

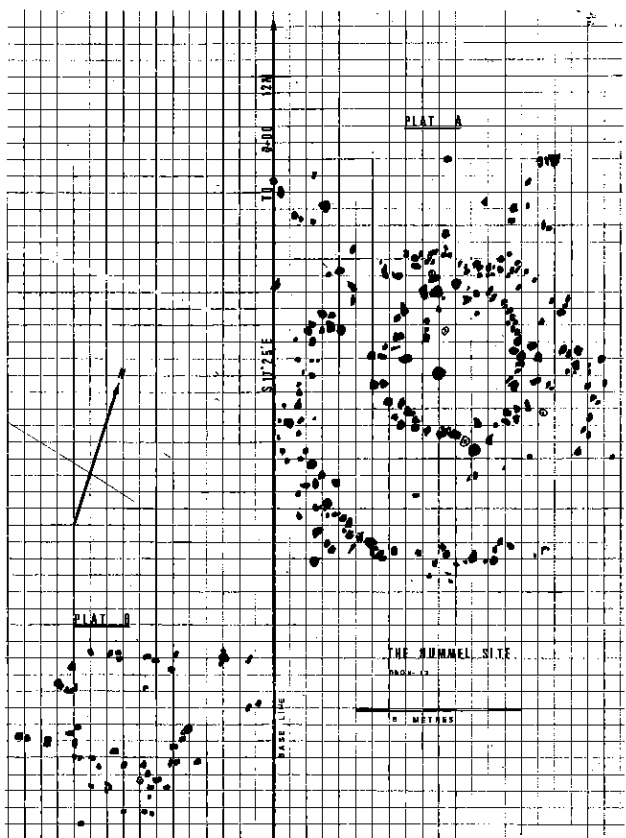
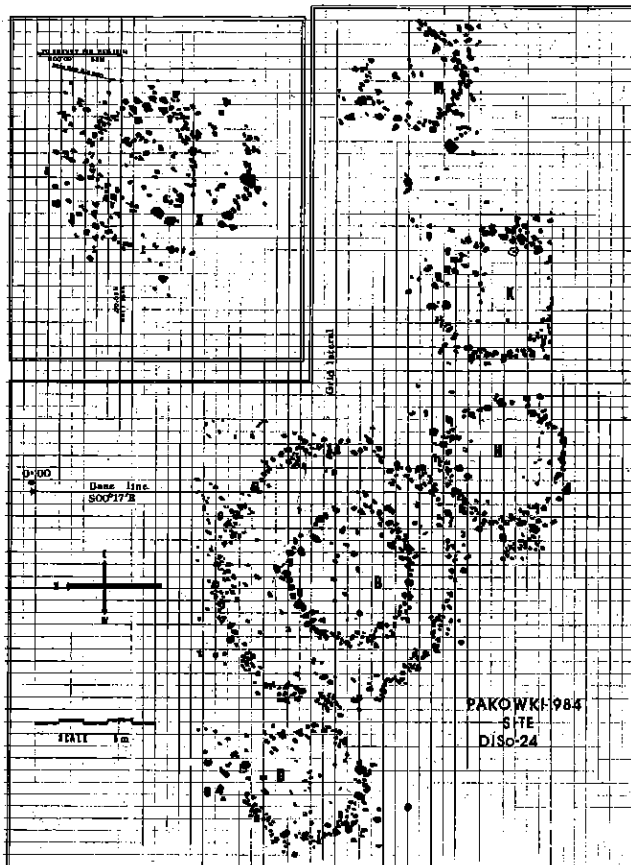
Lab #4

R.W. Baerendse

Archaeological  
Society of Alberta

LETHBRIDGE CENTRE

# Camp Sites and Ceremonial Circles



Reports on:

The Grand Forks Site  
Bow Island Site

Hummel Site  
Pakowki - 1984 Site

CAMPSITES AND  
CEREMONIAL CIRCLES

A 1984 publication of

THE ARCHAEOLOGICAL SOCIETY OF ALBERTA  
LETHBRIDGE CENTRE

REPORTS ON:

THE GRAND FORKS SITE	PROJECT NUMBER 19
THE BOW ISLAND SITE	PROJECT NUMBER 21
THE HUMMEL SITE	PROJECT NUMBER 22
THE PAKOWKI-1984 SITE	PROJECT NUMBER 23

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Editor J. H. Carpenter.

## ACKNOWLEDGMENTS

### HEALTH AND WELFARE CANADA--NEW HORIZONS PROGRAM.

The Lethbridge Centre is grateful for the assistance Health and Welfare Canada has given to our retired senior members (35 in number). Through their New Horizons program our members have received new and lighter frames for the mapping of petroforms and much other equipment that has made our chosen work more enjoyable and satisfying, resulting in publications such as this.

### MEMBER ASSISTANCE

The following members have assisted at each of these sites; The Grand Forks (1), the Bow Island (2), the Hummel (3) and the Pakowki-1984 (4):-

Henry Anderson (1, 3)	Bruce Anderson (1)	Tom Allen (1)
Sid Birkenhagen (4)	June Carpenter (1, 3, 4)	Jim Carpenter (1,2,3,4)
Barbara Carriere (3)	Andrea Chadsey (1)	Claudette Chadsey (1,3,4)
Leslie Darjes (3, 4)	John Dormaar (1,2,3,4)	Armin Dyck (3)
Gerry Dyck (3)	David Elford (3, 4)	Ralph Erdman (1, 4)
Andy Graspoiner (3)	Lawrence Halmrast (1,3,4)	Glen Hamilton (1, 3, 4)
Gudrun Hesse (1)	Caroline Hudeck (4)	Wallace Hummel & son (3)
James Kew (1)	Elsie Kitchener (1, 3, 4)	Al Machacek (1, 2)
Jennie MacKenzie (3)	Duncan Mackintosh (1, 3)	George Morden (3)
Michael O'Shea (3)	Leah Poelman (1, 3)	Ralph Poelman (1)
George Reti (1)	Hazel Ross (3, 4)	Gorden Ross (3, 4)
Peggy Prato (4)	Linda Sears (1, 3)	Herb Sivyler (3)
Ed Sloboda (3)	Pheona Sloboda (3)	Wendy Sloboda (3)
L. Stanford & wife (3)	Barbara Stewart (1,3,4)	Carly Stewart (1, 3, 4)
Elza Tudor (1, 3)	Charles Tyrrell (1)	Linnea Walker (1, 3)

Special thanks go to Jim Carpenter for the diagrams and compiling this report; to Dr. John F. Dormaar for soil examination and the research and manuscript on the Bow Island site; to Glen F. Hamilton for the survey work; to Lawrence Halmrast, Henry Anderson, Carly Stewart, Gudrun Hesse and Ralph Erdman for the photography; to Dr. Alex Johnston, Linnea Walker and Elsie Kitchener for their research on the flora and fauna and to Linda Sears for her introduction to the Hummel site.

Orders for this publication should be mailed to the treasurer. A special discount of 40% will be allowed book stores on orders of 5 or more copies.

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August 1984.

THE ARCHAEOLOGICAL SOCIETY OF ALBERTA  
LETHBRIDGE CENTRE  
PROJECT REPORTS

THE GRAND FORKS

Project Number 19 22 September 1979; 9 October 1981; 20 June 1982. Site D10w-4.  
A report on circular and linear stone petroforms.

BOW ISLAND

Project Number 21 21 August 1980. Site D10w-7. A report on soil investigations  
at three depressions on the south end of Bow Island.  
By Dr. J. F. Dormaar.

The Grand Forks and Bow Island sites are written up in one report as the sites are both at the junction of the Oldman and Bow rivers. The reports on the other two sites, Hummel and Pakowki-1984, are also included in this booklet.

THE GRAND FORKS

The Grand Forks is the confluence of two large river systems in the northern part of North America's Great Central Plains. The Plains in this area slope gently eastward losing a mean average elevation of 1 m in each kilometre. The Bow River, flowing generally southeast from the Rocky Mountains, is bounded on the north by the Wintering Hills. When it reaches the middle Sand Hills, near the Saskatchewan border, it arcs southward to join the Oldman River. The Oldman River starts in the Rocky Mountains some 240 km south of the Bow River and flows north of the Milk River Ridge in an east by north direction. The two rivers join in a broad valley some 90 m below the surrounding Plains and their meanderings form the Bow Island at the junction, so named because of the bow shape. The eastern flow of these two rivers from this junction is called the South Saskatchewan River.

THE CAMPSITE

Along the banks of the Bow, the Oldman and the South Saskatchewan Rivers there is ample evidence of early man. The Grassy Lake cairn and medicine wheel (D10v-1 and D10v-2) (J. H. Carpenter, 1976) is 6.5 km to the east while to the west is the Ross Site (D1Pd-3) (Richard G. Forbis, 1957) which contains two buffalo kill sites. Further west still is the Stalker Site DkPa-1) (A. MacS. Stalker, 1969) in which Dr. Stalker came across "fragmentary human skeleton of an immature individual of respectful antiquity" (H. M. Wormington and Richard G. Forbis, 1965). West along the Oldman and Bow rivers the banks are lined with campsites, cairns, kill sites, medicine wheels, buffalo jumps and drive lanes. East along the South Saskatchewan River the same evidence of early man is amply displayed.

The Grand Forks campsite, covering over 100,000 m<sup>2</sup>, is situated on a level terrace to the east and some 7 to 15 m above the river bed of the Oldman river where it swings to the north just before joining the Bow River. The site was first brought to the attention of the Archaeological Society of Alberta, Lethbridge Centre, in the spring of 1979. The Centre commenced mapping that September. The grid area mapped was 10,800 m<sup>2</sup> (Figure 6) and mapping was not completed until 1980.

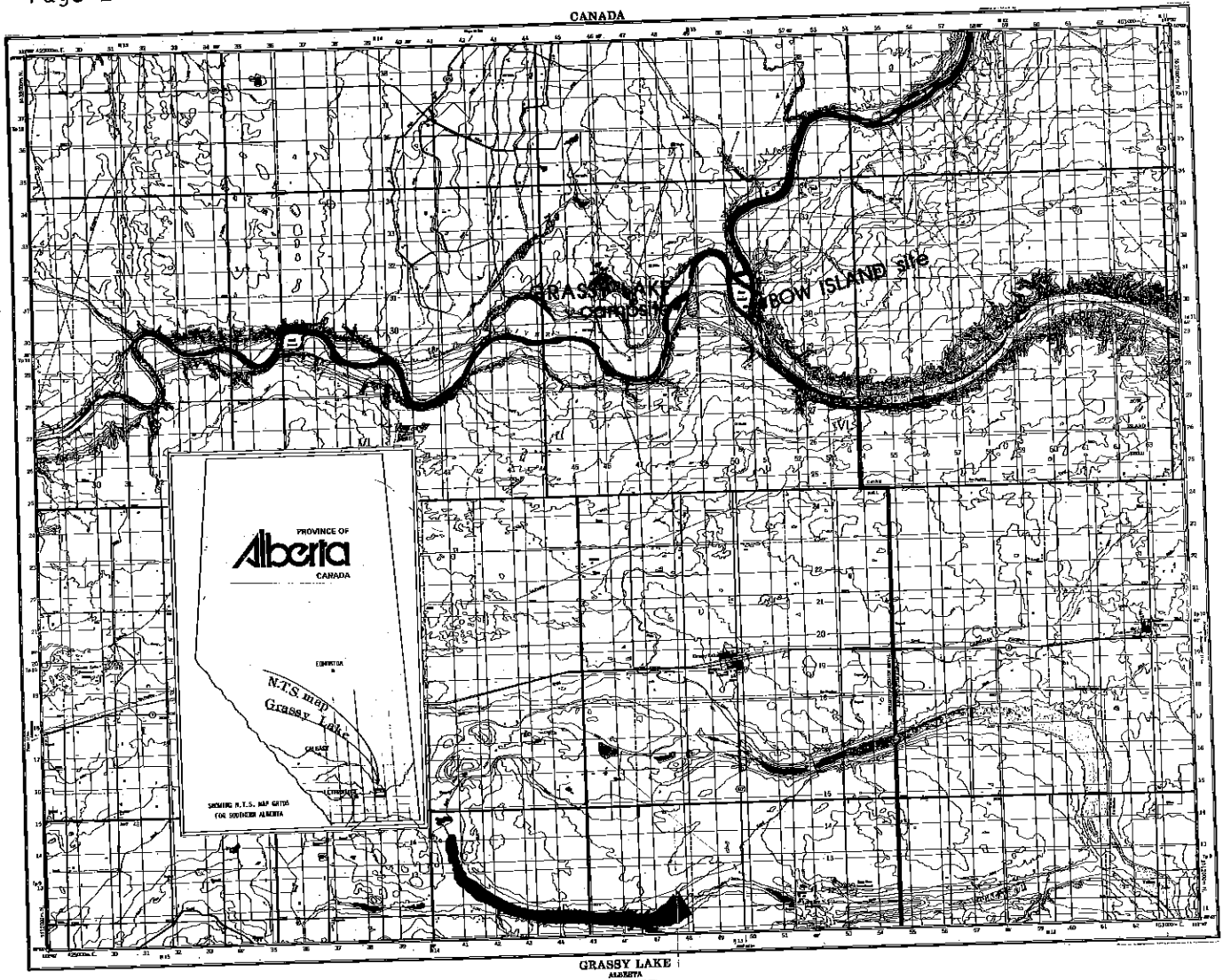
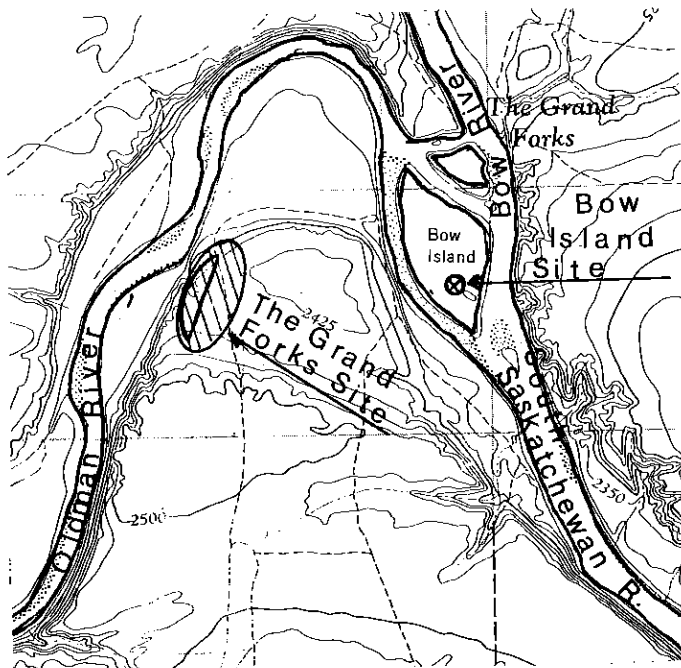


FIGURE 1-- The N.T.S. Provisional Map 72E/13, Edition 2 MCE, Series A 741. Inset of Alberta map shows location within the province and both sites are shown.



The enlarged area of the map shows the confluence of the three rivers and The Grand Forks and Bow Island sites.

The Grand Forks Site has Borden number D10w-4 and is on latitude 49°56' and longitude 111°43'. The site straddles the N-S ½ section line (NE-SE¼)(SE-NE¼) S21 T11 R13 W4. UTM location is 12UVL488305.

The Bow Island Site is D10w-7. The latitude is 49°55'30" and longitude is 111°41'. The site is on the south end of the island in SE-NE¼ of Section 22 T11 R13 W4. The UTM location number is 12UVL505304.

West of the campsite was the Oldman River and the river banks in this area are generally perpendicular, and due to their height, 2 to 4 m, were almost impossible to climb.

To the north, following the east bank of the Oldman River, the land slopes gently downward until it reaches that point where the river forms a horse-shoe bend about 1 km downstream and joins with the Bow and South Saskatchewan. The soils on the terrace become more silty and sandy as it nears the river.

To the east where the terrace rises to a higher elevation there were a number of rock chips, cores and fragments which suggested that the higher ground was a favorite tool-making area. Throughout the grid mapped area there were many cobblestone tools and what seemed to us a shortage of fire-broken rock and of fire hearths in association with the stone circles we were mapping.

To the south the land rises to the Plains which are approximately 76 m above the terrace. To the immediate south of the mapped area was a wash which had cut a deep ravine down to the river which in turn made an ideal walkway to the river and to the forested area on the flood plain to the south.

