing of the surrounding region for this feature was impractical within the time available for excavation. Also undetermined is whether the rocks of the tipi ring always lay on this compact layer, soil being deposited around them and eventually covering them, or whether they sank down to it through successive wet seasons; probably both factors were operative.

The remainder of the squares containing the tipi ring were also cleared of the surface material to the 0.1-foot hard gray level. While it appeared that the extremely heavy rocks had embedded themselves deeper into this layer, owing to their weight, the majority of the rocks lay on it. In a typical square, 2L2, 15 rocks of the tipi ring occurred (pl. 52, *b*). Thirteen were approximately 0.6 foot in diameter and were toward the inside of the ring, while two, 0.8 and 1 foot in diameter, lay somewhat outside the ring. In square 1L1 the rocks had been displaced about 0.6 foot because wind action had removed the soil from under them; this formed a section of the small blowout on the south side of the site, mentioned above (pl. 53, *a*).

The only artifact discovered was a rounded stone, apparently from a stream bed, 8.6 by 7.1 by 5.8 cm., with peck marks showing evidence of use as a hammerstone. This occurred 4 feet southwest of the fire hearth, on the hard gray 0.1-foot level. A bone fragment 1.9 by 1 cm. lay also on this surface, in square 2L1, near a small deposit of ash.

The center of the ring was occupied by a rock-ring fire hearth composed of 10 stones, 1 of which was entirely below the surface, and ranged in size from 0.4 to 0.8 foot in diameter. These stones lay on the 0.1-foot level; it was observed that the hard gray layer sloped slightly down to the area midway between the hearth and the outer ring, and consequently these rocks were very slightly higher than the rest of the interior of the ring. Several of the rocks lining the hearth appeared fire-reddened, and one was fire-cracked. Under one of the larger rocks in the northeast portion of the circular ring a small handful

of charcoal and charred wood was found. Since the wind appeared to blow from the southwest, it was surmised that here was represented the last remnants of the fire, blown from the hearth but caught under the edge of this rock.

Summary of fieldwork.—As in the case of the historical accounts and the ethnographic material, the archeological information collected on the Backfeet Indian Reservation supports the conclusion that the tipi rings were used to hold down lodge covers.

Sheer numbers of tipi rings alone give testimony that they served a domestic function, rather than having been of occasional ceremonial use. Their location on flat or nearly flat areas in good camping spots, where they appear to have had taken into account, in their placement, factors of drainage, wind, and other climatic influences, support their use as habitation sites. The topographic settings concur with the camping patterns (of which regular plans of a limited number of types were observed) in suggesting seasonal variations in camps, reflecting an annual cycle of activities such as is known from historic tribes.

The size of the tipi rings on the Reservation vary to a limited extent, but the range and the average both coincide with the sizes of lodges used as conical dwellings among the historic tribes. The variations can be explained by both individual owners and by temporal differences. The number of rings in a site approximate the number of lodges in historic camps, changing from season to season in a regular cycle.

No eccentric tipi rings were found, nor any partial or overlapping rings. All the tipi rings observed on the Reservation were suitable in construction and shape for use as lodge-cover weights. The rocks making up the rings were uniform within a restricted range of size, shape, type of material, total numbers, and arrangements, and the aggregate of these features reinforces the surmise that they were weights for the skin lodges. The absence of rocks, in a few of the tipi rings, in a small area toward the east is reminiscent of the historic tribes' tradition of placing a doorway toward the rising sun.

The occurrence of rock concentrations and rock-lined fire hearths in several tipi rings is further evidence of their use as habitations, while the absence of these hearths in numerous rings agrees with native informants' memories of cooking being done outside the lodge.

A comparison between the sizes of tipi rings and the depths to which their rocks are embedded, as well as the total numbers of rings and of sites at different depths, suggests a temporal change in tipi ring size. The change could well be due to the shift in cultural and economic patterns outlined by Lewis (1942, pp. 35–36).

DISCUSSION

It is difficult to understand why archeologists working in the Northern Plains appear to be so confused over tipi rings, lumping several diverse phenomena under this classification, assigning esoteric functions to them, or refusing to hazard hypotheses on their functions at all.

Mulloy is a leading exponent of the "problematical" theory of the nature of tipi rings. Referring to them as "manifestations of unknown relationships," he has summarized his reasons for arriving at this conclusion (Mulloy, 1952, p. 137). A point-by-point discussion of this summary incorporating the evidence previously presented in this paper removes, it is believed, the basis for Mulloy's hesitation and supports the conclusion that tipi rings were indeed lodge-cover weights:

(1) Mulloy states (ibid.): "'Tipi rings' [vary] from five to forty feet in diameter and occasionally larger . . ." Tipi rings found on the Blackfeet Reservation vary in size from 7.5 to 29 feet in diameter,[21] within Mulloy's range but likewise within the range and with the average of lodges used as conical dwellings by historic tribes, and by the modern Blackfoot at their 1956 encampment. Variations reflect owners' and temporal differences.

(2) "'Tipi rings' . . . are found either isolated or in groups of several hundred." On the Reservation, the rings occur isolated or in groups of up to 170; these variations in camp size result from the seasonal cycle of subsistence and ceremonial observances.

(3) "Frequently they intersect each other so intricately that it is difficult to separate one from the other. Usually they are simple circles, but eccentric forms occur." No tipi rings on the Reservation intersected each other, overlapped, or could be termed an eccentric form, nor could historical or ethnographic sources clarify this assertion. Perhaps this is a trait characteristic of another area, which cannot be solved in north-central Montana.

(4) "Sometimes they occur near camp sites, but rarely are artifacts found in them. . . . [There is a] lack of evidence of habitation in their vicinity." Since tipi rings were occupied for only a short time by nomadic people who would discard very little, an abundance of habitational debris is not to be expected. Reputable collectors report

[21] In the autumn of 1956 an amateur collector from Valier, Mont., James Tidyman, brought the writer to a large hill overlooking Two Medicine Creek in the southeastern portion of the Blackfeet Reservation. On the summit of this hill is a stone ring 43.7 feet north-south by 44.5 feet east-west, but differing from other tipi rings only in size. A fire hearth 3.9 by 3 feet is located 19.7 feet from the west, 18.6 feet from the east side. Disturbance of the surrounding land, preventing examination of the lower slopes of the hill, obscured surrounding rings, if any. Carle Leavitt of Conrad recalls visiting, with the late H. P. Lewis, three rings at a site in north-central Montana, which he believes must have been about 60 feet in diameter, and 40 to 50 feet apart, with the rocks deeply embedded in the ground. It has not been possible, so far, to investigate these phenomena sufficiently to reveal their significance—perhaps they were ma'toki dance lodges (see p. 428).

occasional artifacts in them, and one was discovered in the ring excavated by the writer. Many times the rings are in the vicinity of buffalo drive sites; a Blackfoot informant, Bull Head, stated that his people were accustomed to camp near their drives.

(5) "In the Dakotas, some are merely circular depressions in the sod." Maximilian reports observing the use of sod to hold down the lodge covers of the Blackfoot at Fort McKenzie, where suitable stones are lacking.

(6) "Rarely . . . are the remains of fires found in them." Rock concentrations as well as rock-lined fire hearths are frequently found in the center of tipi rings. Native informants, however, recall that cooking was often done outside the lodge. As for the remains of the fire itself, buffalo dung used as fuel would produce a slow, consuming fire leaving very little ash. Furthermore, the wind would be strong enough, in most cases, to remove all ash and charcoal remains—that charcoal which is found is usually a small amount caught under the hearth rocks. (Local ranchers have mentioned that many times, on the day after one on which they have branded cattle, they can find no traces of the branding fire.) Finally, that cooking was commonly done at the buffalo drives, rather than in camp, is evidenced by the charcoal and ash midden built up at these drive sites.

(7) "They lack packed floors." The tipi ring tested for this feature revealed a hard layer at the base of its rocks, which may possibly have been a floor. However, the nature of the sod on the Reservation (like that of much of the Great Plains) is such that packed earth is unlikely to result from relatively short occupancy of an area. At the 1956 Blackfoot encampment, the interiors of the tipis were marked by grass less packed than that outside the lodges.

(8) "They are situated on high river terrace fingers and less frequently in sheltered lowland areas." On the Blackfeet Reservation, tipi rings are found in all topographic settings favorable for camping. Historical and native sources indicate that the Indians lived in the sheltered lowlands in winter, but in spring were forced up on the terraces by flooding. It should also be remembered that tipi rings are very difficult to discover in the brush of the low valleys, and are in greater risk of destruction, from settlers as well as from floods.

(9) "They may be related to so-called 'medicine wheels.'" This topic is discussed in detail in another paper (Kehoe, 1954; see also Dempsey, 1956). Although no medicine wheels occur on the Blackfeet Reservation, they are found in north-central Montana and in Alberta. They can be defined as cairns or circles of stones, from the center of which radiate a number of rows of other stones. Elderly Blackfoot state that they mark the grave or place of death of esteemed members of the tribe, and this is substantiated by historical accounts. Tipi

rings are thus "related" to medicine wheels solely by having been used as weights for the cover of the death lodge, and subsequently forming the basis of the construction of a marker, or "wheel."

