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Survey and synthesis of archaeological sites within the sub-alpine ecological zone, Pryor Mountains, Montana

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A SURVEY AND SYNTHESIS OF ARCHAEOLOGICAL SITES WITHIN THE SUB-ALPINE ECOLOGICAL ZONE, PRYOR MOUNTAINS, MONTANA

by

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CHAPTER I

INTRODUCTION

Area Defined

The area of study with which I was concerned for my thesis study is geographically located approximately 35 miles south of Billings, Montana. The Pryor Mountain complex lies on an East-West axis and is approximately 15 miles wide and 25 miles long. Although the mountain range is found primarily in Montana it slopes downward toward the south into Wyoming.

The Pryor Mountains are made up of five ecological zones which are a function of altitude: one, dry-lands (semi-desert); two, grasslands; three, juniper breaks; four, conifer forest; and five, sub-alpine. Although much archaeological research has been accomplished in four of the five zones, little research has been accomplished in the sub-alpine zone. My area of study, the sub-alpine zone, is located on or near the top of the mountains at a maximum elevation of 8,400 feet.

The area was chosen for study for the following reasons:

1. Since most of the Pryor area will become a national recreation area it is important to gain as much archaeological knowledge of the area as possible before it is vandalized.

2. It is important to understand the sub-alpine zone so the occupation within the area can be correlated with occupations of other zones, thus making possible a better understanding of the movements of people in the Pryor Mountains and their exploitation of available resources.

3. The sub-alpine zone may have played an important role in the survival of pre-historic people during an Altithermal period, thus it is important to investigate the incidence of sites associated with the Middle Pre-Historic Period.

Acting as field supervisor during the 1970 and 1971 seasons for the Pryor Mountain Archaeological Survey Team, I conducted a survey and excavation of sites within the sub-alpine zone. The information gathered during these two seasons and subsequent research is the basis for this thesis.

One problem developing out of the project was for me to reconstruct the lifeway of the people who utilized the sub-alpine zone during the summer months. This construction involved my making assessment of archaeological sites and a synthesis of the cultural data that was recovered from these sites. The construction also involved comparisons with archaeological sites found in similar environments throughout the Plains.

Artifacts recovered during testing and excavation of sites found in the sub-alpine were compared to other artifacts found in sites from similar environments. This comparison was done in order to define the period of prehistoric occupation as well as the season of occupation within the particular zone. The archaeological evidence collected from this zone, compared and correlated with evidence from similar environments, along with evidence from other disciplines, will permit one to raise questions and establish relationships. It is thus hypothesized that archaeological sites within the sub-alpine zone will show relationships to:

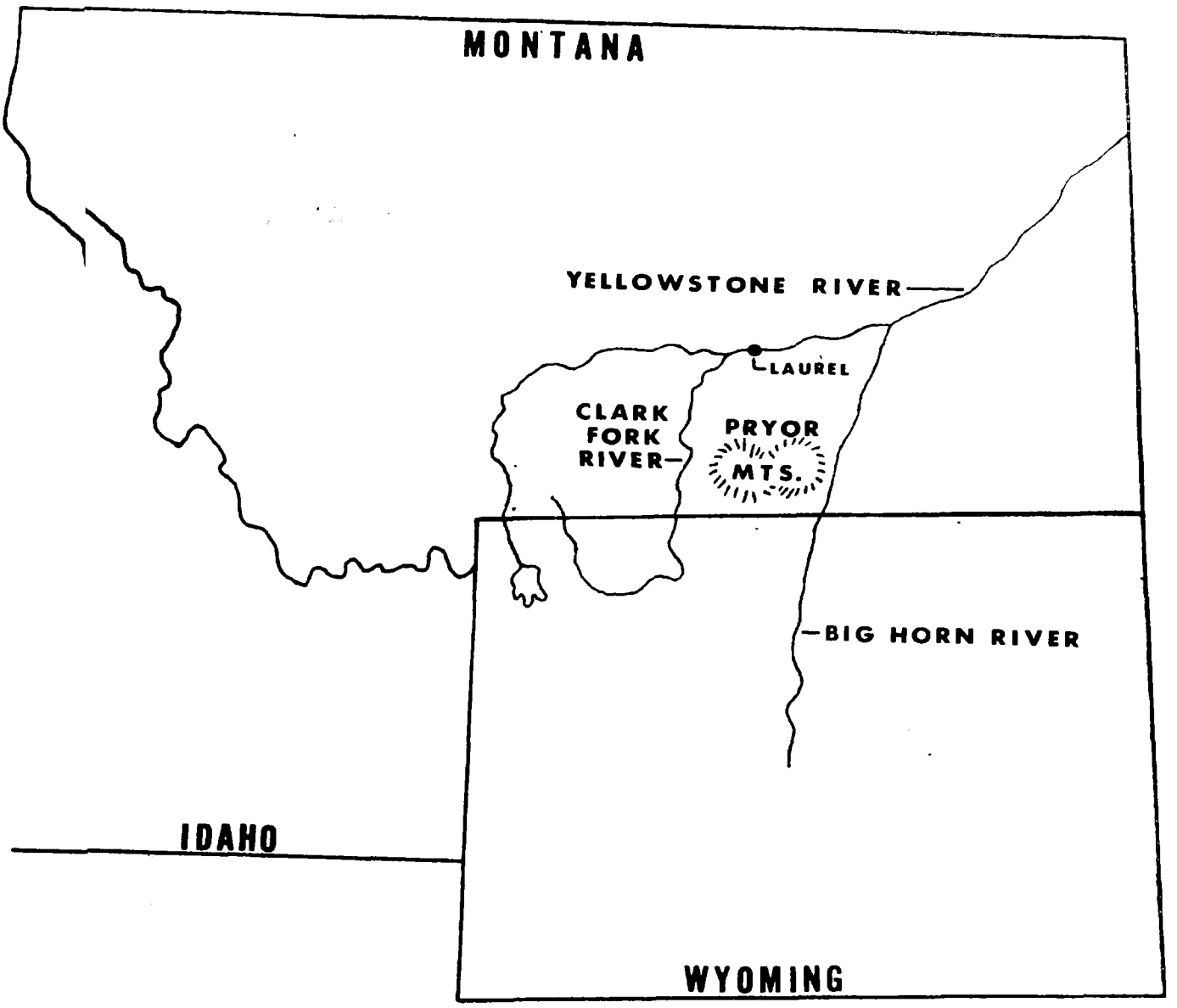


Fig. 1. Pryor Mountain Location.

1. Other sites in similar environments.

2. Sub-alpine sites and their role within a yearly subsistence cycle.

3. Archaeological sites in the Eastern Montana region.

4. The Archaeological cultures in the Northwestern Plains.

Previous Archaeological Work Within the Pryor Mountain Area

The American Museum of Natural History was the first institution to do archaeological work in the Pryor Mountains. N. C. Nelson working in conjunction with the Museum undertook excavations in several caves in Sage Creek Canyon in 1941. This canyon is located twenty miles south of Bridge, Montana. Excavation of fifteen caves produced an abundance of artifacts including corner-notched projectile points and some historical material.

Nelson also tested several rock shelters in Pryor Creek Canyon and also excavated a large rock offering mound at the base of Arrow Rock (Nelson 1943:166).

Mulloy (1952, 1958) later mapped and recorded a series of sixty-four smaller rock piles that were associated with the large mound reported by Nelson.

The array of artifacts found in the rock piles suggests strongly that these piles were in fact offering places. It should be noted that the Crow Indians, who are located on the reservation near the Pryors, still leave offerings at Arrow Rock, near West Pryor, and in the large mound excavated by Nelson.

The River Basin Surveys of the Smithsonian Institution conducted archaeological survey and excavation in the Bighorn Canyon during the 1962, 1963, and 1964 seasons (Husted 1969). This project was undertaken to salvage archaeological information that might be destroyed by the waters of Yellowtail Dam.

Recently there has been much archaeological work accomplished in the Pryors by the Pryor Mountain-Bighorn Archaeological Survey Team. Under the direction of Dr. Lawrence L. Loendorf, this survey has been continued through the summer field seasons of 1968, 1969, 1970, 1971 and 1972. The project is a result of a united effort of the National Park Service, the National Forest Service, and the Bureau of Land Management. The function of the salvage project is to locate, record, and excavate sites that may be used in an interpretation of the Pryor Mountain-Bighorn Canyon Recreation Area.

During the 1969 field season Loendorf and the Pryor Mountain Archaeological Survey Team conducted a preliminary survey of the conifer slopes and the sub-alpine zone of the Pryor Mountains. For several years, members of the Billings Archaeological Society, particularly Stuart Conner of Billings, Montana, had frequented the Pryors and recorded numerous sites. Upon learning of the survey, Connor supplied pertinent information concerning the sub-alpine zone.