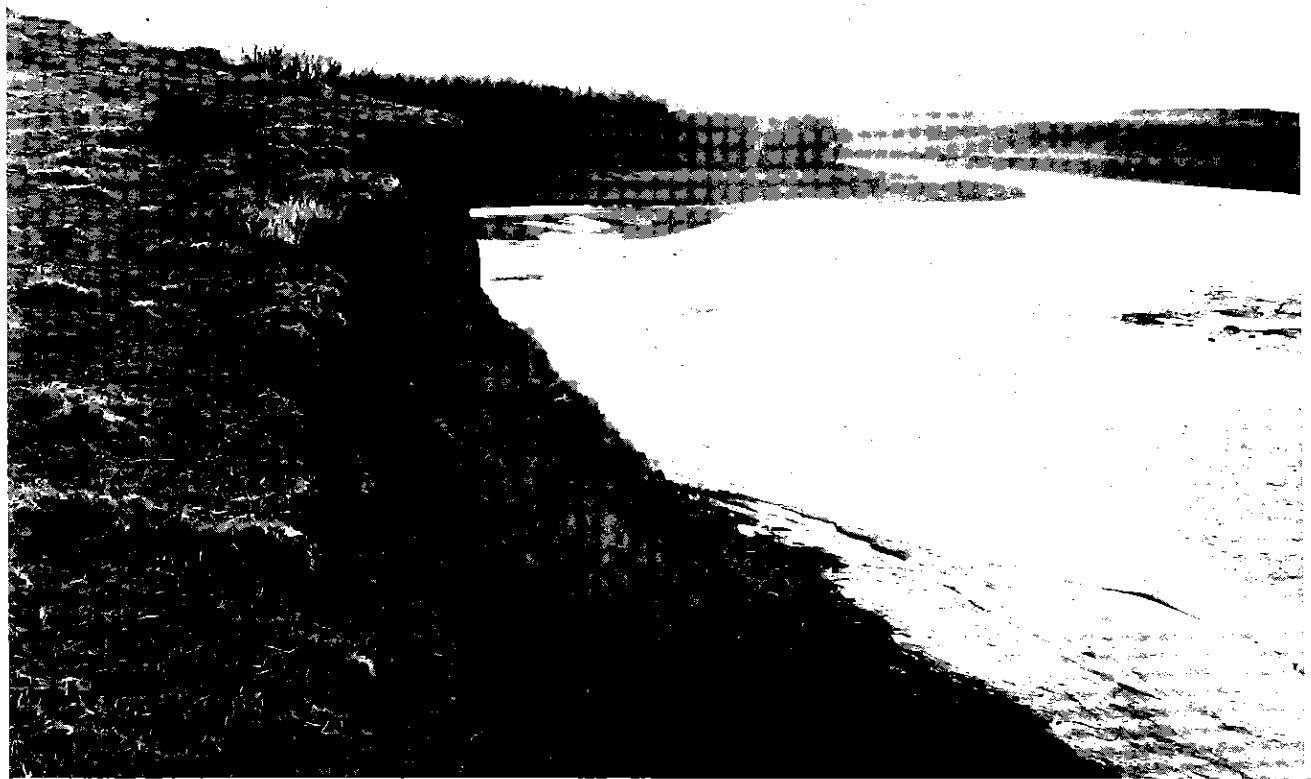


FIGURE 3--Photograph shows the western edge of the terrace, the eroded river banks, the Oldman River and the trees on the flood plain to the southwest.

In 1980 the Centre mapped the grid area (FIGURE 6) we did not have any surveying equipment with us and we had to return again in the fall of 1981. At this time on a slightly higher terrace south and west of the ravine we noticed a number of other stone circles and stone outlines. The vegetation was quite high and although we mapped a number of the circles we undoubtedly missed some. We did not attempt to map any of the partial circles nor did we find any unusual rock patterns.

## SOILS

Soil analysis is usually expressed by various formulae and for better understanding of these formulae a Glossary of Terms is partially reprinted.

### Order, soil -

A category in the Canadian system of soil classification. All the soils of Canada have been divided into eight orders: Chernozemic, Solonetzic, Luvisolic, Podzolic, Brunisolic, Regosolic, Gleysolic and Organic. All the soils within an order have one or more characteristics in common.

### great group -

A category in the Canadian system of soil classification. It is a taxonomic group of soils having certain morphological features in common, such as colour, and a similar pedogenic environment.

### subgroup, soils -

A category in the Canadian classification system. These soils are subdivisions of the great groups and therefore each soil is defined more specifically.

### Horizon, soil -

A layer of soil or soil material approximately parallel to the land surface; it differs from adjacent genetically related layers in properties such as colour, structure, texture, consistence, and chemical, biological and mineralogical composition.

A - A mineral horizon formed at or near the surface in the zone of removal of materials in solution and suspension, or maximum in situ accumulation of organic carbon, or both.

B - A mineral horizon characterized by one or more of the following:

- 1) An enrichment in silicate clay, iron, aluminum, or humus.
- 2) A prismatic or columnar structure that exhibits pronounced coatings or stainings associated with significant amounts of exchangeable sodium.
- 3) An alteration by hydrolysis, reduction, or oxidation to give a change in colour or structure from the horizons above or below, or both.

C - A mineral horizon comparatively unaffected by the pedogenic processes operative in A and B, except gleying, and the accumulation of carbonates and more soluble salts.

h - A horizon enriched with organic matter.

Ah - An A horizon of organic matter accumulation. It contains less than 17% organic carbon. It is one Munsell unit of colour value darker than the layer immediately below, or it has at least 0.5% more organic carbon than IC, or both.

m - A horizon slightly altered by hydrolysis, oxidation, or solution, or all three, to give a change in colour, or structure or both.

k - Presence of carbonate.

### Munsell colour system -

A colour designation system specifying the relative degrees of the three simple variables of colour: hue, value, and chroma. For example: 10YR 6/4 is the colour of a soil having a hue of 10YR, a value of 6, and a chroma of 4. These notations can be translated into several different systems of colour names.

## Munsell colour system - (continued)

## chroma -

The relative purity, strength, or saturation of a colour. It is directly related to the dominance of the determining wavelength of light. It is one of the three variables of colour.

## hue -

The aspect of colour that is determined by the wavelengths of light, and changes with the wavelength. Munsell hue notations indicate the visual relationship of a colour to red, yellow, green, blue, or purple, or an intermediate of these hues.

## value, colour -

The relative lightness of colour, which is approximately a function of the square root of the total amount of light.

## pH, soil -

The negative logarithm of the hydrogen-ion activity of a soil. The degree of acidity or alkalinity of a soil as determined by means of a glass, quinhydrone, or other suitable electrode or indicator at a specified moisture content or soil-water or soil-calcium chloride solution ratio, and expressed in terms of the pH scale.

## reaction, soil -

The degree of acidity or alkalinity of a soil, usually expressed as a pH value. Descriptive terms commonly associated with certain ranges in pH are: extremely acid, less than 4.5; very strongly acid, 4.5-5.0; strongly acid, 5.1-5.5; moderately acid, 5.6-6.0; slightly acid, 6.1-6.5; Neutral, 6.6-7.3; slightly alkaline, 7.4-7.8; moderately alkaline, 7.9-8.4; strongly alkaline, 8.5-9.0; and very strongly alkaline, greater than 9.0.

SOIL ANALYSIS

by J. F. Dormaar 22 September 1979

The soil on the site has the general properties of the Chernozemic Order, the Brown Great Group, and the Calcareous Subgroup. It has a B horizon from which primary alkaline earth carbonates have not been removed completely.

TABLE 1

Description of Calcareous Brown Chernozemic soil profile at The Grand Forks site.

Soil location	Depth (cm)	Colour (wet) Munsell (10YR)	Description	pH <sub>CaCl<sub>2</sub></sub>	Structure
Area Soil	Ahk 0-10	5/3	brown	8.2	loose to granular
	Bmk 10-30	6/4	light yellowish brown	8.6	strongly columnar
	Ck 30+	7/4	very pale brown	8.7	friable
Soil - 3.6 m ring	Bm <sub>1</sub> 10-12	6/3	pale brown	7.8	loose to friable
	Bm <sub>2</sub> 12-16	6/4	light yellowish brown	8.2	coarse platy
	Bm <sub>3</sub> 16-18	6/4	light yellowish brown	8.2	columnar
	Bmk 18-30	6/4	light yellowish brown	8.6	strongly columnar
Soil - 5.4 m ring	Bm <sub>1</sub> 10-11	6/4-6/3	lt. yell. to pale brn	8.3	coarse platy
	Bmk 11-30	6/4	light yellowish brown	8.6	strongly columnar



The soil samples were obtained from around and underneath granite boulders of two different stone circles. The boulders lifted for a closer examination of the soil underneath were about 22 by 18 cm and 13 cm thick of which about 10 cm was below the soil surface just touching the B horizon; they were partially lichen covered. Many small quartzites were scattered around the area together with stone chips.

### CONCLUSION

In terms of soil development under the boulders it can be concluded that the boulders of the 3.6-m rings tested have been in situ longer than those of the 5.4-m ring.

Editor's comment--It has long been concluded that with the coming of the horse to the western plains, between 1725 and 1750, Indian lodges increased in size from approximately 3 m to 6 m in diameter. The use of smaller lodges, such as sweat lodges, continued to be used for special purposes. To establish a relative dating for these lodges Dr. Dormaar pioneered the idea of examining the boulderflow (water flowing over boulders) on soil transformation under the abandon tipi boulders.

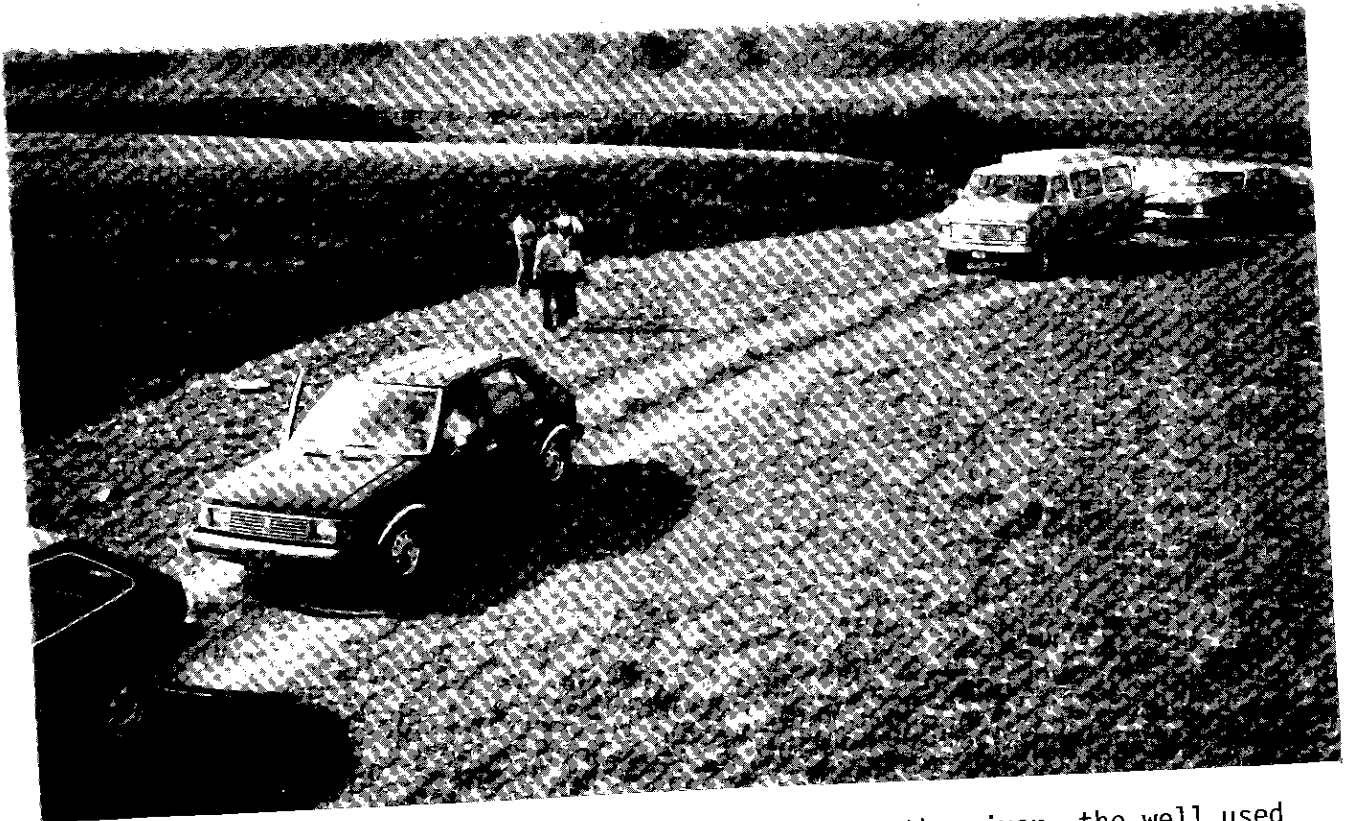


FIGURE 4--This photograph shows the ravine leading to the river, the well used prairie trail, the higher terrace to the south of the grid mapped area, the river just past the last car and the pasture land west of the Oldman river.

### FAUNA

On each occasion when the Society members visited this area there were picnickers, campers, hunters and always fishermen somewhere. The fluctuating depth of the river bed is the habitat for a variety of fish. The deep pools support the sucker, the sturgeon, the pike and pickerel and the goldeye while the odd species of trout and the Rocky Mountain Grayling (actual name Mountain White-

fish) feed in the ripples. In the silt/sand banks along the river the fresh water clams seem to be plentiful.

On one occasion in the fall, nine white pelicans were seen fishing the ripples just downstream from the island. It was at the time when the grayling were going upstream to spawn and five fish were caught while we watched. On the river were Canada Geese, many varieties of ducks, some sandpipers and even the Great Blue Heron. On the uplands south of where we mapped were about two dozen Long-billed Curlews busy feeding for their migration south. The killdeer, horned lark and meadow lark as well as the ever present red-winged blackbirds all made themselves heard. In the stands of poplar, cottonwood and willow song birds sang. The Great Horned Owl was seen here also while high overhead two golden eagles were circling.

It seemed that antelope were everywhere. While mapping two groups of three and one group of four came to watch us and on the pasture land across the river a herd of twelve were feeding. While surveying in the winter of 1983-4, three herds totalling 57 antelope were counted. There were also jack rabbit, cottontail rabbits, Richardson ground squirrels and the long-tailed weasel seen at one time or another. We did not see the prairie coyote, badger, beaver or skunk although these too frequent the area. Before the coming of the European settler the plains grizzly, elk, deer, moose and great herds of buffalo roamed the valleys. There is no wonder that, back through the centuries, this place the Blackfoot Indians called OMAK-ETAOW-TOWUGHTY was a meeting place, a camping place, a hunting place and a fishing place. The wonder is that, with all the pressures the modern day people put on the land and the river, it still remains a good meeting place, camping place, hunting place and fishing place.

#### FLORA

This region is part of the Mixed Prairie complex, an assemblage of drought-tolerant species of low productivity. The average stocking rate is about 1.7 hectares per Animal Unit Month. Precipitation is in the order of 350 mm per year with a range of from 150 to 670 mm. Temperatures range from  $-40^{\circ}\text{C}$  in January to  $40^{\circ}\text{C}$  in July.

Important grasses in the complex were needle-and-thread, blue grama, Sandberg's bluegrass, June grass, western wheatgrass and northern wheatgrass. Forbs, non grass-like herbs, includes moss phlox, prairie parsley, umbrella-plant, bastard toad-flax, wild vetch, northern hedysarum, fleabane, scarlet globe mallow, Colorado rubber-plant, white beard-tongue, golden bean, sulphur plant, yarrow, prairie onion, prickly-pear cactus and pincushion cactus. Stands of willow, Saskatoon and chokecherry grew in nearby coulees, as did stands of wild rose; nettles grew among these species. Shrubs and shrub-like plants included fringed sage, silver sage and hoary sage. More willow and cottonwood grew along the river. There were considerable amounts of little club moss on the ground surface with here and there small patches of lichens.