Mulloy is further confused by circles of mixed stone and posts, which he encountered in the Yellowstone region (1952, p. 132; 1954, p. 55). These structures are conical, semiconical, rectangular or pentagonal in shape, often supported by trees or cliffs, and constructed of both stone and wood, in toto suggesting an entirely different type of structure from the weighted conical skin tipi. Mulloy believes (1954, p. 55) that "these structures may account for the origin of the prevailing myth in this region that 'tipi rings' have hearths in them, but they are by no means the same thing as the circles."

The 1954 report documents Mulloy's investigation of two "stone circle sites" in the Shoshone Basin, Wyo.[22] In one, containing 75 rings from 11 to 24 feet in diameter, situated on a flat-topped gravel terrace, he mapped and photographed the site and tested one circle by coordinate trenches 2½ feet wide and 3 feet deep. Another ring was tested by being completely excavated to the level of the gravel terrace. In addition, a second site of six rings was investigated but not excavated. The conclusions Mulloy derives from this work are that "stone circles" are still "manifestations of problematical purpose," similar in their occurrence along the eastern edge of the Rockies from New Mexico north to the Canadian border, and that "they might be circles used in dancing, or in other religious rituals" (Mulloy, 1954, p. 55), which may possibly be connected to the "medicine wheel" in the Big Horn Mountains of Wyoming. In sum, Mulloy adduces no new reasons for denying the domestic function of tipi rings as lodge-cover weights, though he is still committed to a belief in an inscrutable esoteric use for the circles, and therefore the rebuttal of his 1952 argument continues to be valid.

A second student of tipi rings, Hoffman, begins his review by cautioning, "In form and use they must be distinguished from somewhat similar structures such as medicine wheels, eagle catches, the Lacotah Love Dance circle, and Koyokee pits" (Hoffman, 1953, p. 1), but later refers to all of these together as "tipi ring forms" (op. cit., p. 10 ff.). Failure to clear the confusion results from his superficial

[22] In a letter dated October 4, 1955, with photographs enclosed, Mr. William McCarty of Laramie, Wyo., sent me a description of a group of tipi rings in southeastern Wyoming (130 miles southeast of Mulloy's study). He wrote: "This group of tipi rings is located on a high bluff with a sheer drop to the west and north and a gradual slope to the east and west (sic). From the high point one can see for miles in any direction. This bluff is located eight miles south of Medicine Bow, Wyoming.... These rings seem to be in groups of three to six and are scattered around the level areas. . . . Rings are about eighteen feet in diameter and are formed of a double ring of stones. . . . At each group is a smaller ring of stones with a fire hole in the center of each.... My wife found a broken arrowhead and my daughter a smaller broken one. Some flints I have picked up show they were worked on and may be crude arrowheads."

speculations unsubstantiated by cross checking, field investigation of informants' descriptions, or full documentation of these informants' background and reliability. Hoffman makes much of the theory that tipi rings were used as shelters during "medicine getting" quests; these fasting shelters, however, are U-shaped stone constructions large enough to hold a man and high enough to protect him from the wind. They thus cannot be confused, in the field, with tipi-ring circles. Several of these fasting shelters can still be seen today, and have been located on the Blackfeet Reservation. One of the best surviving examples is the shelter of Ear Rings, a Piegan, father of John Bird Earrings, who brought Claude Schaeffer, then curator of the Museum of the Plains Indian in Browning, to this shelter, placed on a hill above Ear Rings' allotment and near his grave. Dr. Schaeffer photographed the shelter at this time (pl. 53, *b*).[23]

Carling Malouf is also noncommittal on the use of tipi rings, but is led to the supposition of a ceremonial function by the lack of hearths and artifacts in so many.[24] Malouf's statement that ethnographic accounts fail to provide sound information on the rings is difficult to comprehend in the light of the evidence presented by informants in a previous section of this paper.

Review of their writings suggests that the hesitation of these students in assigning a domestic function to tipi rings stems from (1) lack of detailed examination and analysis of tipi rings in the field, (2) unfamiliarity with published historical and ethnographic sources and with surviving native knowledge, (3) application of interpretations based on phenomena from a limited area to a large geographical region occupied by a number of tribes representing diverse linguistic stocks, cultural traditions, and geographical connections, in which entirely foreign but superficially similar structures cause much confusion, and (4) an unwillingness to commit themselves on a seemingly controversial topic.

It should be noted, of course, that tipi rings are distributed over an area much greater than the former home of the Blackfoot, to which my conclusions are limited. In other areas and among different tribes, there may be stone circles that served other functions. The archeological past of each area is, to a greater or lesser extent, unique, and must be recognized as disclosing information perhaps inapplicable to any other area. Therefore it is admitted that the hesitation of archeologists such as Mulloy may well be justified in regard to stone circles treated as a phenomenum scattered from New Mexico to Montana; the writer will maintain only that those herein described from the

[23] Personal communication, summer of 1953.

[24] Personal letter dated November 7, 1953.

Blackfeet Reservation vicinity were used as lodge-cover weights, or "tipi rings."

The extension of the use of tipi rings as lodge-cover weights to the northern Blackfoot range in Alberta is corroborated by information recorded by Dempsey (1956, p. 177):

> The tipi ring . . . is common in Blackfoot country and has been used within the past two decades by at least two tribes of this nation (Blood and North Peigan) where the owner wished to follow early customs.
>
> The tipi rings were aptly described in 1955 by One Gun, an elderly North Blackfoot informant: "The circles of stones were normally used to hold down the edges of the lodges. The old tipis were made of buffalo skins and were much heavier than the canvas ones. They could not be blown away as easily, so stones were able to hold them in place. But when we started to use canvas, we had to use pegs or our tipis would be blown over. Stones were also used between the pegs."

Dempsey also notes that the Blackfoot word for "medicine wheel" refers only to the radiating lines, the speaker thus assuming that the listener knows, as is inherent in Blackfoot tradition, according to Dempsey, that the lines are "merely appendages to existing tipi rings" (ibid.).

Granting, then, that the question of the function of tipi rings has been answered, at least for the area inhabited by the Blackfoot, problems of cultural affiliation and age still remain for these archeological features. Solutions rest partly on knowledge of the changes in size of the tipis during protohistoric and historic times, and of the size and arrangement of the camps.

For example, Anthony Hendry observed in 1754, while journeying through the Blackfoot country, near the present Calgary, Alberta, a camp which in his description invites comparison with archeological sites (Bushnell, 1922, p. 25):

> Came to 200 tents of Archithinue Natives, pitched in two rows, and an opening in the middle; where we were conducted to the Leader's tent; which was at one end, large enough to contain fifty persons; where he received us seated on a clear [white] Buffalo skin, attended by 20 elderly men. . . . I departed and took a view of the camp. Their tents were pitched close to one another in two regular lines, which formed a broad street open at both ends.

Matthew Cocking, sent west by the Hudson's Bay Company in 1772, writes of this tribe's camp arrangement in connection with a buffalo pound (Bushnell, 1922, p. 26): "Our Archithinue friends came to see us and pitched a small distance from us; on one side the pound 21 tents of them, the other seven are pitched another way." On the Reservation, tipi rings are found associated with buffalo drive sites in similar arrangements. A cluster of nine was located within a few hundred feet and on each side of a buffalo drive site, as diagrammed in figure 35 (see also pls. 49, *a*; 54, *a*).

Deductions on the size of the tipi may be made from observations such as those collected by Lieutenant Bradley from white traders