It was during this preliminary survey conducted by Loendorf that many of the sites incorporated in this thesis were first recorded. The results of the preliminary survey of the sub-alpine zone are included as a portion of the 1971 field report, "Archaeological Survey in the Pryor Mountain-Bighorn Canyon Recreation Area--1969 Field Seasons" (Loendorf

1971). In the 1971 report Loendorf first attempted to identify particular ecological zones, and to correlate archaeological sites to these zones.

In 1971, follow up survey of the sub-alpine zone was accomplished. Under the direction of Loendorf, previously recorded sites were, revisited, accurately mapped, and tested. A few new sites not previously discovered were subsequently recorded.

The contribution of this thesis consists of adding to the knowledge of the utilization of high-elevation environments by prehistoric people of the Plains. Probably the most important hypothesis formulated is the role of sub-alpine sites within a seasonal subsistance cycle. Loendorf, after establishing particular zones for the Pryor Mountain area, hypothesised a seasonal transhumance for this intra-mountain region. The seasonal cycle is simply the utilization of different zones during different times of the year by the indiginous population. According to this hypothesis the sub-alpine zone was utilized during the hot summer months. The survey and excavation undertaken during the 1971 season is synthesized in this thesis and was accomplished in order to gather evidence to support the seasonal transhumance hypothesis.

Thus this thesis and the work conducted in 1971 play an integral part in the understanding of people's utilization of Pryor Mountains and the Northwestern Plains. In-as-much as I address the spatial implications I also concern myself with temporal aspects. As a sanctuary during a period of arid climate the sub-alpine zone appears to have been utilized for greater length of time. In the conclusions of the thesis I give evidence in support of this temporal aspect.

CHAPTER II

PHYSICAL SETTING OF THE PRYOR MOUNTAINS

Introduction

This chapter contains information on the physical setting of the Pryor Mountains. The following sections; Climate, Geology, Pleistocene Chronology, Flora and Fauna, although non-archaeological, are important to the understanding of man's utilization of a particular area. Likewise it would have been nearly essential for prehistoric peoples to have had an understanding of these factors for survival.

An understanding of climate would have been basic to prehistoric man's survival. During different times of the year it was important for him to be at a particular place in order to take advantage of food and shelter. Indirectly then, climate (weather and seasons) would have played an important role in man's utilization of the Pryor Mountains and the Sub-alpine Zone.

Since much of the climatological information of the past is difficult to duplicate, I have included historical records compiled from climatological weather stations located near the Pryor Mountains. Much of this information on climate has been compiled from Alyea (1970), Lowers (1960), Dightman (1960), Fassler (1970) and from personal communication with the Lovell,

Wyoming, and Bridger, Montana, Climatological Weather Stations.

The inventory of prehistoric man's tools consisted mainly of stone tools and he would have had a basic understanding of stone. Only particular types of stone flake properly to produce the tools needed to kill and butcher animals. Where this stone could be found was also essential knowledge to prehistoric man.

Shelter, a basic necessity, would fit within his knowledge of geomorphology. Rockshelters for example, occur in outcroppings of particular formations. Prehistoric peoples inhabiting a particular area would have needed to know where these types of shelters could be located and in what formations they were likely to be found.

In the Pryor Mountains the geology has changed very little since prehistoric people lived there. I have included the section dealing with geology in order that readers may gain understanding of the area and how the topography was formed.

Two sections on flora and fauna are discussed together. Food, another basic necessity, came from plants and animals. Prehistoric peoples would have had a knowledge of edible plants, where they were found, when they matured, and how they were prepared. Animals were probably a more important food source for nomadic hunters. An understanding of the animals behavioral patterns (including migration patterns), how the animals could be procured, and the meat could be prepared, and preserved, was a necessity for these people to survive.

Some of the animals that once existed in the Pryors are no longer

found within the area (bison, elk, grizzly and sheep); however, from early records and skeletal remains we are able to construct the faunal population that once existed.

While the sections including flora and fauna are not complete, they do include those plants and animals that were probably important to the prehistoric inhabitants of the Pryors.