#### EARLY PLANT USAGE

Many of the plants were used in one way or another by the original Indian population of the region. These included the golden bean, called by the Indians the buffalo flower because blooms appeared when the buffalo bulls were prime and fit to hunt. The prairie onion was eaten as was the prairie parsley. All of the sages were used in religious rituals while the fringed sage had in addition medicinal properties. Yarrow was used as a spring tonic by the aboriginal population and later by the white settlers. The berry of the pincushion cactus was eaten

while the fruit of the saskatoon, particularly, and the chokecherry formed the most important vegetable food of the meat-eating Plains Indians. Wood of the saskatoon was used in the manufacture of arrow shafts. The tips of the willow contain aspirin and were boiled, the decoction then being used in the treatment of fever. The flowering of the wild rose, now Alberta's floral emblem, coincided with the spring flood stage of the Missouri river; the Blackfoot were careful not to plan raids into Crow Indian country at this season.

# THE GRAND FORKS SITE D & OW - 4

SCALE 1 50 METRES

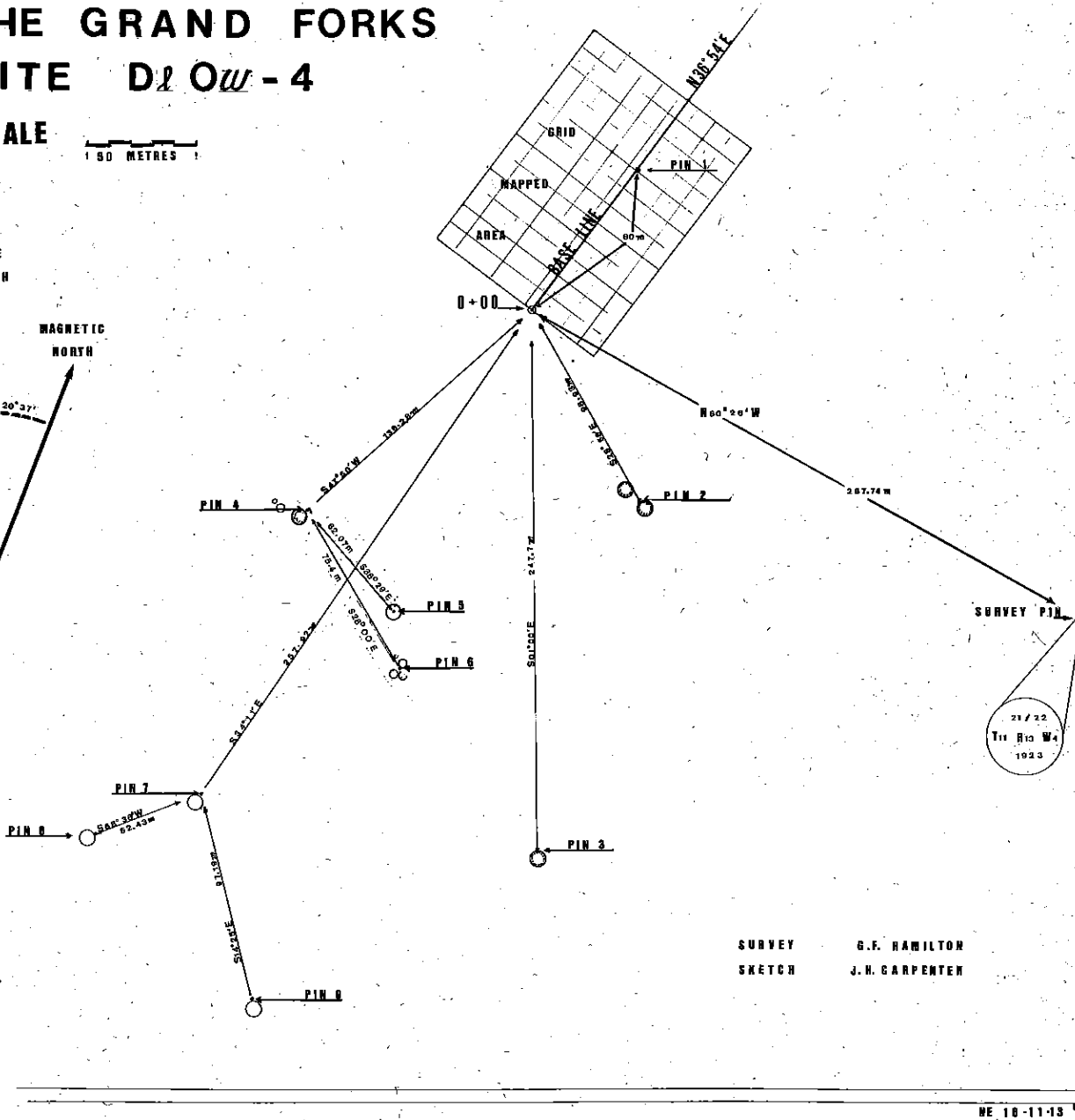
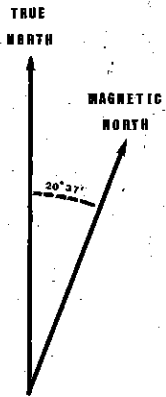


FIGURE 5--This topographical survey sketch is of the east central portion of Section 21 Township 11 Range 13 West of the 4th Meridian. The north part shows a large square which is the grid mapped by the society members as a block grid. The survey markings with pins 2 to 9 are where individual mappings of small boulder outlines took place.

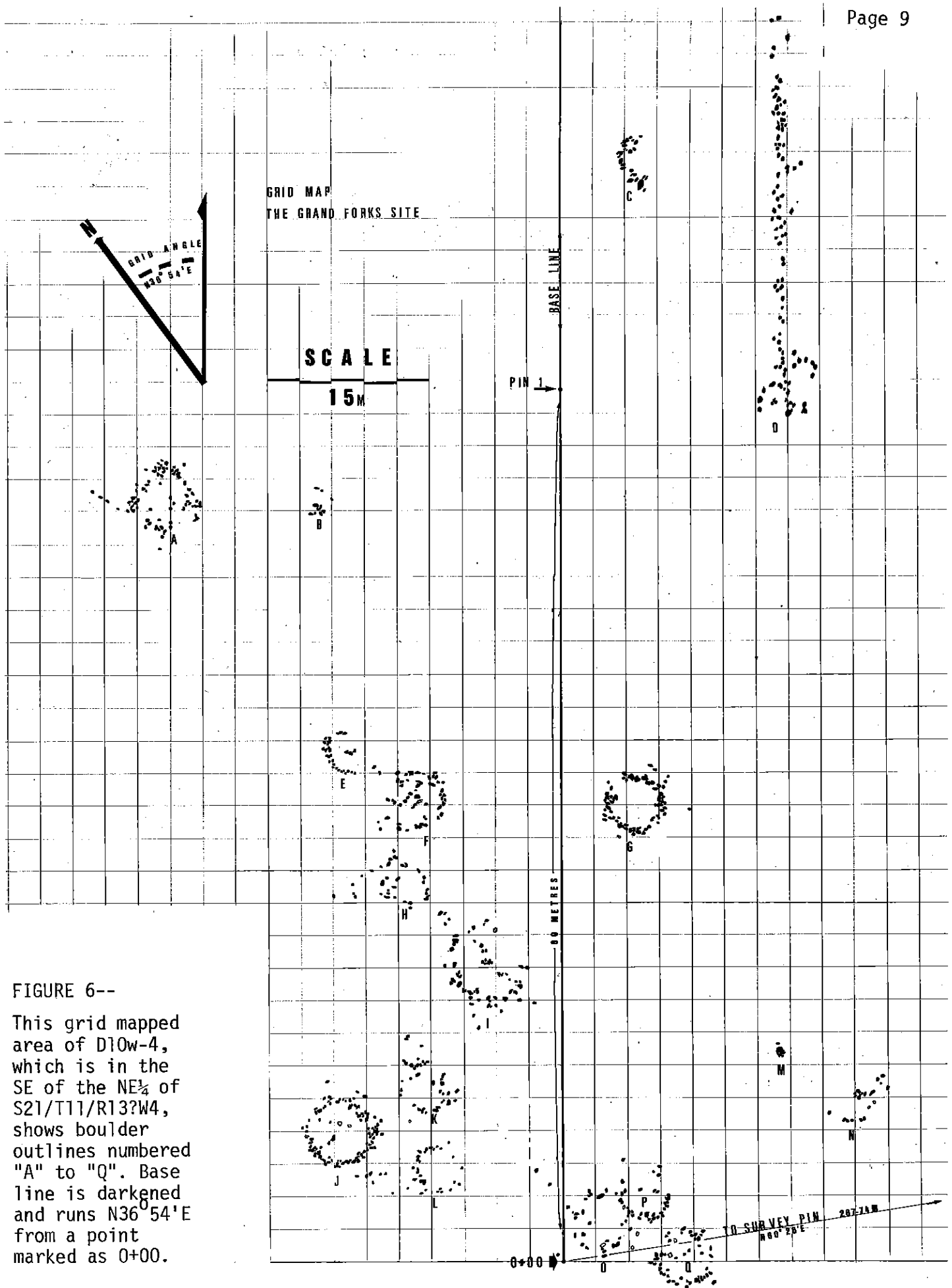


FIGURE 6--

This grid mapped area of D10w-4, which is in the SE of the NE 1/4 of S21/T11/R13?W4, shows boulder outlines numbered "A" to "Q". Base line is darkened and runs N36°54'E from a point marked as 0+00.



FIGURE 7--Photograph shows some of the field crew from the Lethbridge Centre of the Archaeological Society of Alberta setting out the mapping frame. The tape and line measurements are from the base line N36°54'E from the point 0+00.

MAPPING TECHNIQUE

The Lethbridge Centre, when mapping, uses a 3 m x 3 m frame which is marked off in 50 cm squares with strong twine (see above photograph). The mapping paper is marked out similar to the frame and has in the upper right hand corner a plat numbering square for easy reference.

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

The frame is called a FRAME and a square area of ground that will accommodate 36 frames is called a PLAT.

For larger areas we measure a square of land 180 m x 180 m which we call a GRID. The GRID is numbered alphabetically in compass segments (eg. NWA = northwest A) (Figure 9). This GRID will accommodate 3,600 frames.

FIGURE 8--  
The PLAT

Before mapping is commenced a central point to the area is selected and marked with a metal pin. This point we call 0+00 (\*), from which we run a BASE LINE, generally in a north-south direction. The BASE LINE is marked off every 3 m for FRAME work and a stake is set every 18 m for PLAT measurements.

### THE GRID MAPPED AREA

NWA	NWB	NWC	NWD	NWE	NEA	NEB	NEC	NED	NEE
NWG	NWH	NWI	NWJ	NWK	NEG	NEH	NEI	NEJ	NEK
NWL	NWM	NWN	NWO	NWP	NEL	NEM	NEN	NEO	NEP
NWQ	NWR	NWS	NWT	NWU	NEQ	NER	NES	NET	NEU
NWV	NWW	NWX	NWY	NWZ	NEV	NEW	NEX	NEY	NEZ
SWA	SWB	SWC	SWD	SWE	SEA	SEB	SEC	SED	SEE
SWG	SWH	SWI	SWJ	SWK	SEG	SEH	SEI	SEJ	SEK
SWL	SWM	SWN	SWO	SWP	SEL	SEM	SEN	SEO	SEP
SWQ	SWR	SWS	SWT	SWU	SEQ	SER	SES	SET	SEU
SWV	SWW	SWX	SWY	SWZ	SEV	SEW	SEX	SEY	SEZ

FIGURE 9--The GRID area. Centre point (\*) is usually marked 0+00 and the heavy mar-ed line is usually the Base Line.

northeast which appeared to be in association with the cairn. Circle "G" was formed with a heavy concentration of rocks around the perimeter; the doorway was to the north and there was no evidence of a fire hearth. "I" was just under 6 m outside measurement and was 4.5 m in diameter on the inside. Circles "O" and "Q" were not well defined but both of these also appeared to have the doorway facing north and were about the same size as "G". The half circle to the northeast of these, "P", had a heavy concentration of rock for the south arc and a few scattered rocks for the north arc. This was one of the smaller circles and if completed would have measured about 4 m in diameter. Neither circle "J", which was well defined with a doorway to the north, nor the two smaller circles, "K" and "L" to the southeast, showed evidence of a hearth.

### THE ROCK ALIGNMENT

The most interesting aspect of this camping area is the rock alignment, "D", to the northeast of the campsite. The alignment runs north by east from two half circles of stone which are about 3 m in diameter. The rocks are well concentrated in a straight line for about 36 m. There is a small grouping of rocks, "C", to the northeast of the line but these rocks do not seem to be associated with the rock alignment. There are 100 rocks in the line and arcs. all rocks are a reasonable size, 30 cm x 20 cm to 10 cm x 8 cm and all are well seated in the soil. The line is also about 200 m west of the fence line between sections 21 and 22 and it is doubtful if an old fence line ran along this angle.

The rock alignment is not novel to this particular campsite and is not found strictly in connection with campsites. To the southeast, down stream from The Grand Forks campsite about 6.5 km, is the Grassy Lake Cairn and Medicine Wheel.

A well used trail follows close to the steep bank on the east side of the Oldman river and turns inland as it skirts the deep wash leading down to the river (Figure 4). The starting point for mapping was selected to the north of both the wash and the dirt trail. The point was marked with a metal pin and designated 0+00. A line was stretched northward (N36°54'E) for a distance of 80 m and another metal pin (2) was set in the ground. This was our base line and as we did not have a surveyor with us on this trip all measurements were made from the base line.

The area mapped was 10,800 m<sup>2</sup> within the Grid and there were 17 rock formations which were numbered "A" to "Q" and identified on the Grid map (Figure 6). There were six complete tipi circles .

Circle "A" was different in that there was a heavy concentration of rocks at the four cardinal points, thus giving the whole the appearance of a square. To the east of this circle was a small cairn "B" with three single rocks to the

Situated between the cairn and the medicine wheel, but closer to the medicine wheel, is a rock alignment running in an east-west direction. This straight line of rocks is 59.9 m in length and is terminated at the east end with a large boulder and at the west end by a small cairn. This alignment is shown on a sketch by Richard G. Forbis in his report entitled Some Late Sites in the Oldman River Region, Alberta. Forbis judged the line to be 125 feet in length but makes no other comment regarding it. Like The Grand Forks site line of rocks this line too is on what appears to be virgin prairie and is well away from any fence line. The fence line between section 7 and 18 is approximately 60 m to the north.

Other rock lines have been noted at various sites in southern Alberta but little has been done to try and establish their use. These sites are not extensive and are therefore listed:-

- EeOp-4; A single line of stones running for ca 100 ft. from SW-NE. The only comment by the archaeologist, "possibly old fence line". (U. of C. 21 September 1971, Suffield)
- EfOp-73; A campsite of 25 rings located between two coulees. Rings in large open cluster, small hills to the north with 5 cairns. To the south is a N-S rock alignment of single rocks. (Red Deer River Survey 75-004, 1975)
- EdOr-28; Six or seven very scattered tipi rings, two small cairns. Along the west edge of the site is a line of rocks which extends perhaps 100 yards N-S. There does not appear to be a fence line but they may be natural. (ASC Suffield, 3 August 1972)
- EfOp-220; A valley plateau with 2 tipi rings, 2 m average; four cairns, 1.5 m average and 75 buried cobbles running N-S. (Red Deer River Survey Phase 11, 7 June 1976)
- EaOq-9; Two possible and one well defined tipi rings, 6 m average. A single well defined stone alignment approximately 30 m in a N-S direction. On a knoll in bottom of the South Saskatchewan River valley. (Burnside Ranches Site A)
- EcOp-7; Line of stones runs for about 100 yards along and over crest of coulee NNE-SSW. About 50 feet from the south end is a group of tipi rings 12-14 feet in diameter.

Except for the archaeologists' comment on site E-Op-4 and on site EdOr-28 all rock alignments were reported with no suggestions as to their use. Perhaps it is now time to do a study of these rock alignments and to eventually come up with some reasonable answers as to their use.

#### THE SOUTH SURVEY

South of the ravine or wash the terrace, at 732 m above sea level, extends for about 400 m before the land begins to rise sharply to the 785/815 m level of the prairie plains in this area. On this part of the terrace there is also evidence of use by prehistoric man. The virgin grasses are quite high (Figure 10) at the time we visited the area. Only a cursory examination was made but even this revealed many hearths not associated with tipi rings, small 4 to 6 boulder cairns, much fire-broken rock and tipi circles well separated from each other. (Figure 5). Along the west edge of the terrace, where the land drops steeply to the forested flood plain area, were large clusters of rock about the size of those used in the campsite. These seem to have no pattern and were probably small glacial erratics.