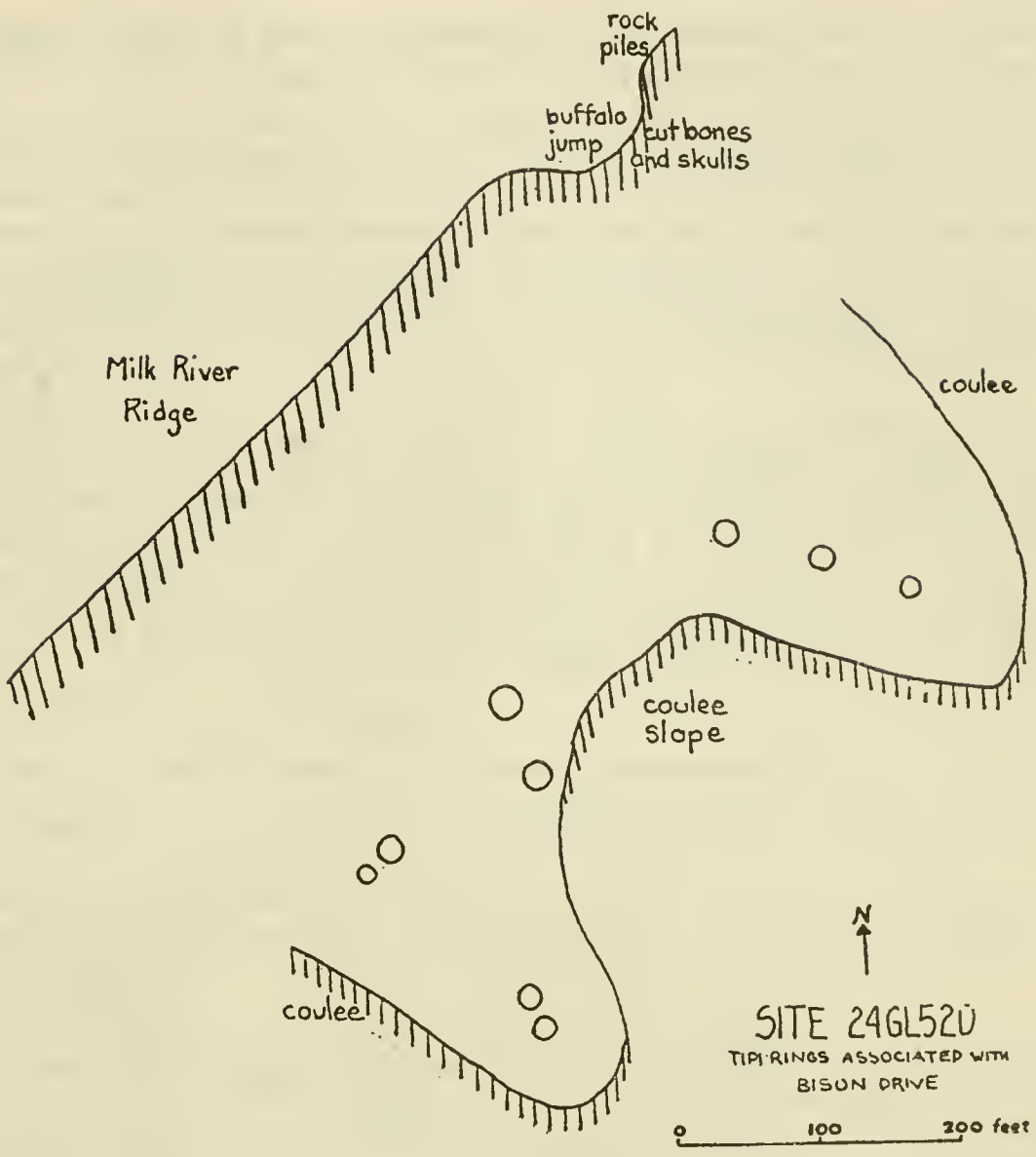


FIGURE 35.—Site 24GL520, tipi rings associated with bison drive.

familiar with the Blackfoot from the early decades of the 19th century. He states that about the middle of that century (Bradley, 1900, p. 258):

> From six to twelve skins were ordinarily employed, according to size desired or the wealth of the occupants. The number rarely exceeded twelve but occasionally reached eighteen and twenty, and Major Culbertson relates having once seen one of forty skins that would hold a hundred people. A six-skin lodge was ten feet in diameter, holding six people, while a twelve-skin lodge was about fifteen feet in diameter and afforded shelter to eight or nine persons. The cover was stretched over eight to twelve lodge poles, in the larger lodges from eighteen to twenty, standing in a circle and inclining inward till they joined near the tops at the height of from eight to twelve feet from the ground.

The social organization and annual cycle of subsistence of the various tribes that once camped in the area of the modern Blackfeet Reser-

vation may be reflected in the surviving tipi-ring clusters. Eggan's paragraph (1952, p. 40) is suggestive in this regard:

> Collier has noted that the social organization of the Plains tribes took a series of forms: the camp circle, two types of large bands, the camp based on extended kinship, and the temporary hunting camp, each of which was adapted to the annual cycle of subsistence as well as to the social environment. It is important to note that tribes coming into the Plains with more complex formal social structures were in the process of giving them up in favor of the more flexible band and camp organization; and conversely, the more simply organized Great Basin groups developed a more complex organization.

Using the information from Bradley (1900, p. 258), Lewis (1942, pp. 35–49), and Ewers (1955, pp. 131–134, 307–308), the following table has been worked out to indicate the possibilities of chronological ordering of tipi-ring sites in the area of the Blackfeet Indian Reservation. Study of this table leads to the conclusion that most of the tipi rings on the Reservation date from the 19th century (cf. p. 444, table 2 and paragraph following).

TABLE 3.—*Temporal change in Blackfoot tipi size*

Date	Period	Size of lodge in number of skins	Floor diameter (feet)	Number of—		Reasons
				Occupants	Wives	
Before 1730.	Pre-horse	6–8	About 10	6–8	(?)	Limited traction power of dogs restricts size of lodge; less value in women's labor, more equal sex ratio favors fewer wives, smaller family.
1750	Generation after acquiring horse.	"Larger"	(?)	One family to a tipi; "leader's" holds 50.	Probably 1–4.	Horse permitted transportation of larger lodge, more lodges to a group.
1830	Fur trade expansion.	Average 6–12	10 to 14 or 16.	Average 6–10.	Average 3	Polygyny increasing due to value of female labor in processing hides, high death rate of men in warfare; greater wealth in horses makes possible more luxurious lodges.
		Wealthy 18–20.	About 16	Large family.	6–16	
		Extreme 40	30	Up to 100		
1870	Competitive fur trade.	Beginning of abandonment of skin tipi for canvas lodge.	30	Up to 100	Up to (rarely) 20 or 30.	Intensification of factors cited above.
1956	Present	Canvas lodge	15–22.5	7–10	1	Erected only for traditional dancing celebration's weekend encampment; many lodges family heirlooms, put up in memory of deceased relatives.

CONCLUSIONS

The material of this paper comprises a preliminary attempt to gather historical, ethnographic, and archeological evidence illuminat-

ing the function of the tipi rings in the area of the Blackfeet Indian Reservation of Montana. Because of the once much greater territory of the Blackfoot, the historical accounts cover a much greater area and include information on some of the peripheral neighbors and allies of the Blackfoot. The ethnographic evidence was obtained from early ethnological works and, principally, from the testimony of elderly Blackfoot now living on the Reservation and on Canadian reserves, as well as from a few members of neighboring tribes. Archeological data has been recorded from sites located in and around the Blackfeet Reservation, north-central Montana.

Well-documented historical records, statements of surviving participants in the traditional Indian customs, and the archeological evidence all support the conclusion that the stone circles known as tipi rings resulted from the use of rocks to hold down skin lodge covers, at least in the region of the Blackfeet Reservation.

There is still a need for interpretation of the data on tipi rings. Contemporary archeologists tend to use the term "tipi ring" as a catchall to pigeonhole problematical stone configurations of unknown functions, without seriously attempting to ascertain what such functions might be. As a result, the simple stone circle or tipi ring has acquired a mysteriousness and obscurity of meaning comparable to that surrounding the more eccentric stone configurations. The problem is largely one of semantics, and could be considerably clarified by limitation of and agreement on definitions and categories. As a start, the work incorporated in this paper suggests that the use of the term "tipi ring" should be limited to an approximately regular stone circle, between about 7 to about 30 feet in diameter (the range ultimately determined by the size range of tipis as this becomes known), averaging about 16 feet, the boulders of the circle being of a size and weight suitable for securing a lodge cover. Rock-lined hearths may be present, but more commonly are not. That the other, various stone configurations now often erroneously lumped under the term "tipi ring" had diverse functions, some utilitarian, some ritualistic, is revealed by historical and ethnographic sources which should be employed to supplement archeological work on these relatively recent phenomena.

The solution to the problems presented by the stone configurations, including tipi rings, appears to lie in intensive investigations of the several types in a number of limited areas. If there is preliminary agreement on the classification of these configurations, and use is fully made of the three branches of study forming the three main sections of this paper, comparisons of the results of the investigations in each area should throw considerable light on the history and ways of life of the many tribes once occupying the vast area in the West

in which the boulder configurations of unknown function are now found.

APPENDIX

A MODERN BLACKFOOT CAMP

On the morning of August 8, 1956, the Blackfoot began erecting lodges for their annual North American Indian Days Celebration (August 8–13, 1956) immediately to the rear of the Museum of the Plains Indian, in Browning, Mont. (see pl. 55, *a*). This celebration has replaced the Fourth of July gathering of previous years, and now coincides with the season of the annual Sun Dance assemblage of the historic tribes, in which the various bands of the tribe camped in one village in the form of a circle of lodges.

The summer season, usually beginning in June and ending in September, was the only time of the year when the entire tribe was encamped in a single village, using the camp circle. During the other seasons the several bands occupied different camps and used other arrangements of lodges (Ewers, 1955, p. 128). Similarly, the contemporary Blackfoot come together only once or twice in one village, during the summer season, and here use the camp circle. The remainder of the year finds them living in their various rural communities on the Reservation.

August 8 and 9, the first 2 days of the encampment, provided opportunities to secure detailed information and photographs of the erection of the lodges (pl. 54, *b*). By August 10 all the lodges were standing: 39 canvas tipis of the 4-pole type, 69 wall tents, and 2 umbrella tents. On this day, with the aid of Lloyd Torgerson of Ethridge, Mont., detailed aerial photographs, both oblique and horizontal, were obtained of the camp (pls. 55, *a*; 56, *b*). In the course of the same flight, a tipi-ring site, 24GL350, the rings of which formed a camp circle partially destroyed by road building, was photographed for comparison with the modern camp, which was subsequently mapped (figs. 36, 37; pl. 56, *a*). (During the previous autumn the 63 tipi rings at this site had been whitewashed for this purpose by an Indian crew under the writer's supervision—see pl. 55, *b*.)