Climate of the Pryor Mountains

"Middle-latitude desert and steppe climate within a Continental Regime" best describes the climate of the Pryor Mountains and surrounding areas. The Continental Regime is characterized by a warm, wet season and a cold, dry season, thus exhibiting seasonal contrast both in temperature and precipitation (Strahler 1965:113). In the Pryor area this phenomenon of seasonal contrast is due to high elevation, dry air which permits rapid incoming and outgoing radiation, and the passage of both cold and warm air masses. Although the Pryor area has a fairly stable climate, widespread and sometimes abrupt changes in the weather do occasionally occur. With cold air masses from Canada and rapid nighttime radiation cooling, late spring and early fall freezes are not uncommon. The average dates of the occurrences of 32 and 28 degree temperatures in the spring are May 14 and May 3, respectively. This results in an average growing season of 130 days for 32 degrees and 153 days for 28 degrees, or an average overall growing season of 141 days.

Some extreme weather conditions have been recorded by the Lovell Climatological Station located at the southern most end of the Pryor

Mountains. The record high of 107 degrees was recorded in July, 1939, and the record low of -39 degrees was recorded in February, 1936. The mean temperatures for these months are 71.4 degrees and 23.3 degrees respectively (see Table 1).

Cold air masses are usually blocked from the Pryor area by the Bighorn Mountains located southeast of the area. Occasionally, however, very cold masses do enter the area and cold temperatures may prevail for several days. Yet, winters, while usually cold, are not continuously so. Between cold waves there are periods of mild, although often windy, weather. These warm windy winter periods, popularly known as "chinook" weather, occur almost entirely along the eastern and northeastern slopes of the Continental Divide. At times, these "chinook" winds can be strong (25 to 50 miles per hour) and may persist for several days with only brief interruption. During the period from November through May, most of the precipitation falls in the form of snow. The Lovell Climatological Station recorded a mean annual snowfall for the period 1931 through 1960 of 21.3 inches. At lower elevations in the Pryor Mountains the annual average is 15 to 20 inches and at high elevations (5,000 to 6,000 feet) snowfall averages from 30 to 40 inches. These figures do not include measurements from within the study area of a maximum elevation of 8,786 feet. Snowfall here is somewhat greater, averaging between 40 to 45 inches annually.

During the summer months, showers are quite frequent, but light, and often amount to only a few hundreths of an inch. Occasionally, however,

TABLE 1

CLIMATOLOGICAL INFORMATION CHART

Climatological Recording Stations and their Elevations in Feet	Sage Creek Elev. 7,000	Crow Agency Elev. 3,036	Bridger 3,910	Lovell 3,837
Mean Annual Temperature		44.9	46.21	44.5
Record High Temperature (July)		106	100	107
Record Low Temperature (February)		-40	-16	-39
Mean Monthly Temperature (July)		70.5	71.6	71.4
Mean Monthly Temperature (February)		22.7	23.0	23.3
Average Last Frost (Spring)		May 18	May 19	May 3 May 14
Average First Frost (Fall)		Sept. 25	Sept. 17	Sept. 14 Oct. 3
Mean Annual Snowfall			20.1	21.3
Mean Annual Precipitation	19.05 (2-year period)	14.75	10.23	6.89

there will be some very heavy rain associated with thunderstorms which may cover a few square miles and drop as much as five inches of precipitation within a 24 hour period.

Since strong winds are broken up by the surrounding mountain ranges; the winds confronting the Pryors are relatively calm, averaging between 8 and 12 miles per hour. Although strong winds do occur, they are generally confined to the early evening hours and frequently accompany the thunderstorms prevalent in the summer months. Occasionally, tornadoes have been recorded, primarily during late spring and summer months.

While the Bighorn range breaks up wind patterns, the Absoroka Mountains and the Beartooth Mountains, to the west of the Pryor range, form a barrier to moisture. Through forced ascent over these ranges of mountains, followed by adiabatic heating upon descending the lee slopes, the air masses are deprived of their moisture and raised in temperature as well. Thus, the region ajoining the Pryor Mountains to the west and south is poorly situated for obtaining precipitation. Records for the "Mean Annual Precipitation" have been gathered from two stations in this area (see Table 1), and are as follows: for Lovell, Wyoming, the mean annual precipitation for the years 1931 through 1960 was 6.89 inches. For the period from January through December, 1970, the total precipitation was 5.51 inches. For Bridger, Montana, the mean annual precipitation for years 1931 through 1955 was 10.23 inches. During the period from January through December, 1970, the total precipitation was 11.43 inches. These stations are at an elevation of approximately 3,800 feet.

As the air masses reach the Pryors, forced ascent takes place and once again the air masses are robbed of their moisture. There is no climatological recording station located in the Pryor Mountains, although the "Sage Creek Station" is a precipitation storage station and does give some information as to total yearly precipitation.