FIGURE 10--Photograph of Tipi Circle "L" showing the tall grasses on the prairie and generally the size of rocks used. Note how most of the rocks are fairly well sunk in the soil.

The boulder outlines on this higher terrace were numbered from "AA" to "AO" and were generally about 6 m in diameter. There were hearths in some of the outlines and like the tipi rings in the grid mapped area, many had openings facing northward. There seems to be an accepted belief that the tipi opening should face to the southeast. In this campsite, however, there are high bluffs to the north and west which offer some protection from the winds coming from this direction (Figure 18). The island and the river can be reached quite easily by walking north and this may be part of the reason why so many of the openings face in that direction.

The sketches of all boulder outlines (Figures 11 to 18) are reasonably close to scale. The background squares indicate 1 m and the broken lines, such as in sketch area around pin 2, indicate non-conformity as to distance and while Circle "AA" may look only 5 m from circle "AB" the true distance is as indicated, 20 m toward 0+00 and 3 m to the left.

Most of the tipi and rock formations in the south area need little comment but attention is drawn to the formations at Pin 4 (Figure 13). This rock formation consists of tipi circle "AO" with the opening to the north and there is strong evidence of a hearth in the centre of the circle. West of this is a smaller circle "AE" which also has a hearth but the opening of this tipi circle appears to be to the southeast. Two small piles of rocks or cairns, "AF" and "AG" are to the northwest or behind this smaller circle of rocks. It takes very little imagination to visualize this complex as a lodge, a sweat-lodge and boulders heaped in readiness for the sweat-lodge ceremonies.



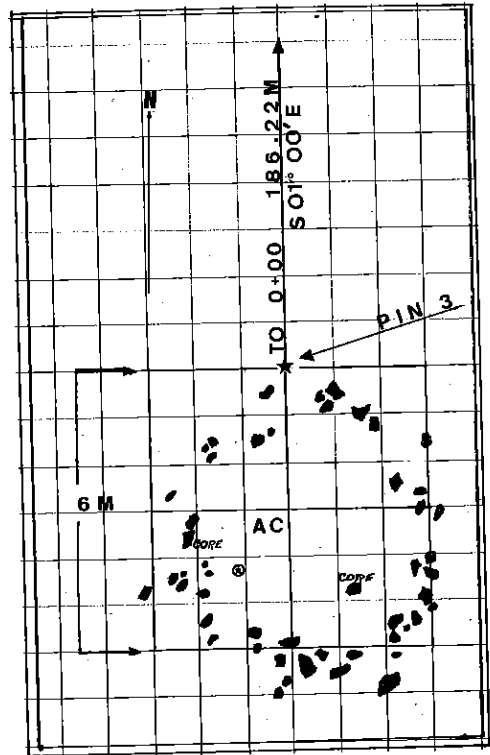
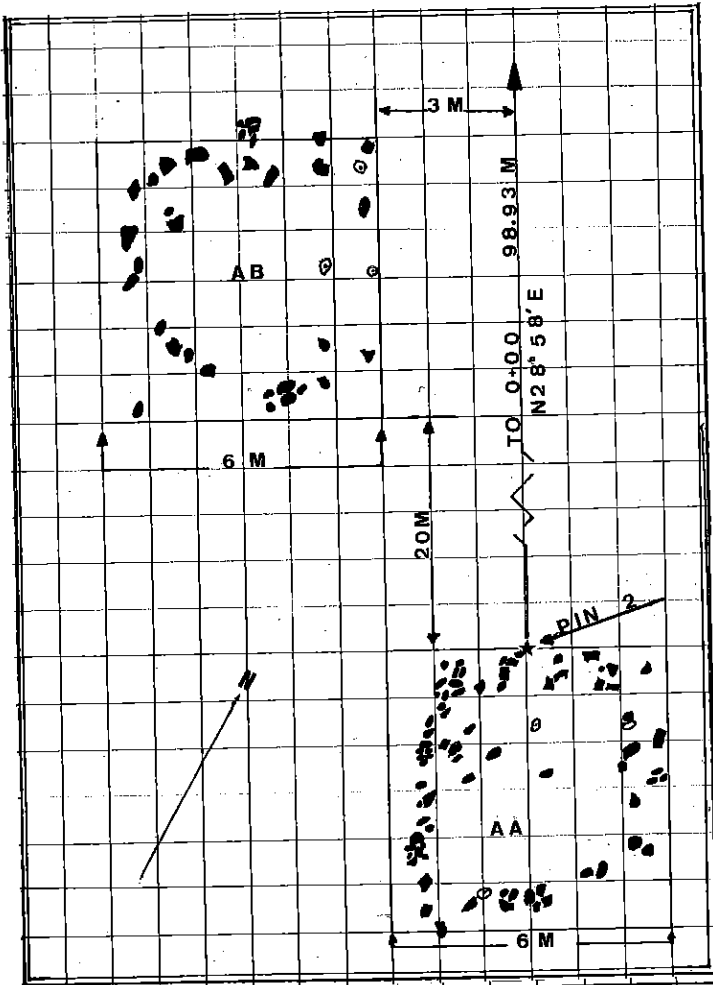


FIGURE 12

FIGURE 11

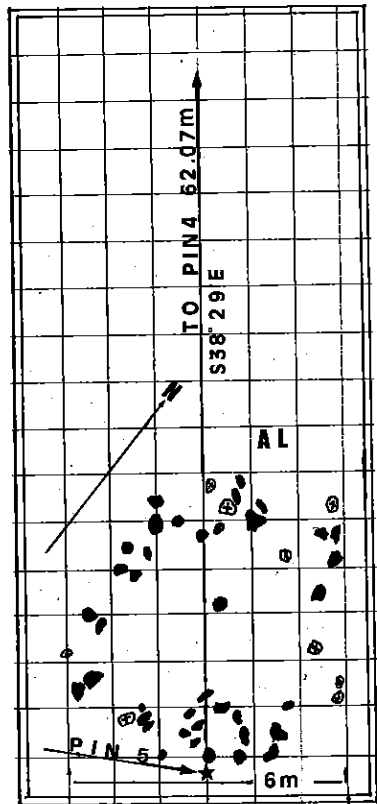
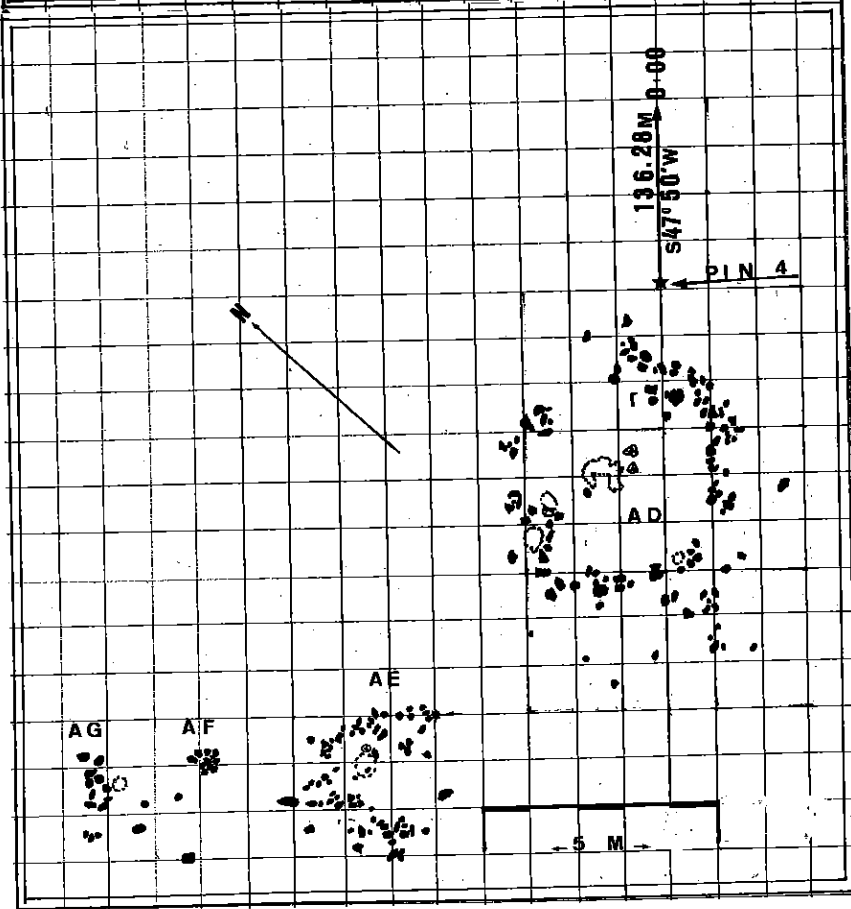
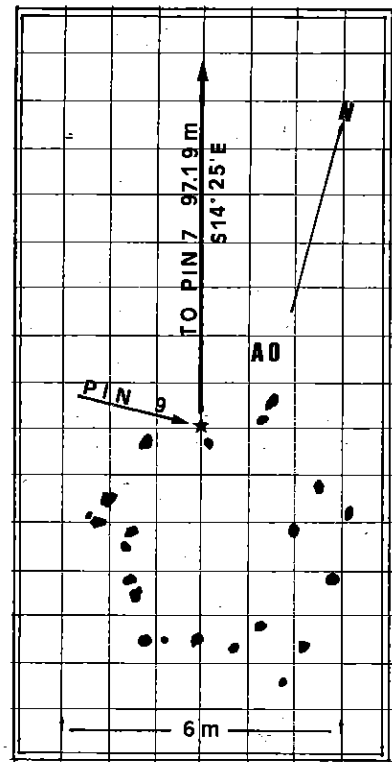
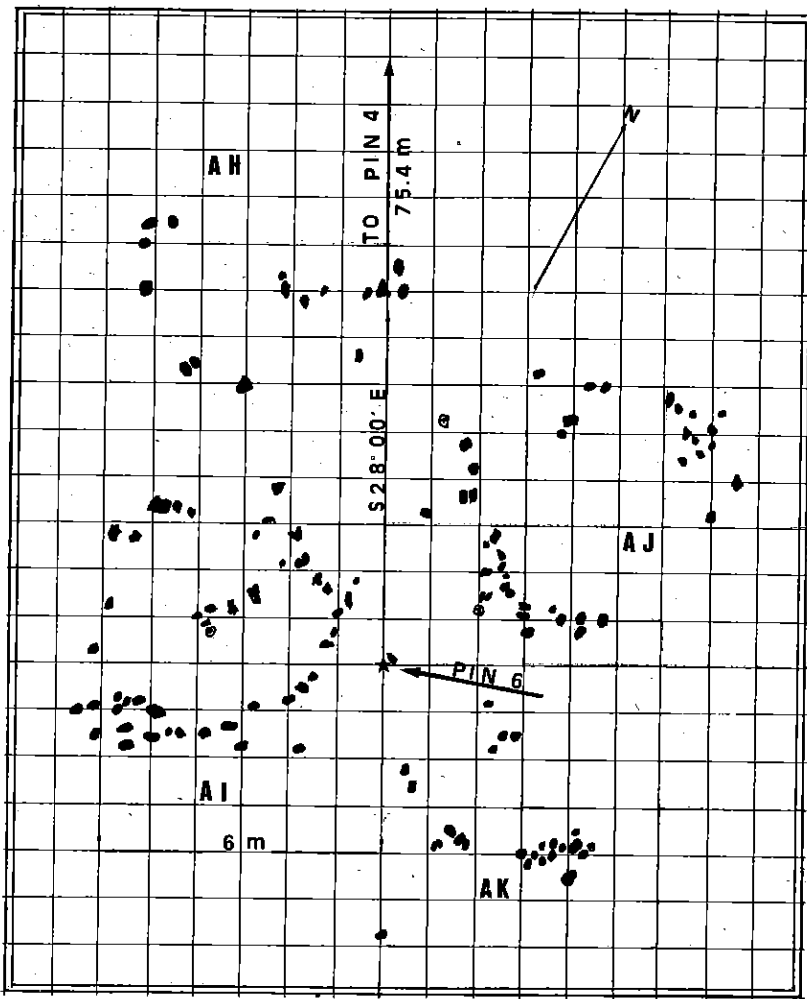


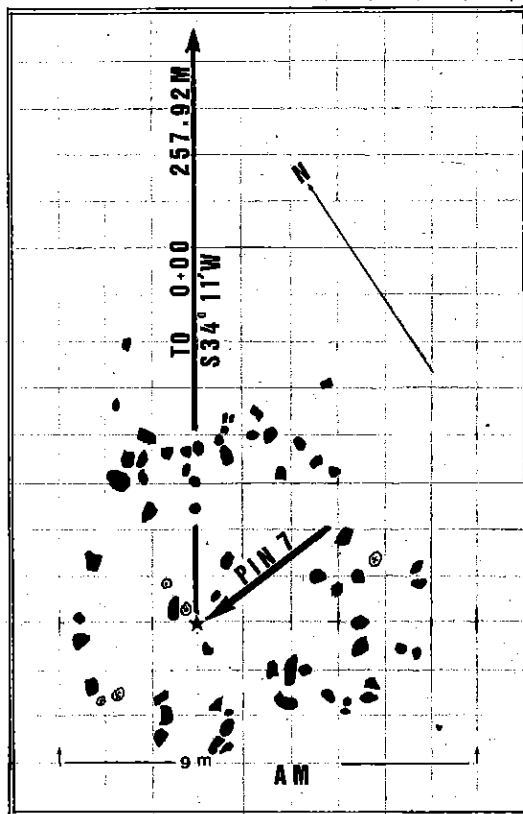
FIGURE 14

FIGURE 13



▲ FIGURE 16

◀ FIGURE 15



◀ FIGURE 17

FIGURE 18

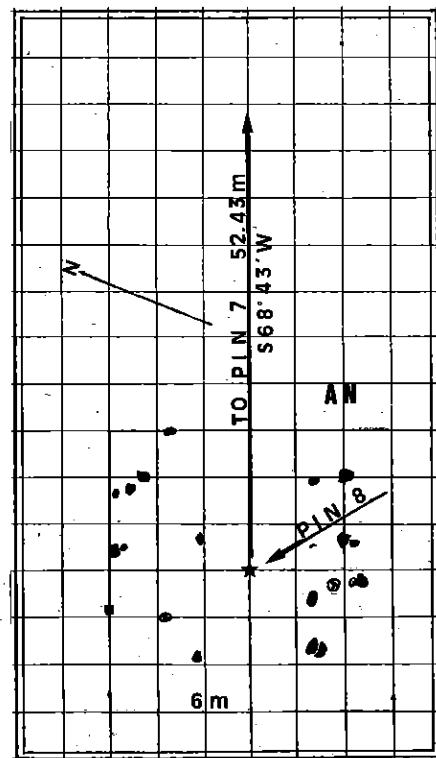




FIGURE 19--Lunchtime. Photograph shows the heavy cover of prairie grasses and the high bluffs to the north and west which partially protect this campsite from the prevailing winds. The Oldman river follows the base of the bluffs.

### THE ARTIFACTS

As previously noted this valley terrace was well covered with surface artifacts. Most were flakes of quartzite which may or may not have been used as scrapers and knives. Other tools were made from cobble stones or local boulders.

No special effort was made to search for artifacts. The chips, cores and cobble-stone tools in Figure 20 were gathered from the ground around the parked cars, near point 0+00, and were photographed to show the abundance of artifacts available.

The photograph (Figure 21) shows two core rocks, a scraper and a small pebble chipper which were in close approximation to circle "J".

The artifacts shown in photograph Figure 22 and Figure 22a are all tools showing evidence of flaking or chipping from use. The artifacts are listed as:-

- A--Fine-grained sedimentary stone flaked for use as a hand chopper. The sandstone is brown-black in colour and there is a growth of lichen along the cutting edge.
- B--This is a flat brownish quartzite cobble, very coarse-grained, which has apparently been used for pounding or chipping.
- C--This flat brown coarse-grained quartzite cobble has been flaked to form a biface hand axe or chopper. The flaked edges are well covered with lichen.
- D--This coarse-grained quartzite flake, about 20 mm thick, is flaked along the straight edge and was apparently used for cutting or scraping.