From August 8 through August 13 visits were made to the various lodges of the encampment. Upon entering Lodge 26, owned by Mrs. Mae Williamson, it was discovered that rocks were being used to hold down the canvas liner of the lodge (pl. 57). These liners or back walls "serve to keep out the wind and water that may find its way down the poles from their tops. They protect the people from draughts, as air can enter under the edge of the tipi, pass upward between the cover and the back wall and out over their heads, affording ventilation

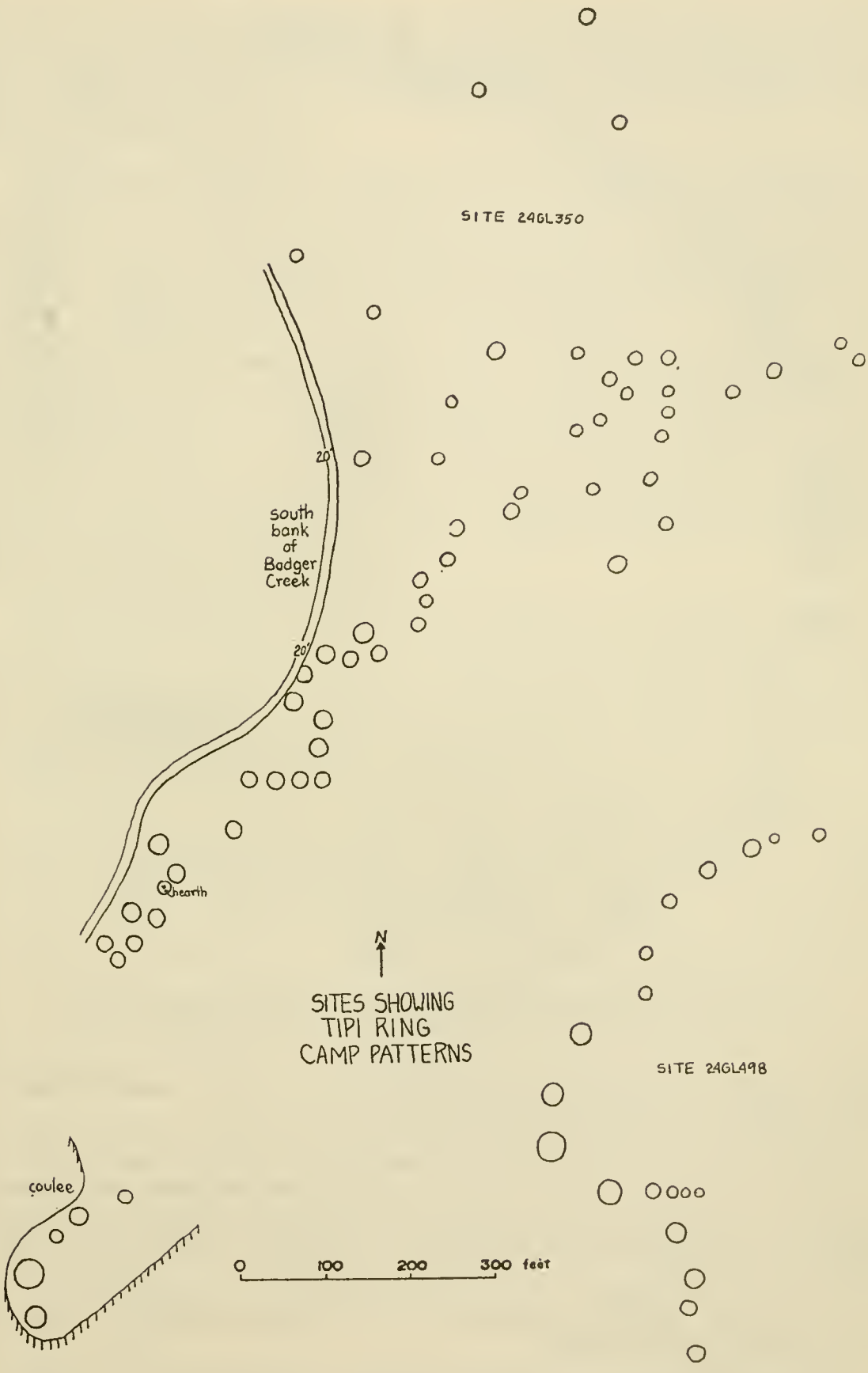


FIGURE 36.—Sites showing tipi-ring camp patterns.

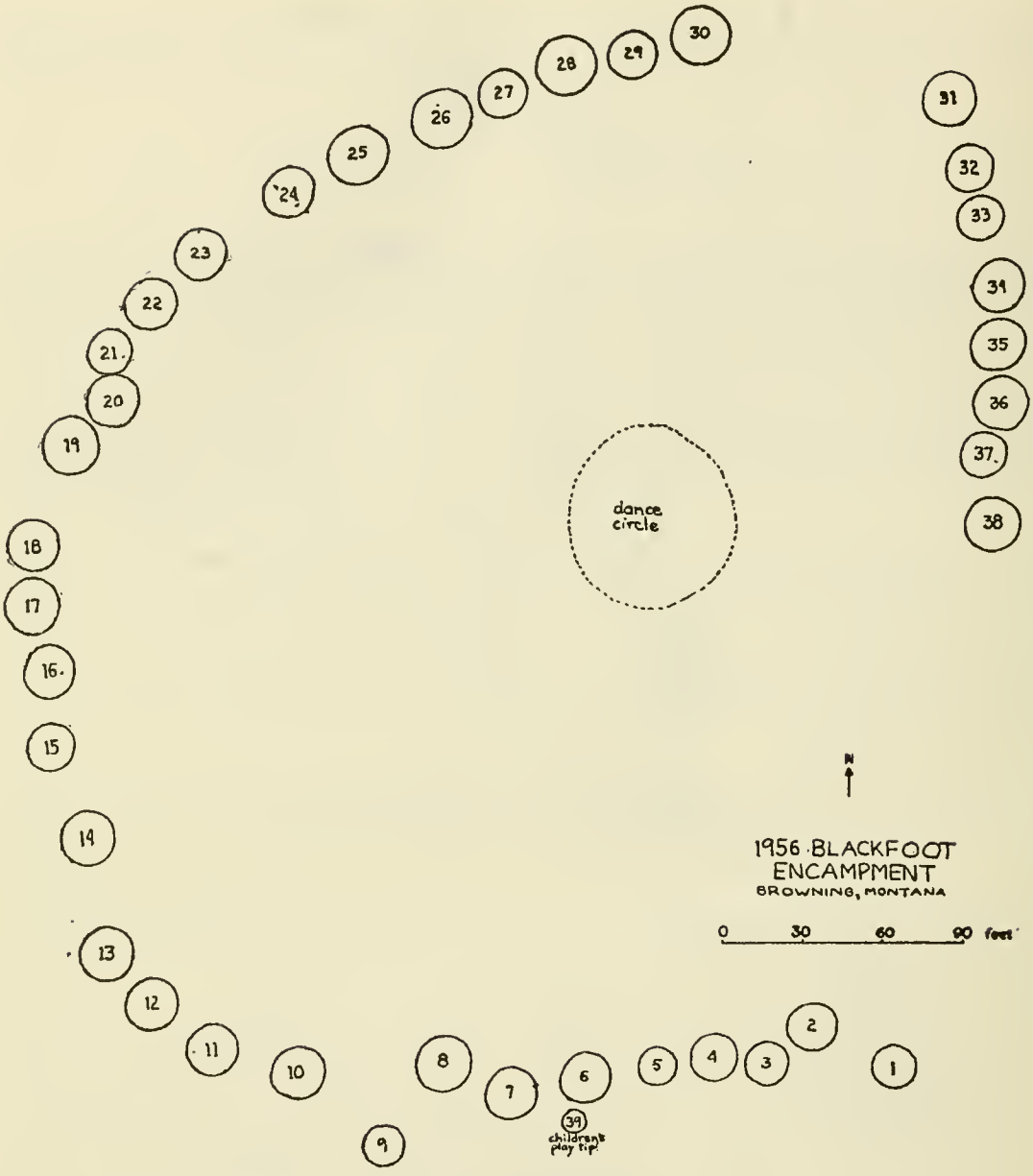


FIGURE 37.—Camp plan, 1956 Blackfoot encampment, Browning, Mont.

of the most approved type" (Wissler 1910, p. 106). Questioning of Mrs. Williamson elicited this information:

The rocks were used to hold down and push out the tipi liner similar to their use in the old days. Quite a few of the other campers were using them too but most of them were too lazy to gather rocks since they were not easily found at the Browning camp ground. Filled parfleches are often used to push out the inside liner.

Mrs. Nora Spanish, manager of the Blackfeet Arts and Crafts Association, revealed that:

The North Blackfeet from Gleichen, Alberta, have discovered a new idea to peg the lining similar to the way the tipi cover is pegged to the ground, and loops are now being sewn on the tipi liner for that purpose. A woman from Gleichen told me this in 1955, but claimed that it is much harder to peg the inside liner than

the tipi cover, so rocks will continue to be used in most cases. There would be less wear on the liner with pegs than in using rocks. I have never seen pegs used to push out a tipi liner here on the Reservation, just rocks or parfleches, or both. I am going to sew loops on Mother's (Julia Wades-in-the-Water) tipi liner and use pegs next year.

The Blackfoot began to break camp on the morning of Monday, August 13. At this time measurements were taken of each tipi's floor dimensions, from peg to peg north-south and east-west, tabulated in table 4, and the distances between each of the lodges were noted (table 5); these relationships can be seen in figure 37. It was noticed that after removal of the lodge inner liner, with the tipi cover and pegs, rings of stones remained in place or slightly inside (0.3 to 1.2 feet displacement) their former position against the tipi poles and pegs (pls. 58, 60, *a*). It was rare, although it did occur, that the rocks were found outside the peg line: in these instances their distance from the peg line was 0.3 to 0.6 foot. Unquestionably, the tipi rings at this camp resulted from the pulling out of the canvas liner from the rocks placed on it as weights.