Records for the period 1969 through 1971 show a mean annual precipitation of 18.05 inches for an elevation of 7,000 feet. The mean annual precipitation for the summit of the Pryor Mountains, elevation of 8,786 feet, averages approximately 3-4 inches greater than that at 7,000 feet. Normal precipitation is least for the months of December, January, and February, increasing rapidly to a peak in early June. Precipitation amounts decrease rapidly through the latter part of June and July to a low in August. A slight rise in precipitation is generally noticed in September, followed by a steady decline to the minimal precipitation of the winter months (see Table 1).

Since the eastern side of the Pryors is comprised of abrupt descent scarps, the air masses do not follow the gradual slopes as they do on the west side. When descent of the air masses does occur it is over the flat grassy prairies to the east of the mountains. The air masses descend slowly over this area, and thus moisture loss is moderate for the flat grasslands. The Crow Agency Climatological Recording Station lies within this eastern area, and records from this station show a mean annual precipitation of 14.75 inches for the years 1931 through 1955 (see Table 1).

Sunshine is quite abundant in the Pryor area with but a few days

during the year lacking some sunshine. There is no instrumental record of sunshine. However, it is estimated that sunshine occurs 65 per cent of the daylight hours in late winter and spring, and 35 or 40 per cent of daylight hours in late summer.

It has also been estimated (Loendorf 1969) that change of elevation has an effect on climate. For every 1,000 feet increase in elevation there is a decrease in temperature of 3 to 4 degrees. There are no other records of corresponding changes in climate with an increase in elevation.

Geology of the Pryor Mountains

The Pryor Mountain "uplift," located approximately 30 miles south of Billings, Montana, is an isolated range within the Central Rocky Mountains. Oriented east and west, the Pryor Mountains cover an area of approximately 450 square miles. This area lies primarily in south-central Montana but extends a short distance into Wyoming (Blackstone 1940:590-591).

Most of the tectonic structuring of the Pryor Mountains took place at the close of the Cretaceous Period. With the onset of the Laramide Revolution and the start of the Tertiary Period, the western portion of the continent was subjected to one of the longest and most severe periods of volcanism in the earth's history. During this period of crustal deformation the sediments of the Rocky Mountain trough (within the Pryor Mountains) faulted and folded to form the Great Rocky Mountain System (Matthews 1967:123-133).

The geological strata of the Pryor Mountains range in age from the

Archeozoic Era through the Mesozoic Era, with exposed portions of the Pryor Mountains represented by conformable, but a discontinuous sequence ranging from Pre-Cambrian to Upper Cretaceous Periods (see Table 2, Silurian and Devonian Periods are absent (Blackstone 1940:595)). The strats exposed in the Pryor Mountains consists of siliceous limestone with thin lenses and nodules of cherts and jaspers. The exposed strata also consists of shales, sandstones, and fossilferous limestone (see Table 3). These formations play an important role in man's utilization of the Pryor Mountains. Caves resulting from erosional effects were used as shelters, while chert and jasper provided material for the manufacturing of stone tools.

Many of the uplifts and anticlines found in the Central Rocky Mountains are clearly exhibited in the Pryor Mountains. The unusual surface expansion of the uplifts is an asymetrical anticline, or monocline, which traditionally is assumed to have been caused from rotational uplifts. From this faulting and uplifting, plus later erosional effects, four major units of the Pryor Mountains were formed. These are as follows: West Pryor Mountain, Northeast Block, Shively Hill Dome, and Big Pryor Mountain. There are also two minor units represented: Sykes Spring Area, and the secondary monocline in East Pryor Mountain (Figure 2). The presence or absence of faulting as well as the type and degree of faulting comprises the variation in structure of the Pryor Mountains. Although variation between units does exist, all four major units have been uplifted at the northeastern corner.

TABLE 2

STRATIGRAPHIC NOMENCLATURE CHART*

Northern Big Horn-Pryor Mountain Area

ERA	PERIOD		Strata in the PRYOR MOUNTAINS and Bighorn Basin
MESOZOIC "Middle Life"	CRETACEOUS	UPPER	THERMOPOLIS
		LOWER	CLOVERLY GROUP
	JURASSIC	UPPER	MORRISON
			UPPER SUNDANCE
			LOWER SUNDANCE
		MIDDLE	GYP SPRINGS
		LOWER	////////////////////
	TRIASSIC	LOWER	CHUGWATER
PALEOZOIC "Ancient Life"	PERMIAN		EMBAR
	PENNSYLVANIAN		TENSLEEP
			AMSDEN
	MISSISSIPPIAN		MADISON
	DEVONIAN	UPPER	////////////////////
		LOWER	NOT REPRESENTED IN PRYORS
	SILUIAN		
	ORDOVICIAN		BIG HORN
PROTEROZOIC	CAMBRIAN	UPPER	////////////////////
		MIDDLE	GALLATIN
		LOWER	////////////////////
ARCHOZOIC	PRE-CAMBRIAN	Metamorphic and Igneous Rock	Shist and Granite

*Compiled from Billings Geological Society Guidebooks, June 1954, 1958.