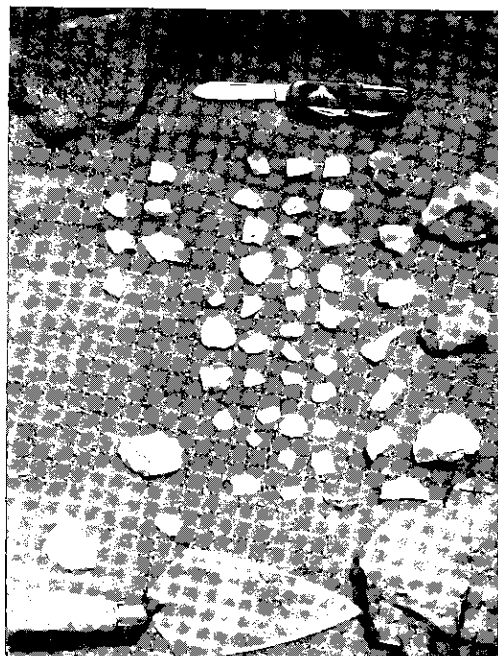


FIGURE 20--A sampling of quartz and quartzite chips, cobble-stone tools, core rocks, scrapers and flakes gathered from around 0+00

FIGURE 21--Photograph shows two core rocks, a scraper and pebble-stone tool found near circle "J".

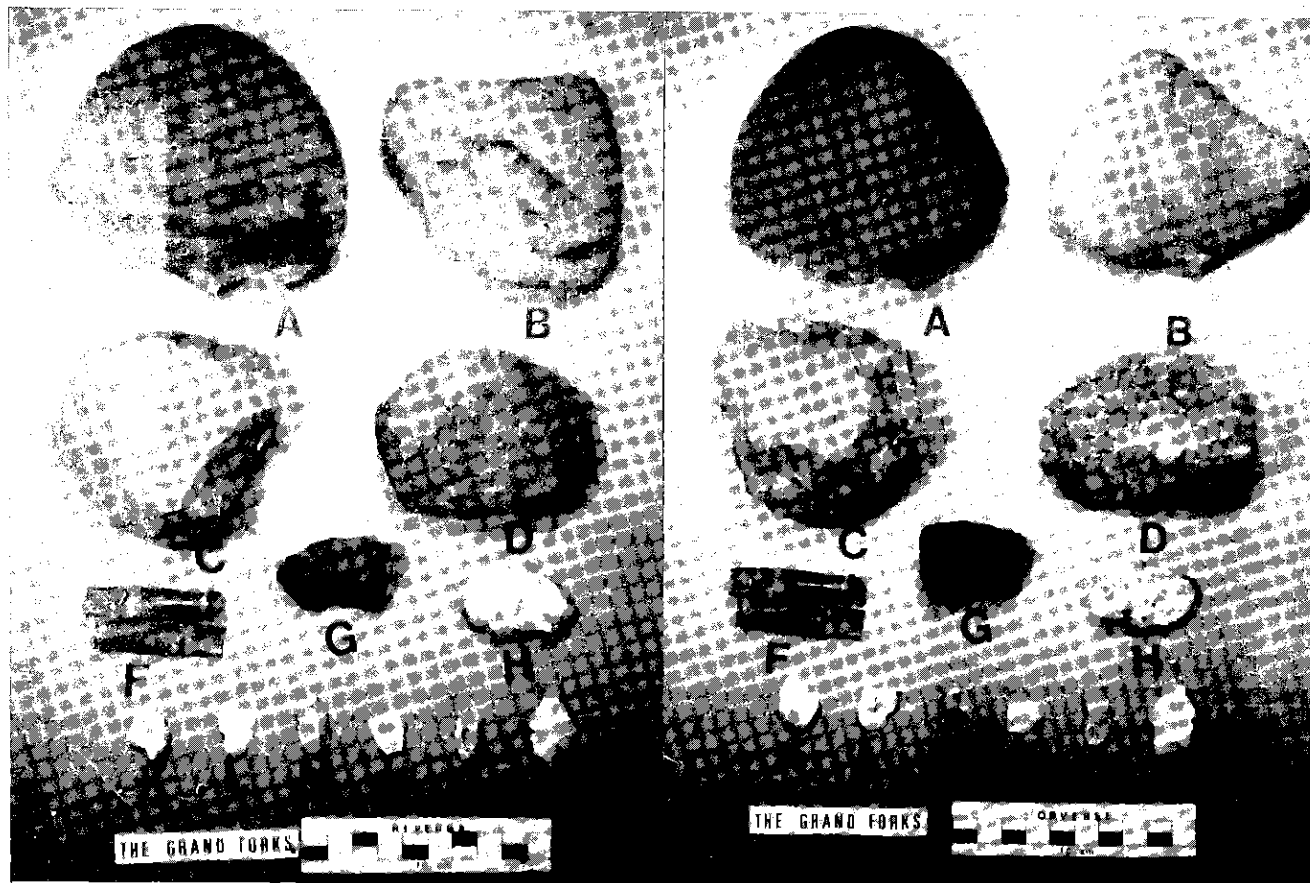


FIGURE 22 and FIGURE 22a--The obverse and reverse of some used tools.

F--Two copper shell casings, one a Dominion Cartridge Company 30-30 centre fire and the other a .303 made by the Savage Arms Corporation. These are just two of the many .303, .22, 16 gauge and 12 gauge cartridges found in the area.

G--This black chert stone is flaked only on the rounded edge and was probably used as a spoke-shave.

H--This coarse agatized chip has been flaked on the rounded edge and was most likely used as a knife or scraper. Lichens are present in the broken recesses of the stone.

K--This is a chert chip with no apparent flaking.

L--A small chert chip with rounded edge well flaked.

M--This is a small secondary flake of quartzite. The removal of finer chips and flakes from the edge would indicate it was used for cutting and scraping.

N--This is a piece of fine white chert with flaking along the straight edge.

O--This is a coarse-grained pinkish quartzite flake with fine flaking along both sides.

P--This quartzite chip is flaked along one edge and the point is broken off. There is also some lichenization in the recesses of the stone.

### BOW ISLAND SITE

The report on this site was researched by Dr. John F. Dormaar, a soil scientist at the Research Station, Lethbridge, Alberta. The purpose of the investigation was to attempt to establish human occupation by soil analysis.

The site location is reached by going to the river valley in the same manner as going to The Grand Forks site and then crossing over to the Bow Island which is shown on the map (Figure 1 and Figure 2). Borden number for this site is D10w-7 and the grid reference is 12UVL505304 as the three depressions are located in the SE $\frac{1}{4}$ /NE $\frac{1}{4}$ /S22/T11/R13/W4. It was on 21 August 1980 that Mr. Al Machacek, a local farmer, took us to three depressions on the island which he maintained were the locations of three former log cabins known as The Bow Fort. The purpose of the visit was to obtain soil samples.



FIGURE 23--Bow Island is in the centre of this photograph. The Oldman River flows in the foreground. The Bow River enters the picture in the upper left corner and part of the river joins the Oldman on this side of the island and part flows behind the island. Downstream beyond this point the rivers are known as South Saskatchewan.

This area, the forks of the Bow and Oldman (formerly the Belly) rivers, was no doubt well known to the Blackfoot Indian as to warrant a special name, OMAK-ETAOW-TOWUGHTY, a title recorded by George Mercer Dawson (Johnston, 1967). Many campsites can be found along the bottom land and the upland of the Bow, the Oldman and the South Saskatchewan rivers (J.H. Carpenter, unpublished data). There is a prominent cairn and medicine wheel in the vicinity, just downstream about 6.5 m from the junction which is mentioned also by Dawson in his reports of 1884 (Archaeological Society of Alberta, Lethbridge Centre, 1976).

Although The Grand Forks and the Bow Island sites must have a long history, few historical references are available. An early mention is in the account of the 'Bow River Expedition' in 1822 (McGregor, 1978). In this account George Simpson, a dominant figure in the post-coalition period of the Hudson's Bay Company, despatched an expedition to explore the country west of the abandoned Chesterfield House, at the junction of the Red Deer and South Saskatchewan rivers, and to "find significant aggregations of beaver and to counter an influx of Americans in the southern part of the area". Francis Heron and a party of men went up the Red Deer River in November of 1822 for a considerable distance. They then crossed overland to the Bow River, descended it to the junction of the Oldman and continued down the South Saskatchewan. They do not appear to have stopped for any considerable length of time at The Grand Forks.

Another mention of this area is in Dr. Hector's journal as published in Captain Palliser's exploration (1863) of British North America:-

" August 6th (1859) - This morning we again ascended the bank (of the South Saskatchewan river), in order to avoid following the bends of the river, we found a great pile of stones (Grassy Lake Cairn Site, Archaeological Society of Alberta, Lethbridge Centre, 1976), which no doubt marks the site of some Indian battle, and forms a very conspicuous land-mark. We then crossed some sand-hills, and at noon reached the point where Belly River (now Oldman River) joins the Bow River."

This prominent landmark, the cairn, mentioned in Palliser's report became an identification point for the North-West Mounted Police in their march west. The following account is given by Chambers (1906):-

" The force was together on 19 June 1874. The special instructions to Colonel French were to make as direct as possible for the forks of the Belly and Bow rivers, in which vicinity the worst of the much-discussed whiskey forts were understood to be located.

On the 4th September the force was visited by a party of Sioux, to whom Colonel French gave some presents. The country the force had been travelling in had been very hard on horses and oxen; there being no trail for the last 150 miles, and the little swamps that the force used to depend on for feed and water had been destroyed by the buffalo. French's only reliable guide knew the country no further. On the 6th the column struck the Saskatchewan, it being half a day's march nearer than had been supposed, and an American scout accompanying the force insisted that the force was at the Forks, but as there were no Forks in the vicinity he had to admit he was wrong, and added that the Forks were 12 miles more north. To his disgust Colonel French told him he would steer south-west instead. In fact he had little doubt then as to the situation of the force, and on the 9th, camp was pitched within three miles of the forks of the Bow and Belly rivers without knowing it. On the 10th the column moved seven miles farther, finding water by watching the flight of some ducks, and camped there. Some sandhills the column passed denoted that they ought to be in the vicinity of the Forks, but not having seen the prominent landmark mentioned by Palliser, French was very doubtful of the position."

Later Inspector Walsh was sent back with a small party to where the force had camped on the 9th to examine the river at this point. Walsh reported that another large river came in from the north, and that he had also found the landmark Colonel French had been looking for, thus leaving no doubt as to their location.

He reported also that the only forts visible were three deserted log huts without roofs on the island east of the Forks. From this information French concluded that the force had last reached their journey's end, the forks of the Bow and Belly rivers.

The North-West Mounted Police had not reached their destination as the Fort they were looking for was Fort Whoop-Up and Chambers (1906) gives this explanation:-

"With regards to the forts supposed to be at the forks of the Bow and Belly rivers which had been particularly mentioned in Colonel French's instructions, the forts were really at the junction of the Saint Mary and Belly rivers. Persons travelling along the Porcupine Hills, and across the head waters of the Bow and Belly rivers, on being told that Fort Hamilton, Fort Whoop-Up or Fort Stand Off was at or near the Forks had readily supposed that the Forks of the Bow and Belly rivers were meant, when their Indian or halfbreed guides did not mean those forks. In this manner, no doubt, the Adjutant General of Militia, Colonel Robertson-Ross, fell into the error of locating Fort Hamilton at the forks of the Bow and Belly rivers."

One of the members of the NWMP, the sixteen year old bugler, Fred Bagley, wrote in his diary (Grassy Lake and Purple Springs Historical Society 1981):-  
"There were so many "I told you so's" from our halfbreeds when on the 12th of September one of the scouting parties found the much talked of Old Bow Fort at the forks of the Bow and Belly rivers, and reported that the Fort (?) is just a collection of roofless, and deserted log shacks; the only indication of its ever having been the haunt of Yankee whiskey traders being the head of a cask found on the river bank, and bearing the legend "Kelly Bourbon"."

Nothing is left of the three wooden structures. Three shallow hollows are the only sign of where these huts could have been on the island.

Archaeological soils constitute repositories of information of past cultural activity. Yet, soil chemical changes resulting from human occupation have only relatively recently become a topic of abandoned settlement studies (Woods, 1977a). Soil chemistry is altered directly through the deposition and decay of organic and inorganic debris.

Phosphorus compounds in the form of phosphate have proved to be the most stable in their chemistry and location in a wide variety of soils. Faeces, urine, vegetable and animal tissues, and especially bones contain large amount of phosphate. These materials accumulate at sites of human occupation creating zones with unnaturally high soil phosphate levels. Phosphate created by such activity is found primarily in combination with calcium, iron and aluminum (Woods, 1977b).

Soil samples to 5 cm in depth were obtained from each hollow and from the undisturbed surrounding area. Analyses carried out were:-

- (1) pH on a soil-water paste
- (2) Steam distilled ammonium-nitrogen
- (3) Steam distilled nitrate-nitrogen

- (4) Percentage of organic matter.
- (5) Available phosphorus, using methods outlined in Black (1965).
- (6) Phosphorus in iron and aluminum bound forms (Woods 1977b)
- (7) Phosphorus in calcium bound forms (Woods 1977b)

TABLE 2. Shows the chemical analysis of the upper 3 cm of soils taken from three hollows and the area surrounding each hollow. The hollows were on the Bow Island in the South Saskatchewan River at the confluence of the Oldman and Bow rivers. Except where percentage is noted, all values are in the number of micrograms per gram.

	Hollow #1	Area #1	Hollow #2	Area #2	Hollow #3	Area #3
pH	7.8	7.8	7.9	7.9	7.9	7.9
Ammonium-nitrogen (steam distilled)	3.28	3.64	1.46	2.91	1.09	1.82
Nitrate-nitrogen (steam distilled)	2.91	1.46	1.46	1.09	1.09	0.36
% Organic matter	0.91%	0.75%	0.67%	0.60%	0.67%	0.52%
Available phosphate	20.43	4.95	8.65	8.02	5.50	4.29
Iron/Aluminum- bound phosphate	25.3	12.1	15.1	11.3	14.7	8.8
Calcium-bound phosphate	326.8	291.8	370.4	264.0	297.4	286.1

The data (TABLE 2) show the results of the tests either in percentage or in micrograms per gram ( $\mu\text{g/g}$ ). The data allow the conclusion that the sites sampled were indeed the sites of the three "roofless log shacks". However, even though the high calcium-bound phosphorus is probably masked by naturally occurring calcium phosphate, the data allow the tentative conclusion that the hollows sampled experienced human activity at one time.

#### ABBREVIATIONS

- N.T.S - National Topographic System maps.
- UTM - Universal Transverse Mercator Grid
- 12U - Grid Zone Designation
- VL - 100,000 M Square Identification (100,000 m about 63 miles)



HUMMEL SITE

Project Number 22

29 May 1983; Site Dh0x-12. A report and survey of boulder outlines consisting of a large double circle medicine wheel and four smaller tipi circles.

LOCATION

The Hummel Site is located approximately 20 km southeast of Warner, Alberta. By road from Lethbridge travel is south on Highway 4 and just north of Warner, Alberta, turn east on Highway 504. At a point roughly 16 km from Warner turn south on the secondary road and at about the 6 km mark the road passes a dump, turns east then south to bypass a coulee and from this intersection (marked FP on survey sketch--Figure 25) the site can be seen to the southeast. Permission to enter the site should be obtained from the landowner, Wallace Hummel of Milk River, Alberta.