Thirteen lodges left these tipi rings (table 6), with stones ranging from a total of as few as 5 to as many as 40 comprising each ring. The individual rocks varied from 0.3 to 1.2 feet in diameter and were angular stream-rolled boulders identical to those forming the tipi rings on the archeological sites previously discovered on the Reservation.

Later, after the Blackfoot had vacated the camp ground, the area was thoroughly examined. In 22 of the 39 sites of former tipis, fire hearth remains were visible (pls. 59, *b*; 60, *a*). Of these, 17 were unlined, 4 had boulders placed to confine the fire, and 1 had a single brick. Where the hearth was unlined, large metal cans were sometimes used instead to confine the fire, forming improvised stoves which still left a burned area and ashes on the ground; similarly, an inverted washtub "stove" (pl. 59, *a*) left hearth remains (pl. 60, *a*). In at least one tipi (Mrs. Williamson's Lodge 26), however, a commercial stove was employed, which left no evidence of fire afterward. It appeared that for many hearths the sod had been scraped away before a fire had been built, but one hearth seemed to have had dirt thrown on its fire to put it out.

The fire hearths ranged from 0.8 to 3 feet in diameter. For 15, the east-west dimension was the larger; 2 were longer north-south; in the remaining 5, both measurements were exactly the same. The boulder rings of the lined hearths contained 5 to 14 rocks, 0.6 to 1.1 feet in diameter.

The hearth was usually directly between the north and south sides of the lodge, but occasionally was closer to one or the other side. In all but one case, the fire was nearer to the east side of the tipi, the

doorway. It was never exactly in the middle of the east-west line, and in the one exception was closer to the west side than the east. This exception was Lodge 29, which, although erected by the Blackfoot with their four-pole construction, was occupied by visitors from the Umatilla Reservation, Oreg., who built their hearth apparently according to their own tradition: five unusually large rocks (0.6 to 1.1 feet in diameter) placed in a semicircle with the opening to the east, and the whole, as before noted, closest to the west side of the lodge. In this, as in the hearths of the other two Umatilla lodges, charred logs suggested that the visitors were not as thrifty of wood as their Blackfoot hosts, at whose fireplaces only small scraps of tinder could be discovered.

A peculiarity of the camp ground after the removal of the lodges was the evidence of their former location: rings of tall grass. Although the grass was much trampled for a couple of feet around both the interior and the exterior of the tipis, at the peg line itself it remained noticeably unbroken, except for the area of the doorway, in which it was badly worn down (pl. 60, *b*).

The tipi sites were carefully searched for both perishable and imperishable remains. Of the former, wood, papers, cloth, wooden tent pegs and skewers, eggshells, orange and lemon skins, a partially burnt, child's beaded moccasin and a woman's slipper were discovered; of the latter the campsite produced hearths (burnt earth, charcoal, charred wood, ash and fire-cracked or reddened rocks), burnt as well as unburnt bone fragments, pieces of glass and metal (principally food containers), corn kernels, fruit stones, a seed (probably sunflower), and a bead.

Examination of the 1956 Blackfoot encampment in conjunction with investigation of archeological tipi ring sites on the Blackfeet Reservation leads to the inevitable conclusion that the phenomena are truly homologous (pl. 59, *a*, *b*), resulting from the identical cause, the use of rocks as weights in anchoring tipis. The minor differences between the modern and the older sites are attributable to the innovations introduced into Indian life by today's civilization (e. g., stoves, metal tools, and food containers), or to the "ceremonial" aspects of the modern camp, in which several of the tipis were erected in memory of former, now deceased owners, or as showplaces, but not actually lived in, while none were intended to be more than temporary shelter during a 4-day holiday. Thus, study of the modern camp not only presents and indicates the trend for (refer to Mrs. Spanish's statement) an interesting survival of the tradition of using rocks as weights for tipis, now restricted to anchoring the inner lining; but it also illuminates the archeological tipi-ring sites, corroborating the testimonies

of early travelers and elderly informants, and indicating that the tipi rings are closely accurate markers of the sites and dimensions of the lodges of the aboriginal inhabitants of the region in which lies the Blackfeet Indian Reservation.

TABLE 4.—*Tipis in 1956 Blackfoot encampment*

Tipi No.	Owner	Tribe	East-west (feet)	North-south (feet)
1	Martin Sutta (Idaho)	Nez Perce?	16.4	15.4
2	Sister of Rides at the Door	Blackfoot	18.4	19.6
3	Dan Bull Plume	do	17.7	17.0
4	Jim Rider	do	17.6	18.0
5	Louie Fish	do	15.0	14.8
6	Fish Wolf Robe	do	19.0	19.1
7	Mary Black Man	do	18.8	18.0
8	Pete Butterfly	do	21.9	20.0
9	Rose Big Beaver	do	16.0	15.7
10	Charlie Horn	do	21.4	20.3
11	Iron Breast	do	19.5	19.5
12	Richard Little Dog	do	19.7	19.7
13	Paul Old Chief	do	20.0	20.6
14	Louise Croff	do	21.0	21.0
15	Cecile White Calf	do	18.0	17.6
16	Otter Woman	do	19.0	19.5
17	Theodore Last Star	do	21.7	19.4
18	Pete Running Crane (deceased)	do	20.0	19.5
19	Phillip Arrow Top	do	22.7	
20	Juniper Old Person	do	17.8	18.4
21	Grace Kennedy	do	17.0	16.5
22	Cecile McNabe	do	18.8	20.2
23	Cecile White Man	do	19.4	18.7
24	Charlie Reevis	do	19.7	19.75
25	Mrs. Jim White Calf	do	22.1	20.5
26	Mae Williamson	do	22.5	21.4
27	Mae Williamson	do	17.85	19.1
28	Eliza Bill	Umatilla	23.3	21.8
29	Louise Showaway	do	18.2	17.4
30	Gertrude Williams	do	21.4	20.7
31	Mary Ground	Blackfoot	19.5	19.3
32	Alan White Grass	do	18.0	17.6
33	Francis Red Horn	do	18.0	17.0
34	Jim Weasel Tail	do	19.6	20.0
35	Susan Tennywash	(?)	20.4	20.6
36	Louis Bear Child	Blackfoot	19.7	20.8
37	Rachel Big Lake	(?)	16.4	17.0
38	Sam Spotted Deer	(?)	20.7	20.4
39	Probably Fish Wolf Robe (child's play tipi)	Blackfoot	7.5	7.5

TABLE 5.—*Distance between tipis, 1956 Blackfoot encampment*

Tipi No.	Distance between (feet)	Tipi No.	Distance between (feet)	Tipi No.	Distance between (feet)
1-2	17.4	14-15	20.0	27-28	7.0
2-3	3.5	15-16	9.6	28-29	5.4
3-4	2.0	16-17	5.6	29-30	6.3
4-5	4.6	17-18	1.5	30-31	77.0
5-6	10.0	18-19	19.6	31-32	8.0
6-7	10.5	19-20	2.5	32-33	2.9
7-8	7.0	20-21	0	33-34	8.7
8-9	20.0	21-22	2.7	34-35	1.5
9-10	25.0	22-23	7.0	35-36	1.5
10-11	14.5	23-24	22.5	36-37	1.5
11-12	12.0	24-25	9.4	37-38	7.0
12-13	7.0	25-26	12.7		
13-14	24.5	26-27	5.0		

TABLE 6.—*Tipi rings, 1956 Blackfoot encampment*

Tipi No.	Number of rocks	Size of rocks (feet)	Feet from peg line	Side of peg line	Remarks
2	35	0.3–0.7	0.3–0.6	Both	
5	8				
8	8	.4– .6			Fruit and peg also.
11	9				
14	33	.3–1.2	0– .6	Inside	
15	7		0–1.0	do	
19	13	.3–1.2			
23	5	.6– .8			
25	5		.4–1.0	do	Tent peg in ring.
26	40	.3– .8	.3–1.3	do	
31	30				
33	25				Piled in center.
36	20				Piled in center; anchor pole present; shoe heel in pile of rocks also.