TABLE 3

STRATIGRAPHIC FORMATIONS IN THE PRYOR MOUNTAINS*

Geographic Era	Strata	Thickness in Feet
Cretaceous		
Lower	Mowry shale	
	Thinly bedded, siliceous shale, weathering silvery, contains numerous fish scales.	250
	Thermopolis shale	
	Black shales; black sandy shales; black shales with bentonite; and rusty sandy shale, or sandstone, strongly ripple marked.	650
	Cloverly formation	
	Greybull sandstone member--sandy shale or sandstone. Variable clays of red,	20
	purple, and pink color. Bone scrap and gastroliths common. Pryor conglomerate	130
	member. Conglomerate or coarse-grained sandstone, changing to latter from north to south. Black chert pebbles or fragments in a quartzitic matrix.	50
Jurassic		
Upper	Morrison formation	
	Gray, very gritty shale, weathering into soft slope. Lenses of red shale 20-25	170
	feet thick at the base. Yellow buff sandstone, medium-grained.	70
	Sundance formation	
	Olive green sandstone, with fossils. Gray,	40
	soft shales, with minor sandstones and sandy shales. Gray and yellow shales,	115
	thinly-bedded sandstones, bentonitic shale at top. Gray, fossiliferous lime-	120
	stone.	3

TABLE 3--Continued

Geographic Era	Strata	Thickness in Feet
Triassic	Chugwater formation	
	Drab maroon shale, with gypsum streaks.	100
	Gray, dense, massive limestones, with maroon shale partings, and limy streaks.	14
	Red sandy shale, and sandstone. Granular gypsum (traced to north this grades into a three-foot thinly-bedded limestone).	110 60
	Red sandy shales, and sandstone.	330
Permian	Embar	
	Absent on west side of uplift, represented as thin limestone and chert breccia in central portion; best developed on southeast flank. White siliceous limestone.	25-40
	Red and yellow shales.	70-90
Pennsylvanian	Ten Sleep sandstone	
	Sandstone, limy, tan to gray-white in color, with small lenses and nodules of dark chert; fossiliferous. Sandstone, purplish, quartzitic, steeply cross-bedded (20-25). Chert, and fossiliferous siliceous limestone. Alternation thinly-bedded and cross-bedded white sandstone, lower portion dolomitic. Strongly ripple-marked and cross-bedded sandstone. Fine-grained sandstone after grading into pale lavender quartzite.	20 47 1 57 15 10
Pennsylvanian and Mississippian	Amsden formation	
	Thin beds sandstone, shale, earthy limestone purplish to red and green in color.	32
	Purplish shale, with interbedded earthy white to purple limestone. Hard, blocky, red hematitic shale, occasional green conglomerate layer in this material.	145 65
	Limestone-nodular, purple pink mottled.	10

TABLE 3--Continued

Geographic Era	Strata	Thickness in Feet
Mississippian	Madison limestone	
	Gray to blue-gray, fossiliferous, cherty limestone. Hard, brittle, thick-bedded	87
	to massive. Gray, thinly-bedded, softer limestone than above. Chert less abundant.	138
	Breccia due to collapse of post-Mississippian caves (general in area).	51
	Limestone, buff to brown, interbedded with thin gray to white limestones. Soft,	280
	granular, often ripple-marked. Thinly-bedded, purplish to gray limestone. Interbedded with thin layers of minutely ripple-marked, argillaceous sediment. Limestone contains large ripple-marks. Base marked	
	by very fossiliferous, granular limestone.	73
Ordovician	Bighorn dolomite	
	Brown to chalky rather well-bedded dolomites, interbedded with thinly-bedded gray to buff limestones, all unfossiliferous. Massive,	138
	cliff forming, dull brown to chalky-buff dolomite. Poorly-bedded, chert nodules in lower 75 feet, weathers with a brecciated	
	appearance. Dolomite, massive, compact,	210
	light buff to bright yellow, siliferous.	20
Cambrian	Deadwood formation	
	Flat-pebble limestone conglomerate, interbedded in shaly limestones, and glauconitic	
	shales. Glauconitic shales, with minor	253
	thinly-bedded limestones, and flat-pebble conglomerate beds. Basal arkosic sandstone,	500
	weathers into limonitic stained sand.	50
Pre-Cambrian	Schists and granite.	