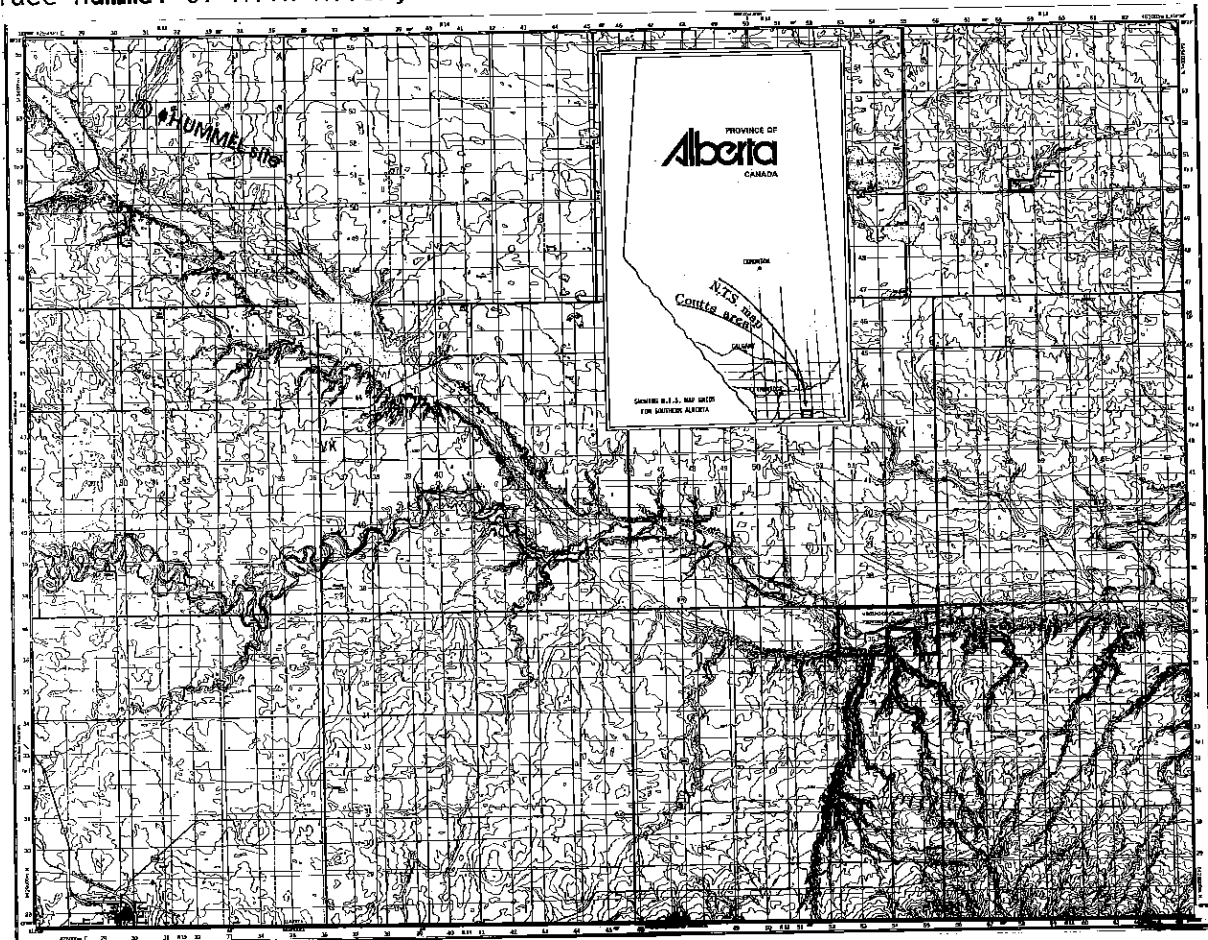


FIGURE 24--National Topographical Survey map shows the Hummel site in the upper left hand corner. Map is Provisional Map 72E/4, Edition 2 MCE. Dh0x-12 is in the NE $\frac{1}{4}$  of Section 22, Township 3, Range 15, West of the 4th Meridian. The U.T.M. location is 12UVK 308534. Latitude is 49° 13' 47" and longitude is 111° 57' 07".

SITE DESCRIPTION

Verdigris Lake (3 km east of the site) and Verdigris Coulee (2.5 km south of the site) are the dominant features of the landscape surrounding the site. They are easily accessible from the Hummel Site, which is situated on the eastern edge of a small coulee, overlooking a seasonal stream that drains northeast to a small lake. The stream bed is now heavily encrusted with saline deposits.

The site is bounded on the east by the coulee and on the west by a fence running approximately NE-SW and parallel to the edge of the coulee, about 60 m away. The stone circles at the site were for the most part intact. Small piles of stone, probably removed from the nearby field, were located along the edge of the coulee, near the circles. Larger piles of rock were found in the hollows northwest of the site. Boulders forming the circles were well-seated and partially covered with lichens, indicating minimal disturbance to this part of the site.

Southeast of the fence Mr. W. Hummel is farming the land which is quite rocky. Elmer R. Halmrast farmed the  $\frac{1}{4}$  section directly east of the Hummel triangle and also the  $\frac{1}{2}$  section to the north. Lawrence, his son, recalls as a boy picking rock from both of these holdings. He tells of a slough or watering hole about 1 km east and slightly north of the site, and of many many tipi circles that were removed so the land could be farmed. Around the watering hole points, scrapers and choppers were found. On the land directly east of the site and among the many circles were a few cairns and in this area also he found artifacts. It can be presumed that the large double circle was used for ceremonial purposes by those occupying this campsite.

THE SURVEY

At the time of mapping there was no transit available and a datum point (0 + 00) was established at a high point on the southwest bank of the coulee. From the datum (marked with a steel pin), two transects were lined out and also marked with steel pins. From these transects three mappings were made and recorded as Plat A, Plat B and Plat C. Later the area was surveyed in by Glen F. Hamilton as shown on the sketch below.

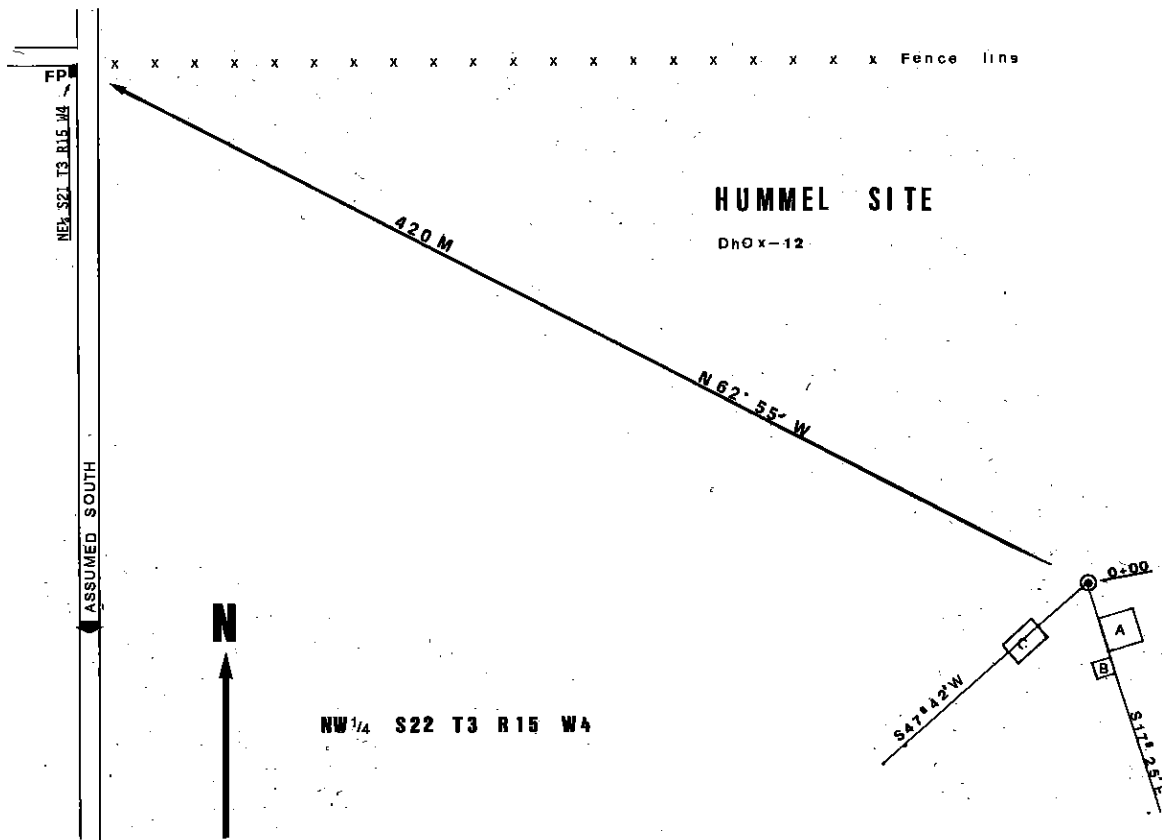


FIGURE 25--Survey map shows the fence to the north of the site but the fence running NE-SW is not shown, being just off the lower right of sketch.



FIGURE 26--The Hummel site viewed from a northerly position. Site is on the knoll to the left. White areas in the bottom are saline deposits. Road going south (right to left) is in the deep centre of the photograph.

#### MAPPING

At a distance of 12 m from 0 + 00 along transect bearing 17°S 25'E, mapping of Plat A (see Figure 25) began. This is the largest feature on the site. It consists of two circles, one within the other, covering an area of approximately 95 m<sup>2</sup>. The diameter of the largest circle was 9 m; of the smaller, 4.5 m. The latter circle was off-centre inside the former, with a distance of 1.5 m between their perimeters on the north side (see Figure 26, Plat A). Stones on the north side of this circle were displaced.

The second feature on this transect was a small boulder circle (Plat B), 6 m southwest of Plat A. Stones have been disturbed, but the circle appears to have had an original diameter of about 4 m (see Figure 27, Plat A & B.).

Mapping of Plat C began 21 m from 0 = 00 along transect 47°S 42'W. In Plat C three stone circles were recorded. The two largest (6 m and 5 m in diameter) were disturbed and both were abutted by rock piles, presumably made when the nearby fields were cleared and ploughed. The average distance between the circles was 3 m (see Figure 28). A number of rocks scattered between and around the circles appear to have been displaced from the original outlines.

All mapping was completed in one day. Although other circles belonging to this site were destroyed by farming activity, the Hummel Site is presently not subject to destructive influences other than normal erosion.

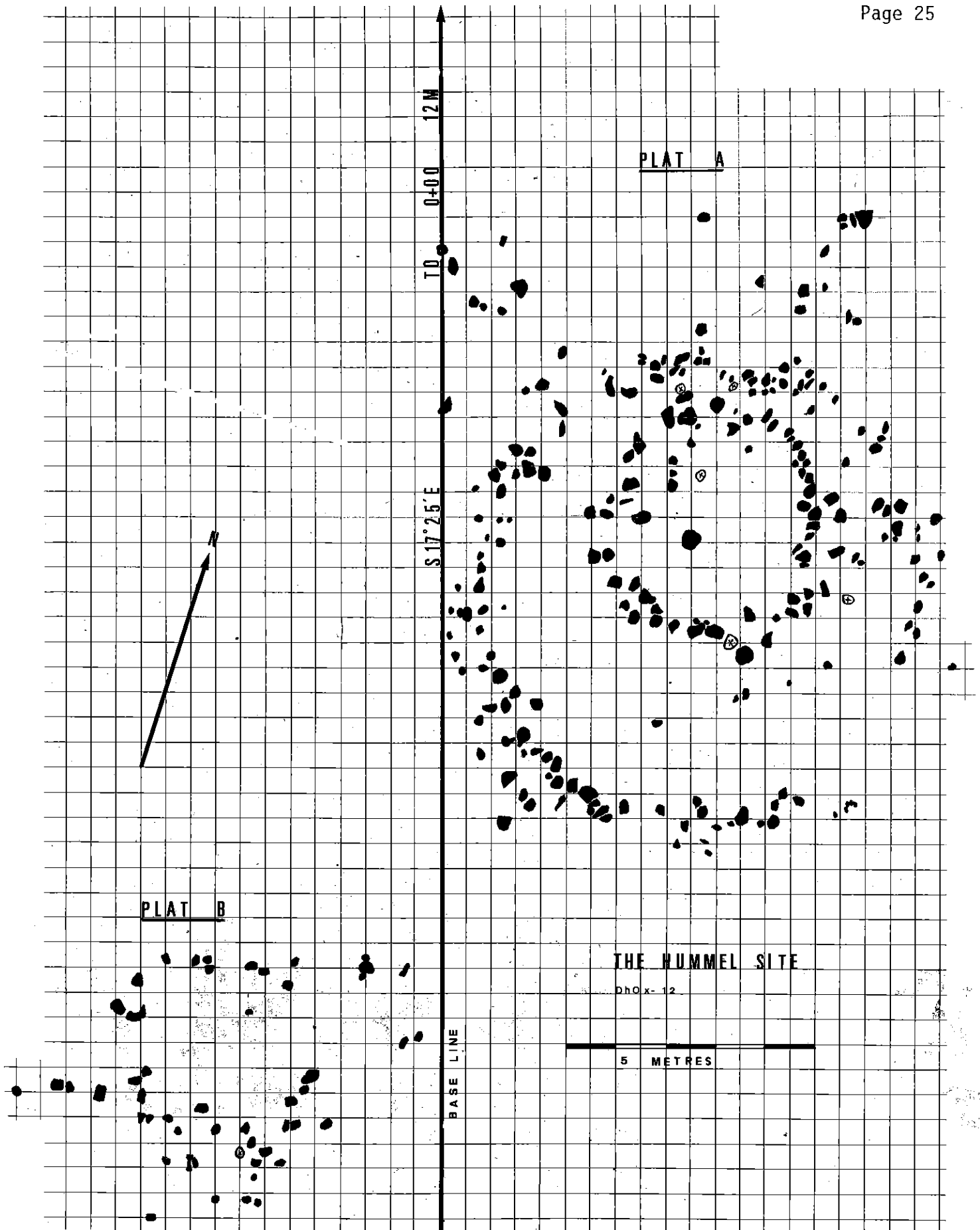


FIGURE 27--Mappings of Plat A. The off-centre double circle is the main feature of this site.

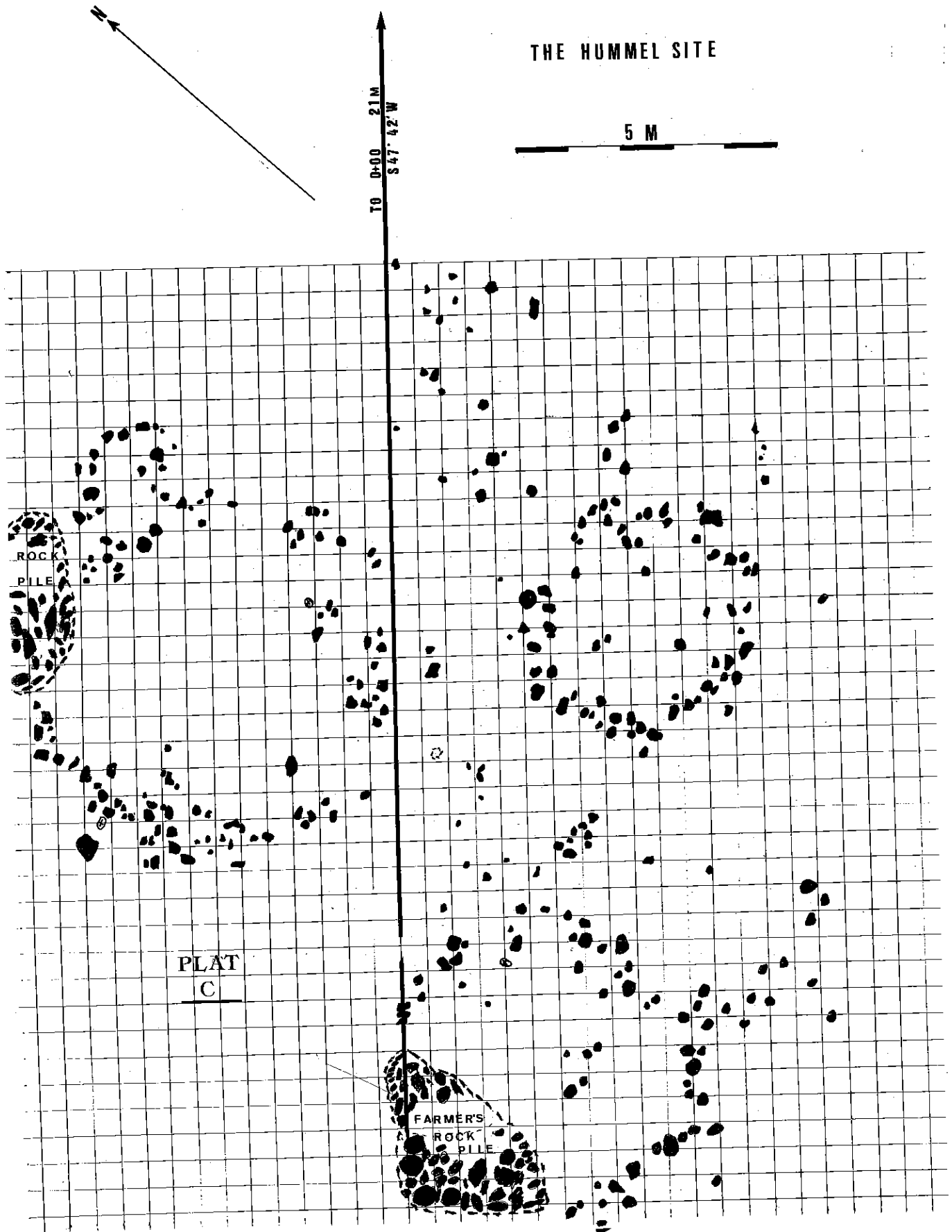


FIGURE 28--Mappings of Plat C. These circles were along the rim of the coulee.