TABLE 7.—*Fire hearths, 1956 Blackfoot encampment*

Tipi No.	Hearth		Rocks		Diameter (feet)		Number of feet from tipi side—				Artifacts
	Unlined	Lined	Number	Size (feet)	N–S	E–W	To E	To W	To N	To S	
[1] 1		×	4	0.6–1		3.5					
1	×				2.3	2.5	6.3	7.6			Glass, bone, corn, wood, metal.
2	×				1.9	2.0	7.0	9.4	8.7	9.0	
3	×				2.1	2.4	7.0	8.3			
4	×				1.9	2.1	7.0	8.5	8.1	8.0	
5		×	1	(2)	2.2	2.3	5.5	7.0	6.5	6.3	Charcoal, ash, burnt earth, glass, metal, peach stone.
6	×				1.8	2.5	7.3	9.2	8.3	9.0	Charcoal, ash, glass, seed, corn, pebbles, peach stone.
7	×				1.3	2.1	7.0	9.7	9.0	7.7	Ash, burnt earth.
13	×				.8	1.0	7.4	11.6	8.5	11.3	Ash, bone, eggshell, peach stone.
14		×	15	.4–1.0	2.8	3.0	8.8	9.2	8.6	9.6	Charcoal, ash, burnt earth, fire-cracked rocks, metal.
16		×	14	.4– .6	2.0	2.2	7.6	9.2	8.5	9.0	Charcoal, ash, wood, metal, cloth.
19	×				1.7	1.8	7.5	13.4	10.0	10.9	Charcoal, ash, wood, metal, lemon skin.
21	×				1.5	1.2	5.5	10.3	6.5	8.5	Charcoal, ash.
22	×				1.8	1.8	7.7	9.3			Charcoal, ash, burnt earth.
23		×	12	.4– .7	2.0	2.2	7.3	9.9			Charcoal; U-shaped (gap W).
24	×				1.8	1.8	7.0	10.9	9.95	8.0	Charcoal, burnt earth.
28	×				2.8	3.0	9.2	11.1	9.5	9.5	Burnt earth and bones, logs, metal.
29		×	5	.6–1.1	2.5	2.5	8.4	7.3	6.8	8.1	Logs, metal; semicircular.
30	×				2.3	2.3	8.0	11.1	9.3	9.1	Charcoal, logs.
31	×				2.0	2.0	7.5	10.1	8.8	8.5	Charcoal, ash, burnt earth.
32	×				2.2	2.3	6.9	8.9	7.1	8.2	Charcoal, burnt earth, metal.
34	×				2.0	1.9	8.0	9.7			Charcoal.
38	×				1.0	1.5	9.0	10.2	10.0	9.4	Metal, cloth.

[1] Hearth was 6 feet southeast of Lodge 1; tin cans and bottles near it suggest cooking was done here, also. Note: None of the other sites yielded remains except Lodge 37, in which a rock and a peach stone were found.

[2] Brick.

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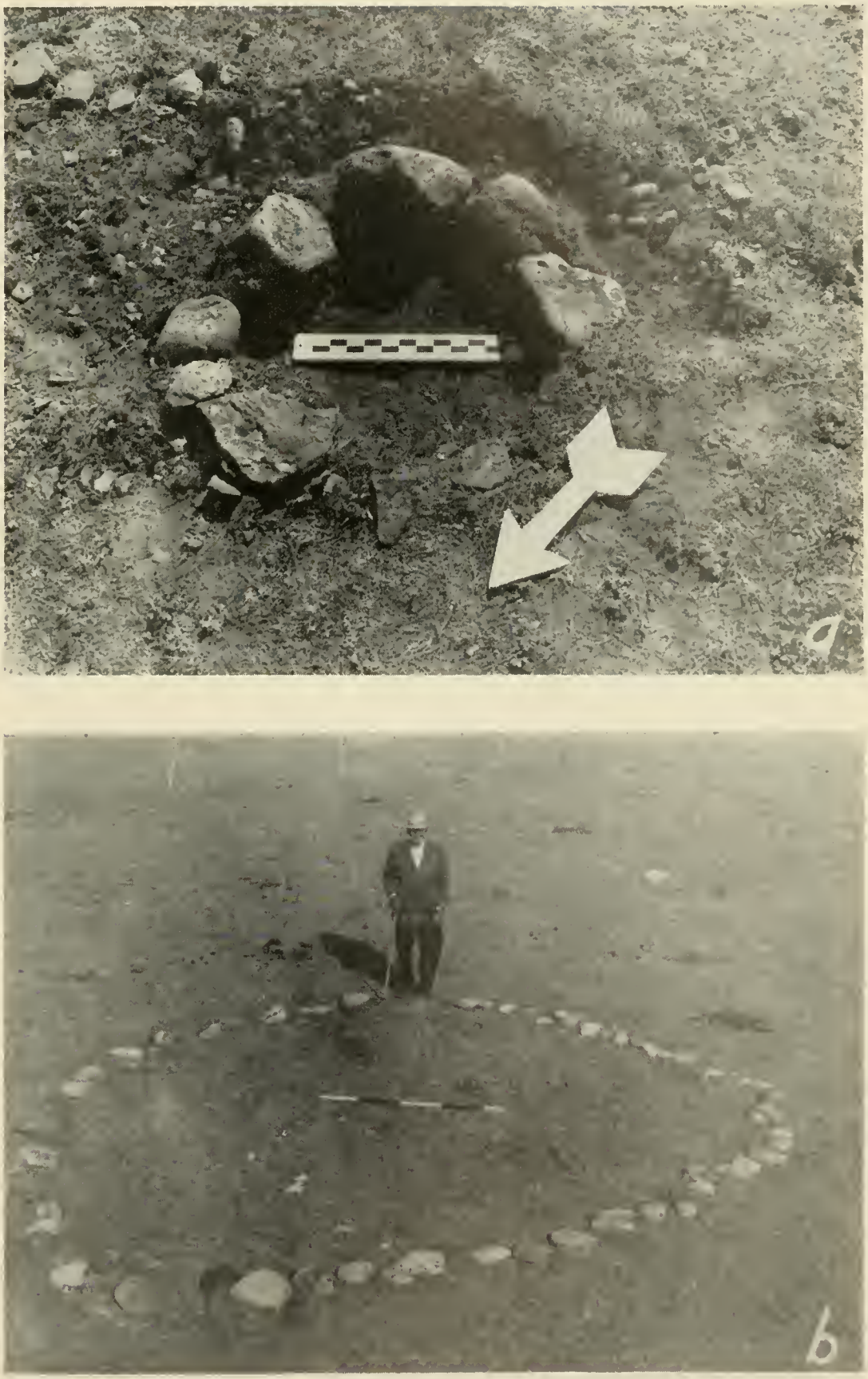
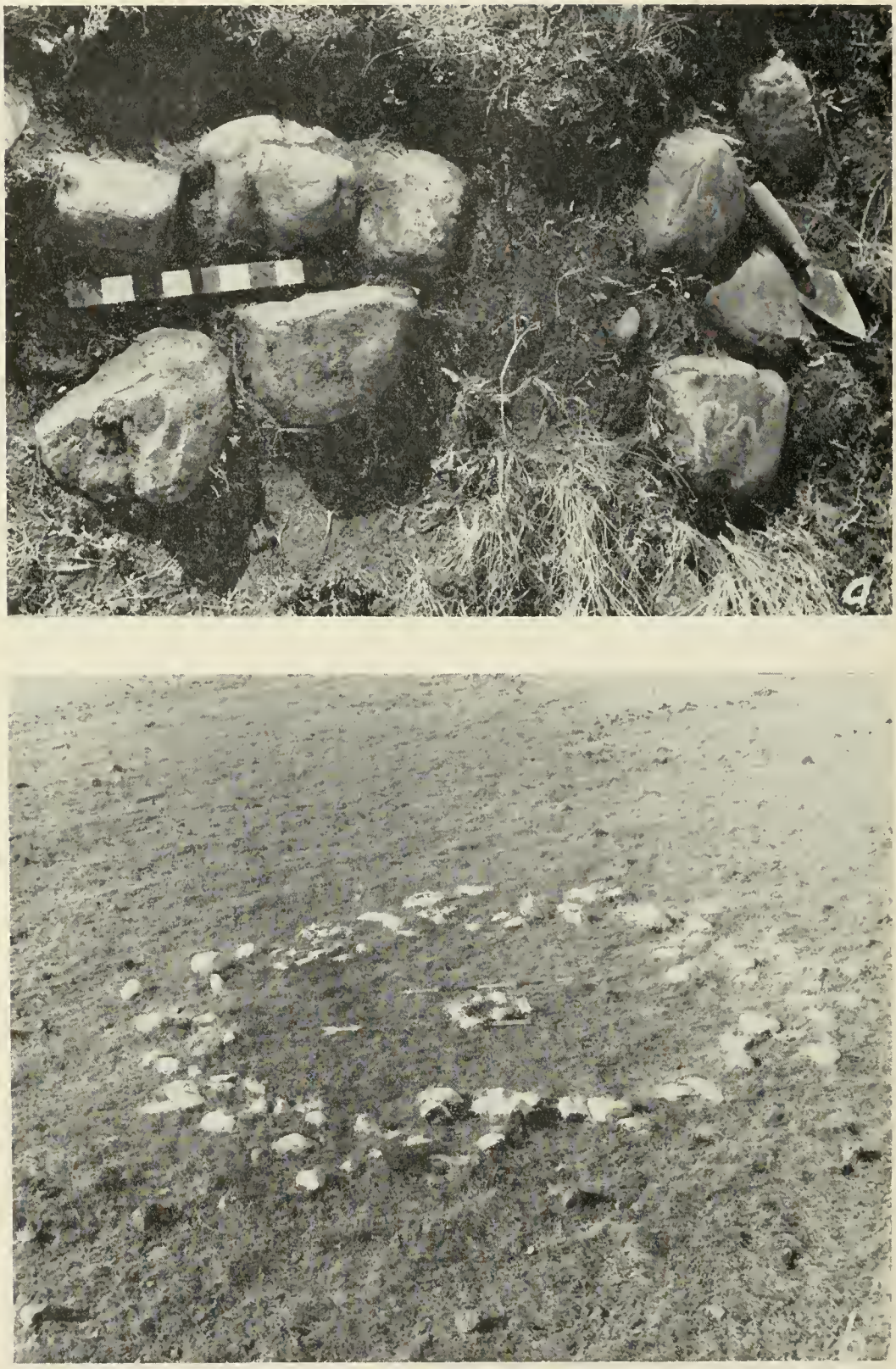