*Compiled from D. L. Blackstone's "Structure of the Pryor Mountains" (1940).

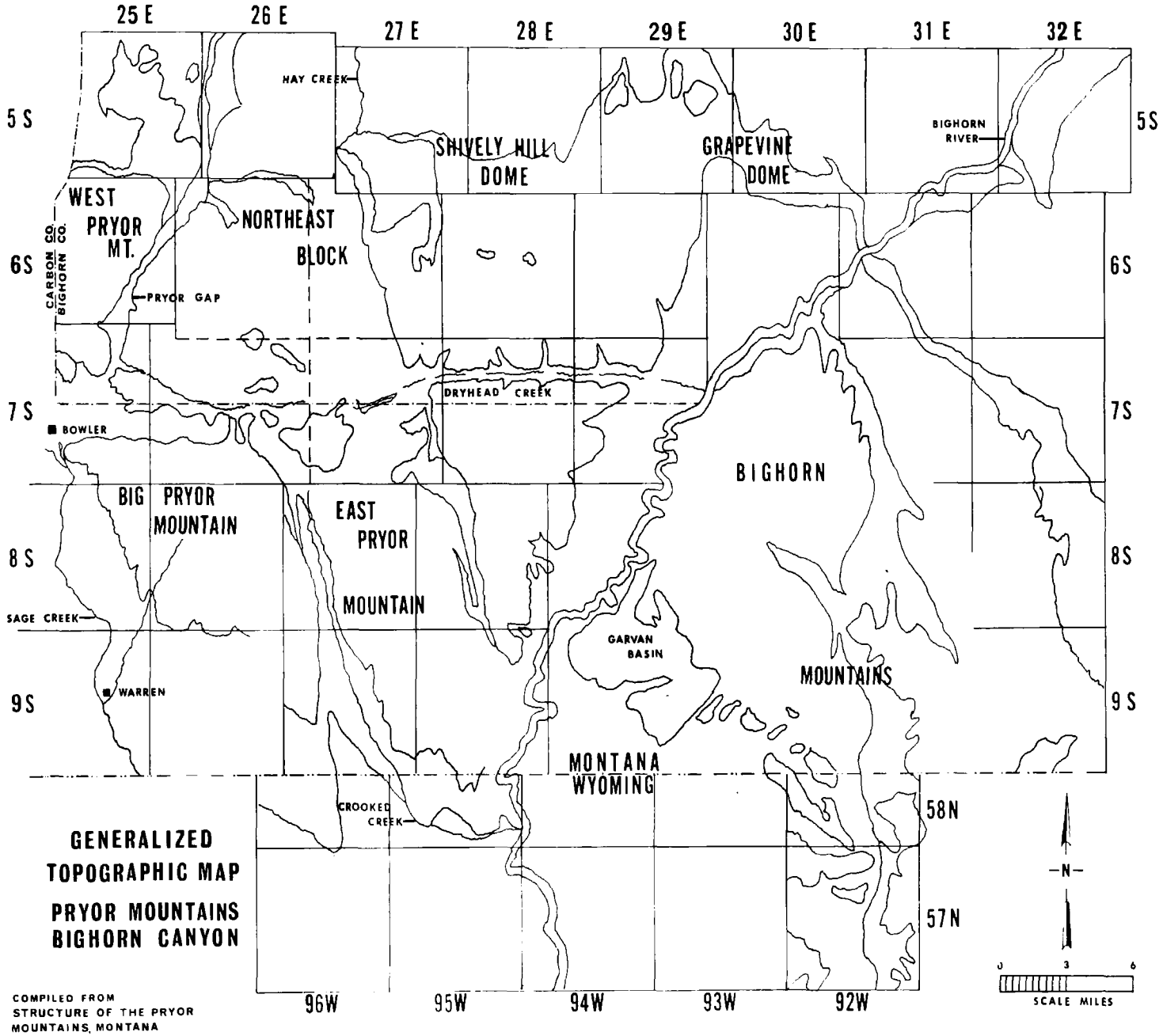


Fig. 2. Pryor Mountains.