FLORA AND FAUNA

Vegetation at the site is typical of the short grass prairie biome as described on pages 6 and 7. Linnea Walker and Elsie Kitchener identified 25 plant species, including Western wheat grass, June grass, several milk vetches, Buffalo bean, prairie rose, sages, parsely and apricot mallow. On the day of the survey, birds were the only fauna seen at the site--horned larks and avocet.



FIGURE 29--Hummel site showing part of the double circle. Photograph is taken looking generally NE and fenceline is running NE-SW as mentioned in paragraph 2 under SITE DESCRIPTION. Some of the rock piles along the coulee edge are shown and frames are set for mapping the northerly portion of the double circle. The examination of the soil under the deep-seated boulders of this circle is being done by Dr. John F. Dormaar.

SOIL DESCRIPTION

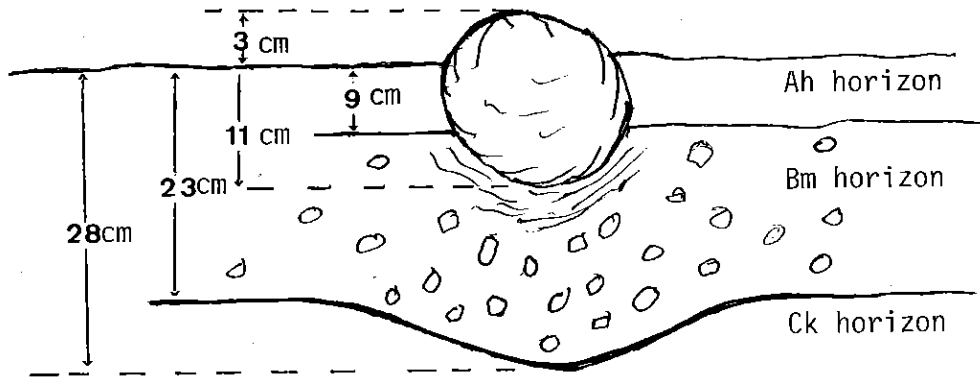
by Dr. J. F. Dormaar

The area is hummocky with a parent material consisting of medium to moderately fine-textured, moderately calcareous till. The soil on the site has the general properties of the Chernozemic Order, the Brown Great Group, and the Rego to Orthic Subgroup and has a B horizon from which the primary earth carbonates have been removed. An average description of the soil around the underneath two boulders from two different circles follows:

A 9 cm thick brown (10YR 5/3-5/4, wet;  $pH_{H_2O}$  6.8) granular Ah horizon is underlain by a dark yellowish brown (10YR 4/4, wet;  $pH_{H_2O}$  7.0) stony, strongly columnar, 14 cm thick Bm horizon. The Ck horizon occurs at about 23 cm below the surface and is very pale brown (10YR 8/4, wet).

The soils from beneath two 14 x 16 cm and 14-cm thick boulders (granite), taken from stone circles of approximately the same diameter, were similar, indicating that they have been in situ for similar lengths of time. The boulders, being granite, quartzite, and gneiss, were only partially lichen covered. About 11 cm of the boulders had sunk into the soil. The soil underneath the rocks was light brownish gray (10YR 6/2, wet;  $pH_{H_2O}$  6.5) and very coarse platy. Moisture

flow from the boulders had lowered the beginning of effervescence (Ck horizon) by about 5 cm.



The sinking of the boulders into the Bm horizon does take time. If the question of how much time it takes for a boulder to sink into a particular soil could be answered, a reasonable estimate of the minimum time of placement of the boulder circles onto the site could be attempted. However, this process is likely affected by a number of forces such as weight of boulder, freeze/thaw cycles which would be of various intensity, repetitiveness and moisture saturation from year to year, and precipitation during the frost-free period of the years.

PAKOWKI-1984 SITE  
Project Number 23

26 May 1984; Site Di0s-24. A report on two medicine wheels, four stone circles, two half circles and a cairn.

LOCATION

This site is in south Alberta, being on the northwest point of a quadrangle which extends 30 km from the United States border on the south and 48 km from the Saskatchewan border on the east. Lethbridge is the closest large city and to reach the site from here you go south on Highway 4 to the intersection of Highway number 61, just north of the town of Stirling. Travel east on Highway 61 to the town of Etzikom where you turn south on Highway 885 and go about 8 km. The site is on your right (west) as you pass through a cut of land. The land belongs to the Sunrise Hutterian Brethern and permission should be obtained before entering this pasture land.



FIGURE 30--This photograph is taken from the Pakowki-1984 site looking to the north. The Town of Etzikom is in the far distant centre of the picture. Highway 885 can be seen approaching the site but disappears as it goes through the cut in the glacial moraine. The rock pile in the left centre of the picture is one of many in the area.

THE LAND

The bedrock in southern Alberta is nearly horizontal marine and non-marine sedimentary rock of the Upper Cretaceous period. Succeeding glaciation laid down the till in sheets and in this general manner the flat lands of the prairies came into being.



While the Laurentide glacier was melting in a continuous northeasterly recession it brought into existence Pakowki Lake and adjacent coulees such as Forty Mile, Chin, Pendant d'Oreille and Etzikom. Drainage from these coulees was into the lake with the exception of Pendant d'Oreille coulee which drained the lake into the Milk River Basin. As the receding margin of the glacier front moved north of the Cypress Hills a new drainage coulee, Seven Persons Coulee, was formed which drained the overflow water of this system into the South Saskatchewan River basin. (Parts of the Etzikom and Chin coulee drainage system can be seen on the N.T.S. map--Figure 32).

The debris left behind by the melting has left the land in this area quite hummocky. One of the more massive moraines, the Etzikom drift, extends NE from the west arm of Pakowki Lake for a distance of about 9 km. The SW terminus of the drift is about 1 km from the lake and about 23 m above the shore line level. It is on this terminus that our site was located.



FIGURE 31--This photograph was taken looking SW and it shows the end moraine of the Etzikom drift. The faint whitish line, just above the shoulders of the man, which extends across the photograph is the demarcation line separating the coulees on this side of Pakowki Lake from the coulees on the other side. The lake is some distance below the plateau and does not show up in the photograph. Note the size of the boulders which vary from just one or two kilograms to about 500 kg.

#### THE SITE

The site is on the high point of the SW terminus of the Etzikom drift which overlooks the west arm of Pakowki Lake. At the site there is a clear view to the north (Figure 30), a clear view along the moraine which extends to the NE, a clear view to the Sweet Grass Hills to the south and also across the broad plateau to the southwest, west and northwest (Figure 31).

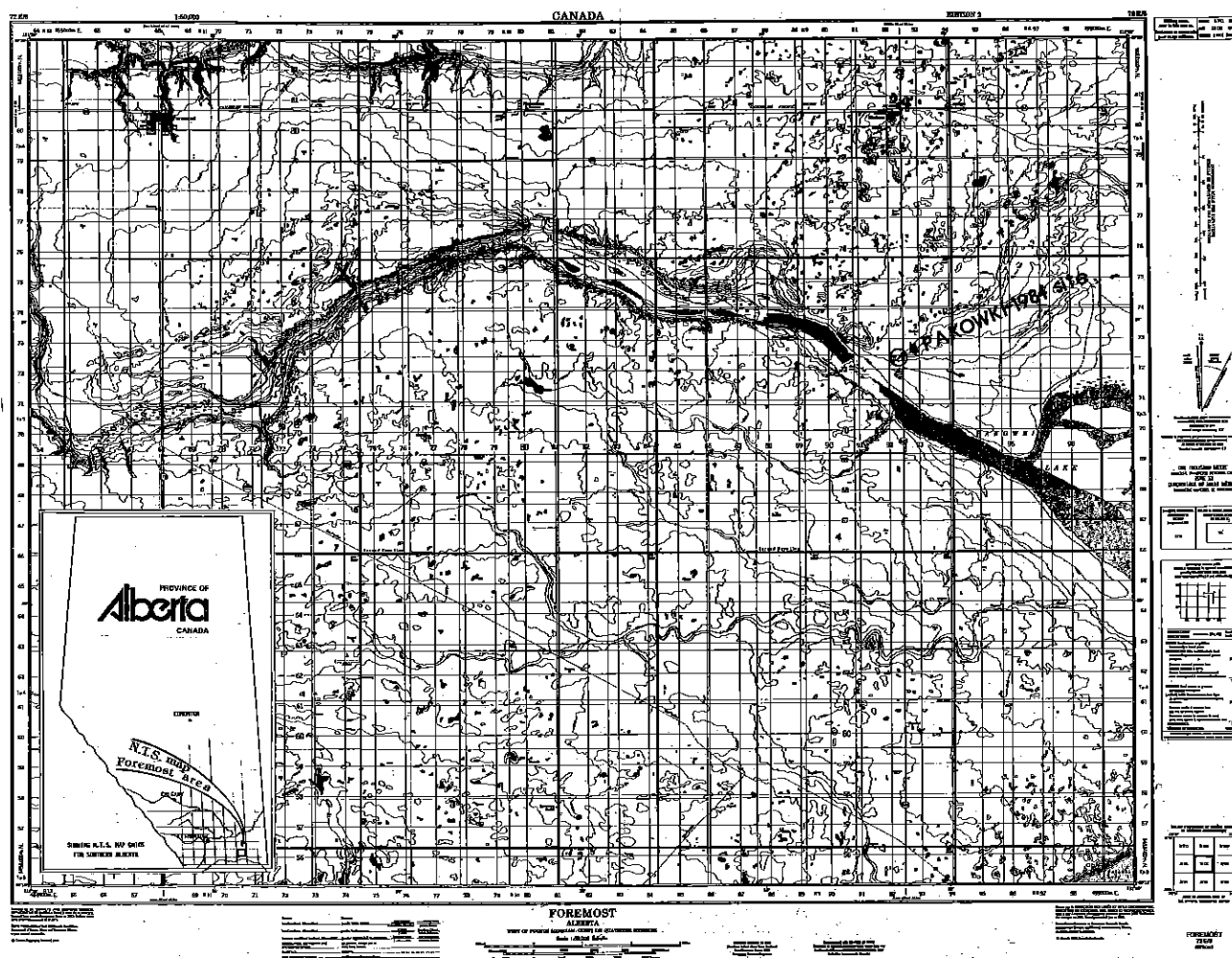


FIGURE 32--The N. T. S. Provisional Map 72E/6, Edition 2 MCE, Series A 741. The Pakowki-1984 site, DiSo-24, is in the circle. The Town of Etzikom is shown to the north and in the upper left hand corner is Chin Coulee. The west arm of Pakowki Lake (Pakowki is an Indian word meaning, 'bad water') is shown with Etzikom Coulee extending westward. Pakowki Lake is fairly shallow with poor drainage and it covers most of two townships, T5, R8 and T4, R7.

The site covers most of the flat table land on the top of this part of the moraine. The present road allowance borders the northeast of the site and the southwest is the end of the moraine which is covered by a heavy concentration of very large boulders which do not appear to have been disturbed. There is no evidence of a general campsite connected with the mapped area either in the valleys or on the plateau of the lake to the south, southwest and west. It is conceivable that a large campsite was associated with the ceremonial rings as evidenced by the many rock piles in the area (Figure 30).

It was apparent that many boulders had been removed from the site, especially close to the road allowance where there still remained the scar marks of the bulldozer which was used to remove the soil and rocks. In this area also a trench had been excavated with the soil embanked to the northeast side of the trench, possibly to protect the road from the winter snow drifts.

The boulders on the site were of granite, quartzite and gneiss although there were a few limestone boulders and sandstone slabs. All boulders, except those that had obviously been recently disturbed, were well seated. The unaligned rocks were buried much deeper in the soil than were the boulders used for the circles.

## THE SURVEY

A datum point 0 + 00 was selected to the north of site and a base line was set at  $S00^{\circ}17'E$ . At right angles to this line another line was set running about the centre of the site, the grid lateral. Mapping was commenced at the intersection of these two lines.

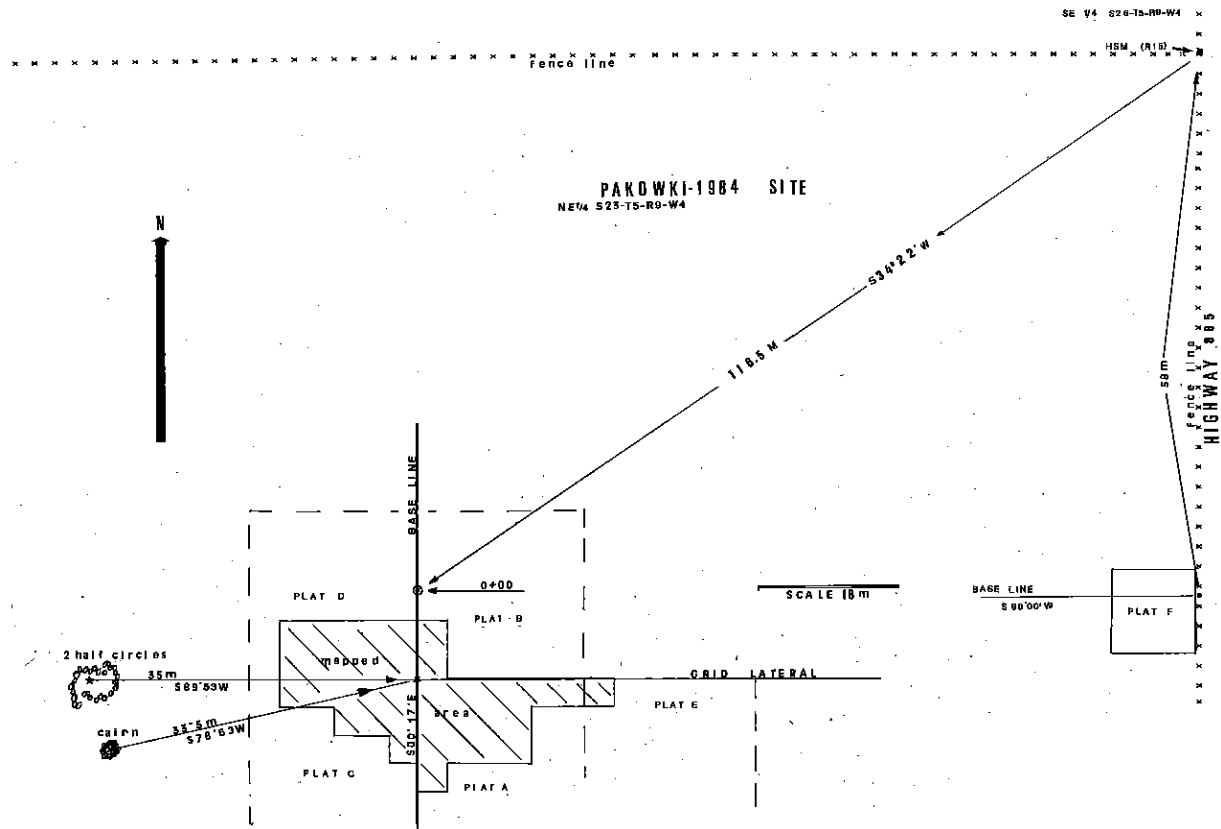


FIGURE 33--The survey sketch. Sketch is drawn to scale with the exception of the two partial circles and the cairn. These are larger than scale but the distance and angle from the intersection of the base line and grid lateral is accurate.

A highway survey marker (HSM), identified as R15, was located on the west side of the road along the N-S fence line at the intersection of the fence which separates Section 23 from Section 26, T5, R9, W4. One half mile south another survey pin was located and a N-S angle was established.

From HSM-R15 a line was sighted in at  $S34^{\circ} 22' W$  for a distance of 116.5 m to the datum point 0 + 00. This served for the mapping of the stone circles on Figure 34 numbered D, B, H, K and M. For the mapping of the double circle next to the road a site was taken directly south from HSM-R15 for 58 m. At this point a line was set directly west as a base line. Mapping commenced at the base line and the 58 m point.