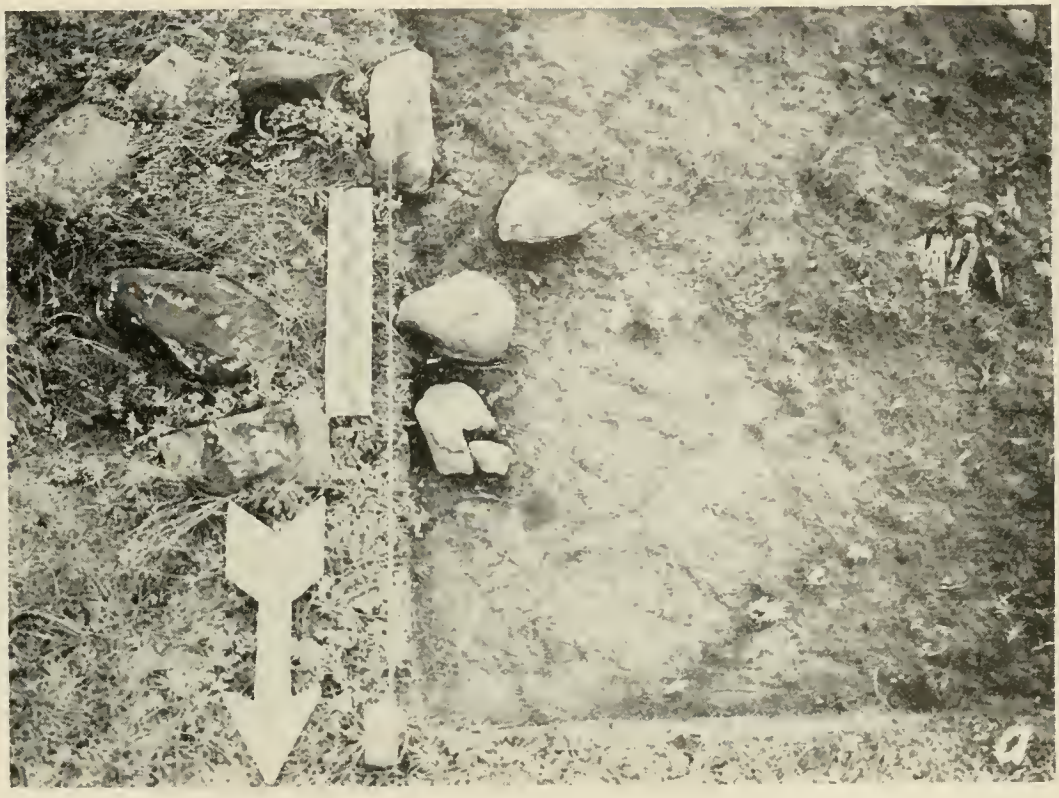
a, Site 24GL390. Boulder-lined fire hearth excavated in the center of tipi ring overlooking Greasewood Creek. Rocks were absent in west portion of fireplace; occupational material consisted of small charcoal particles. *b*, Adam White Man standing in the doorway of the tipi ring identified as belonging to his father. Arrow points east, to the spot described as the fire hearth; rocks in upper right mark outside cooking hearth. (See fig. 29.)

a, Site 24GL520. Looking down from a bison drive on the south side of Milk River Ridge. Six of a group of nine tipi rings may be seen between bottom of picture and automobile See fig. 35.) *b*, Site 24GL490. Testing boulder-lined fire hearth.

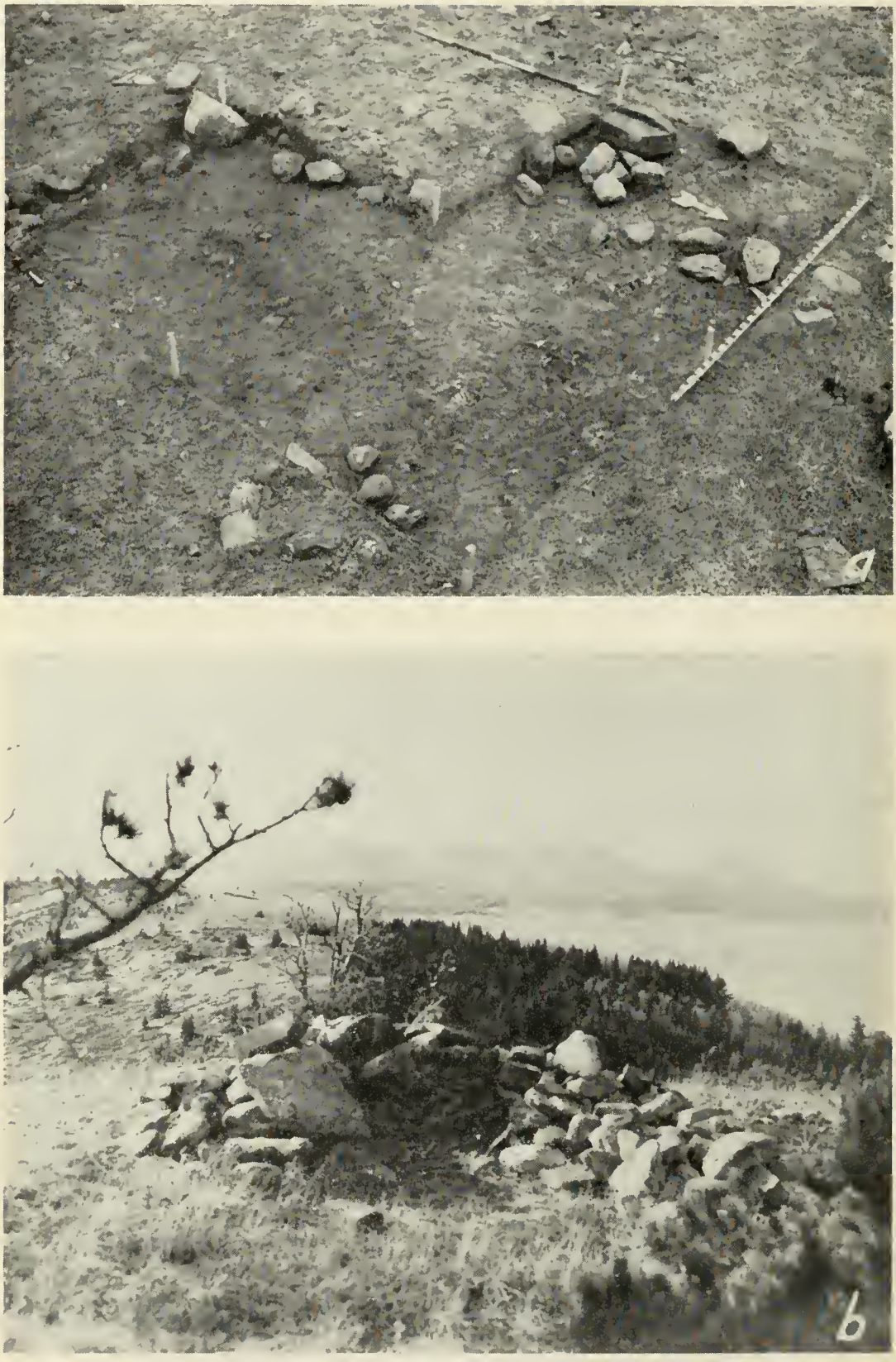
a, Looking down from the south edge of Milk River Ridge, site 24GL486 in exact center of photograph. *b*, Site 24GL487, ring I (Milk River Ridge in background).



a, Detailed view of section of the stone circle, site 24GL487, ring 4 (trowel points north). *b*, Site 24GL486, ring 4, one of a cluster of six tipi rings located on the slope of the south side of Milk River Ridge. Ring is 14 feet in diameter and contains a boulder-lined fireplace.