## MAPPING

The mapping was done in two areas. Circle 'X', next to the fence was mapped from a point 58 m south of the survey marker. The area adjacent to the fence had in it many disturbed boulders as a result of roadbuilding and of cattle following the fence line. The large double circle was 9 m on the N-S axis and 7 m on the E-W axis. The difference is explained by the partial destruction of the outer rim of the circle next to the fence. The inner circle about 5.5 m x 5.5 m was fairly

Grid mappings transfer sketch. Each square is 50 x 50 cm. Two areas.

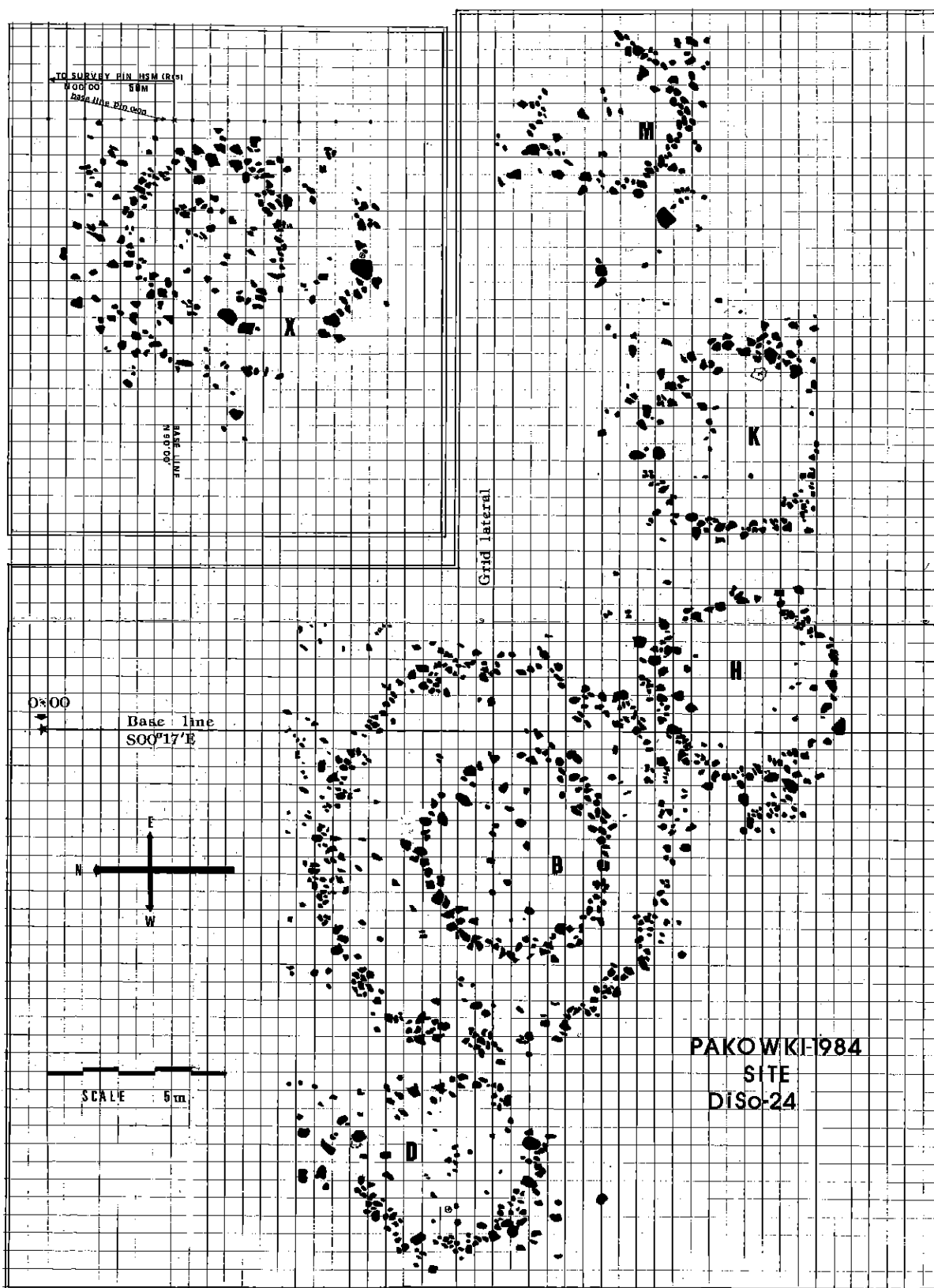


FIGURE 34--The above sketch covers the area mapped close to the fence, circle 'X' and the area mapped along base line S00°17'E and the grid lateral. The later area contained circles 'D', 'B', 'H', 'K', and 'M'. All in close proximity to each other.

complete. There were many boulders in the pathway between the two circles that were not part of the original pattern. Most of these boulders appeared to have come from the outer circle of stones. Area mapped here was 9 m x 9 m.

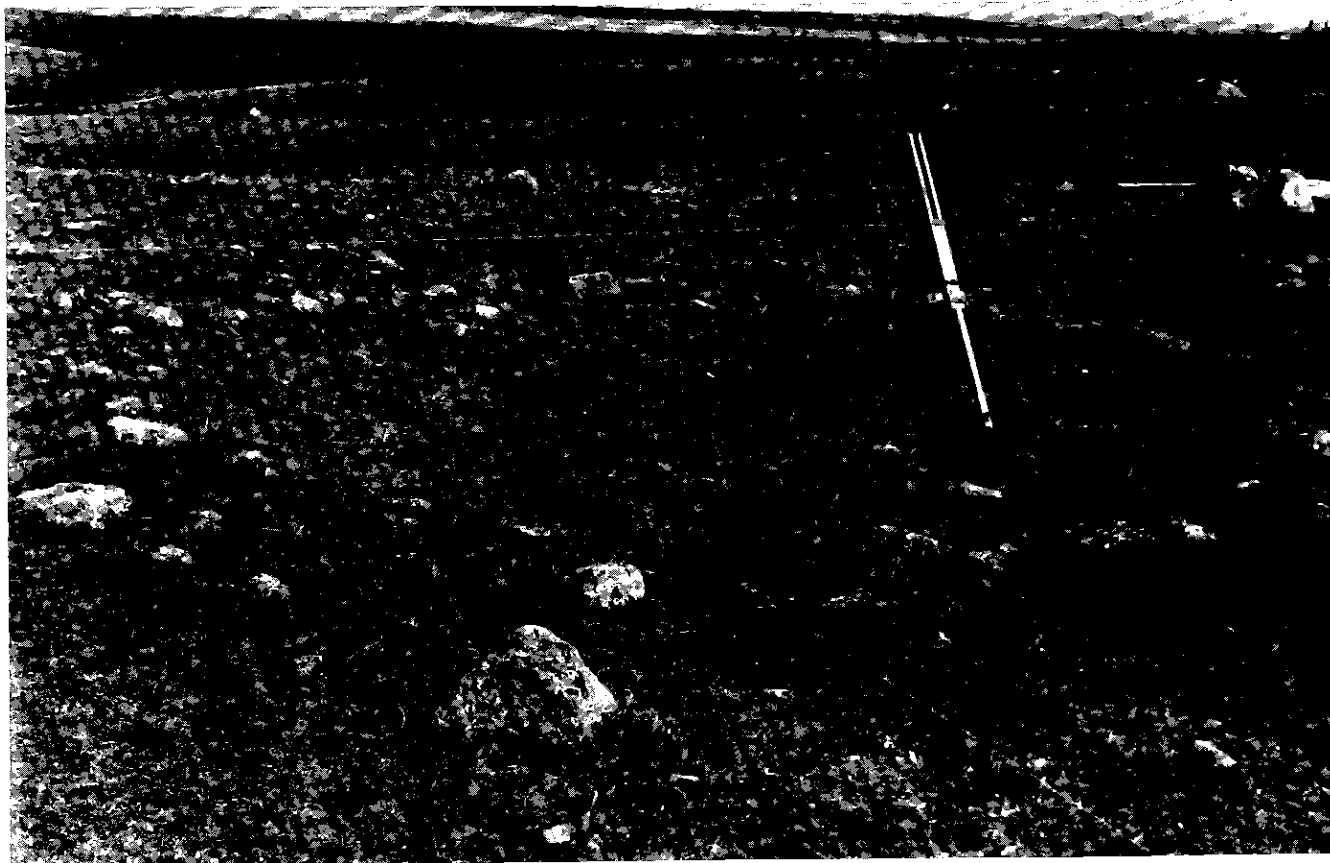


FIGURE 35--Photograph is taken looking northwest. Base line is shown running diagonally lower right to upper left. Lateral grid line is running horizontally. Circle of boulders shown is 'H' (Figure 34). Note the well seated boulders and the well defined circle. Far transit (top-centre-right) is over HSM-R15.



Figure 36--Photograph taken looking due west. Part of the west arm of Pakowki Lake shows above the heads of the crew mapping circle 'D' (see Figure 34).

There was a group of circles about 60 m west of Circle X which were five in number, all circles were clearly defined and undisturbed with the large double circle 'B' set between the third and fourth smaller circles. All circles were within the 333 m<sup>2</sup> area mapped.

To map this area two lines were set. The N-S base line and the E-W grid lateral line. The lines intersected in approximately the centre of the group of circles. A datum point 0 + 00 was marked on the base line north of the intersection 12.6 m. Both lines were marked off every three metres to accommodate the mapping frames (Figure 35).

Further west still, about 35 m from the intersection of the two lines, and not included in the mapped area were the boulders of two partial circles and a cairn. The boulders of the partial circles were entwined and from the appearance of the soil and area around these circles the boulders must have been removed in the distant past, probably to complete some of the petroforms in the mapped area. The partial circles, if left complete, would have been about 5 m in diameter. The cairn was 1.8 m in diameter with the stones lichen covered and well seated in the soil. The centre stones in the cairn were just below the surface of the soil.

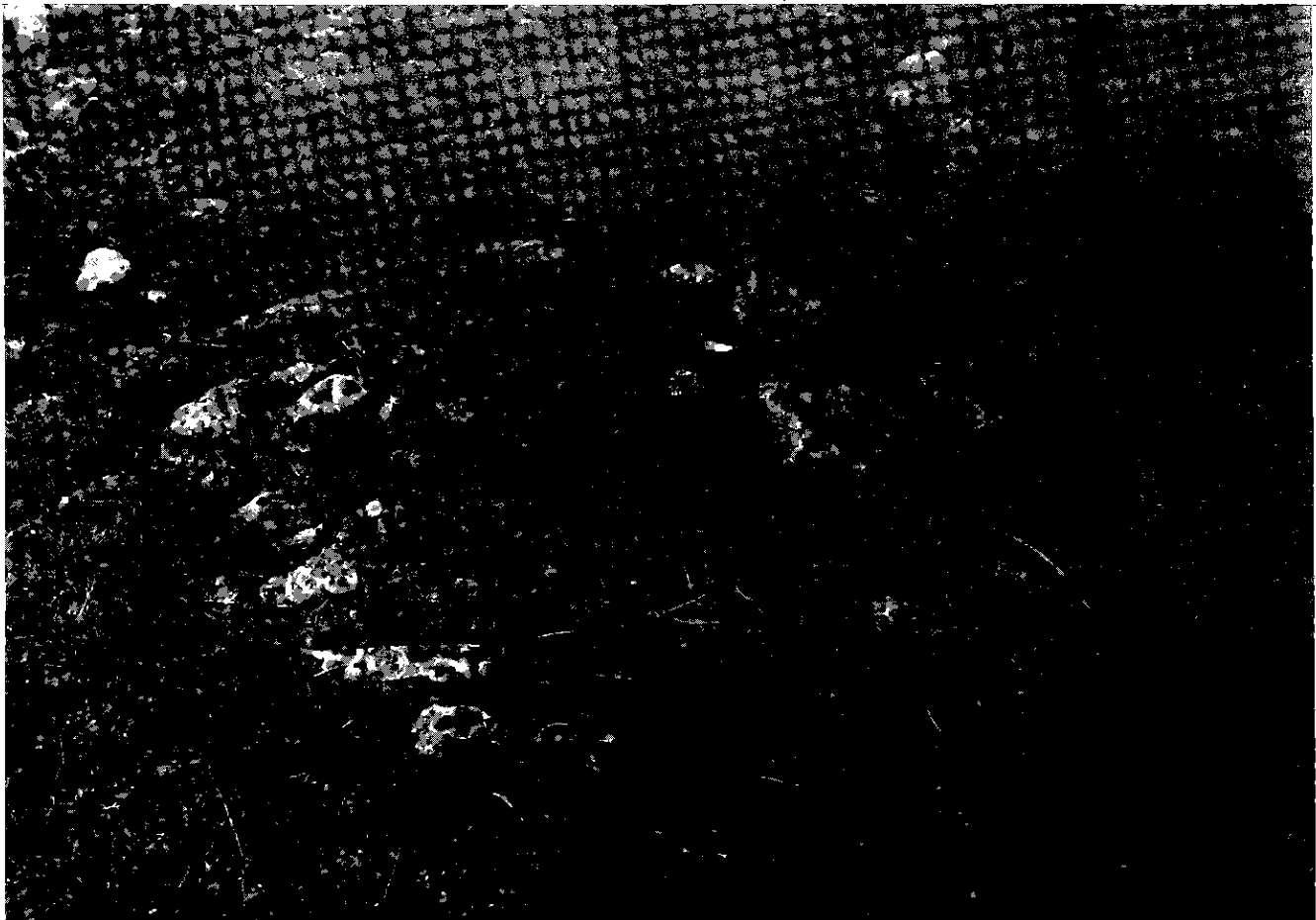


FIGURE 37--A photograph of the cairn which was about 1.8 m in diameter. The lichen can be seen clearly on the rocks. The cairn was about 30 cm above the surface of the land with many of the centre rocks covered with soil and vegetation and as our centre does not dig it is not possible to say how many boulders were below the surface.

The large circle in the mapped area measured 11 m x 11.5 m for the outer circle and 5 m x 5 m for the inner circle. Both circles were complete with no evidence of a doorway. The few scattered rocks in the centre circle were not

indicative of a fire hearth. The four smaller circles were approximately 5 m in diameter. The 'D' and 'H' circles were within 50 cm of the large double circle which is a most unusual location as in most other sites known the large medicine or ceremonial circles were set well away from any other circles. There were no hearths in any of the smaller circles and it is reasonable to assume that all five circles were used in conjunction with some form of religious or ceremonial celebration.

#### SOIL DESCRIPTION

by Dr. John F. Dormaar.

The area on land owned by the Sunrise Hutterian Brethern is in the NE $\frac{1}{4}$  of Section 23, Township 5, Range 9, West of the 4th Meridian. The area is hummocky with the site on the ridged end moraine of the Etzikom drift. The parent material consists mainly of till and some gravel and sand. The soil on the site has the general properties of the Chernozemic Order, the Brown Great Group, and the Orthic Subgroup and has a B horizon from which the primary earth carbonates have been removed. An average description of the soil around and underneath two boulders of two different circles will be:

##### Ah horizon

The Ah horizon extended 7 cm below the surface and was a brown powdery (10YR 5/3, wet; pH<sub>H<sub>2</sub>O</sub> 6.6) soil.

##### Bm horizon

The Bm horizon following was also 7 cm thick and was a dark yellowish brown (10YR 3/4, wet; pH<sub>H<sub>2</sub>O</sub> 6.9) and columnar.

##### Ck horizon

The Ck horizon occurs at about 14 cm below the surface and is light yellowish brown (10YR 6/4, wet; pH<sub>H<sub>2</sub>O</sub> 7.4).

The two stone circles tested were of similar diameter (about 5 m) and soil transformation underneath the two rocks examined (21 x 20 cm and 17 cm thick) was similar indicating that they likely have been in situ for similar lengths of time.

The moisture flow from the boulders had lowered the beginning of effervescence (Ck horizon) by at least 9 cm. This change was very sharp without diffuse boundaries, i.e. the diameter of the areas affected by the moisture was identical to the diameter of the rock above it. The boulders, being granites and quartzites, were lichen covered and were well lodged into the Bm horizon. The soil underneath the rocks had lost its columnar structure to become loose grained and coarse platy and was grayish brown (10YR 5/2, wet; pH<sub>H<sub>2</sub>O</sub> 6.2).

#### COMMENTS

Part of this site was destroyed when the deep cut was made to put the road through and although there were no further petroforms east of the road there is a strong possibility there were some on the 60 m of land removed for the cut.

This site, like the Hummel site, is used strictly for cattle grazing and there is little danger of distruction if the land use does not change. However, like The Grand Forks site, there is always the possibility that sprinkler irrigation may be installed and the land converted to farming.

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