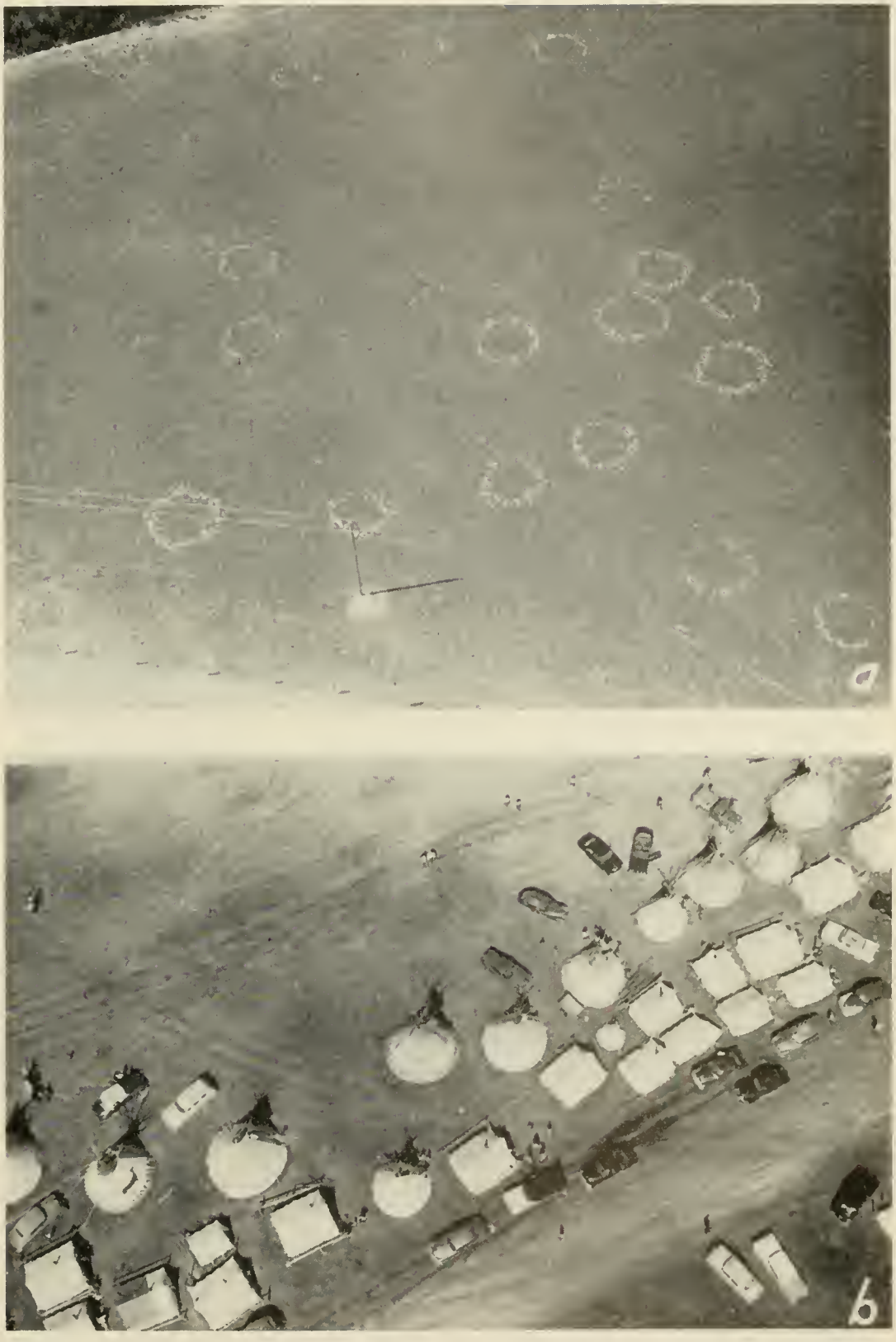
a, Rock ring fire hearth, site 24GL486, ring 4. Square 2L1 (right) excavated to hard gray layer, 0.1 foot below surface. *b*, Section of the stone circle, ring 4, site 24GL486, square 2L2; rock ring fire hearth in square 2L1 (see *a*).



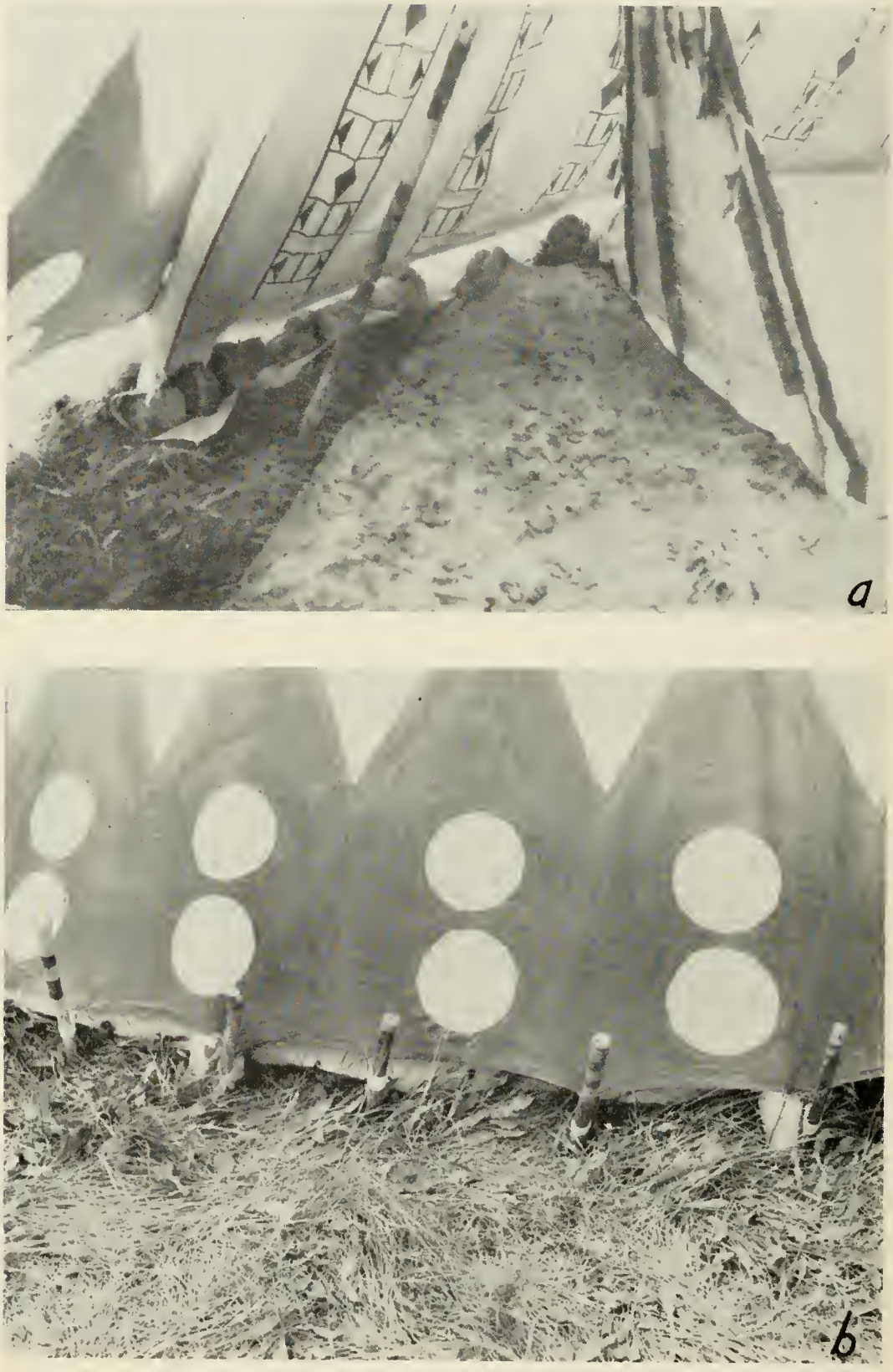
a, Site 24GL486, ring 4. Rocks in square 1L1 (upper left) displaced by blowout; square 1L2, unexcavated, shows rocks embedded in ground between excavated squares 1L1 and 2L2; rock ring hearth in foreground. *b*, Fasting shelter of Ear Rings, Earrings Hill, southeast of Starr School on the Blackfeet Indian Reservation. (Photograph taken October 1950; courtesy Claude E. Schaeffer.)

a, Site 24GL520, tipi rings associated with a buffalo drive site on the south side of Milk River Ridge. (See pl. 49, *a*.) Fragmented bones were found in abundance in the hill slope beyond the jeep. Rock pile drive lanes extend from the drop-off along the crest of the Ridge (not visible in photograph). *b*, Blackfoot woman repairing Lodge 26 at the 1956 Blackfoot encampment, Browning, Mont.

a, Oblique aerial view from the southeast of the 1956 Blackfoot encampment, Browning, Mont. *b*, Whitewashing tipi rings preparatory to photographing, site 24GL350.



a, Aerial view of site 24GL350. Note similarity of tipi-ring pattern to arrangement of 1956 encampment lodges (below). *b*, Horizontal aerial view of the south row of tipis (Nos. 2 to 12 and 39), 1956 Blackfoot encampment, Browning, Mont. Note small play tipi below larger lodge, right center.



a, Rocks holding down inner lining, Lodge 26 (owned by Mae Williamson), 1956 Blackfoot encampment, Browning, Mont. *b*, View from outside Lodge 26, showing rocks pushing out inner lining (see *a*).

a, Rocks forming a tipi ring after removal of inner lining and tipi cover of Lodge 26, 1956 Blackfoot encampment, Browning, Mont. (tipi poles still standing in place). *b*, Removal of the poles of Lodge 14, showing rock-lined fire hearth and tipi ring remaining.

a, Mary Ground in the center of the tipi ring left after removal of her tipi, Lodge 30, in breaking camp, 1956 Blackfoot encampment, Browning, Mont. *b*, Mary Ground's tipi ring and unlined fire hearth after her departure (see *a*).

a, Closeup view of Mary Ground's tipi ring, site of Lodge 30, 1956 Blackfoot encampment, Browning, Mont. Dotted line indicates former position of tipi pegs (i. e., edge of lodge cover). Note lack of packing of grass along edge of ring. *b*, Blackfoot man using 2-foot-wide doorway of Lodge 2, 1956 encampment.

a, Children's play tipi, Lodge 39, next to Lodge 6, 1956 Blackfoot encampment, Browning, Mont. *b*, Tom Horn's family in front of their tipi, Blackfoot Reservation, 1910. (Note rock weights.)