Topographically the Pryors are described as a series of block mountains which are drained by the Clark's Fork and Bighorn Rivers and their tributaries. The Mountains slope gently towards the west, while the eastern edges are abrupt scarps. Although much erosion has taken place on the western side of the mountains resulting in numerous box canyons, the eastern slope exhibits little erosional deformation. The Pryor Mountains are separated from the Bighorn range by a structural trough through which the Bighorn River flows. Recently this canyon has been dammed up and now contains the Bighorn Reservoir (Yellowtail Dam). The extreme northeastern portion of the Pryors, West Pryor, is separated from the rest of the mass by a wind-blown gap known as Pryor Gap. This gap was once the main channel of an early stage of the Shoshone River (Blackstone 1940:591).

Pleistocene Chronology of the Pryor Mountains

There is geological evidence of four major continental ice advances for the midwestern area of the United States. From oldest to youngest, they are the Nebraskan, Kansan, Illinoian, and the Wisconsin. There are three interglacial periods that separate the major glaciations, they are the Aftonian, Yarmouth, and Sangamon. There is no evidence found for pre-Wisconsin ice in Montana. However, during the Wisconsin Glacial Period evidence for six major advances can be recognized in eastern Montana (Lemke 1965:221). None of the six advances extended ice cover into southern Montana. The glaciation in northern Montana did, however, block several major river drainages. The ice damming the Yellowstone River

formed Glacial Lake Glendive, and the blockage of the Musselshell River formed Glacial Lake Musselshell. These lakes extended into southwestern Montana and greatly affected the area. Glacial Lake Musselshell extended as far south as Roundup, Montana, and Glacial Lake Glendive extended to Miles City, Montana.

While the major advances of continental ice were occurring in northern Montana there were several advances of alpine glaciation in southern Montana. Remains of these alpine advances exist as moraines on the Beartooth Plateau or as moraines in the Clark Fork Valley to the west of the Pryors.

There has been relatively little written on the Pleistocene Period for the Pryor Mountains. Since the Pryor Mountains are only 8,500 feet in elevation, they do not appear to have been effected by alpine glaciation.

The alpine glaciation in the mountain ranges adjacent to the Pryors have been designated Bull Lake, Pinedale, and Neoglaciation (Richmond 1965). The extensive alpine ice that occurred in the mountains of west-central Montana, the Salmon River, the Yellowstone-Beartooth Plateau, the Wind River Mountains, and the White River Plateau dates from the Bull Lake Period. Radiocarbon dates for the Bull Lake Stade range between 25,000 and 37,000 years ago (Richmond 1965:221).

There were two major advances of Pinedale Glaciation which were separated by a short interstade. Carbon 14 dates for Pinedale Glaciation are between 6,000 and 25,000 years ago. These dates vary with the

altitude from which the sample was collected, but most dates fall within this range.

The Neoglaciation is divided into the Temple Lake Stade and the Gannett Peak Stade. Carbon 14 dates for Temple Lake are between 4,500 and 1,000 years ago. Gannett Peak moraines are at high altitudes like those of Temple Lake. These alpine glaciers are said to have formed during the 16th, 17th, 18th, and 19th centuries, reaching their maximum formation about 1850 A.D. (Richmond 1965:226).

There has been little work on the post-Pleistocene Period in the Pryor Mountains. Ernst Antevs (1955) has postulated a Neothermal Period for the last 10,000 years in the western United States, and researchers like Mulloy (1958) have attempted to use his concept in the Plains (Loendorf 1969). Neothermal is divided into the Anathermal, Altithermal, and the Medithermal. The Anathermal was a cool, moist period; the Altithermal, a warm, dry period; and the Medithermal period was similar to the climate existing today. Careful examination of all factors should be used in applying these periods to any particular area. A given span of Neothermal time cannot be projected from one area to another without first looking at the climatic and topographic conditions within the second area (Bryan and Gruhn 1964:307).

Climate for the mountains adjacent to the Pryors is now more or less transitional between the more humid and cooler climate that prevailed during the Pleistocene glaciation and the more arid, warmer climate of the interglacial periods. There seems to be no compelling

reason for thinking that climate changes within the region involved large areas. Rather, during periods of glaciation, the boundary between the arid-basin environment and the humid-mountain environment moved down and basinwards. During interglacial periods, the boundary was moved up and toward the mountains (Ten Brink 1968: 154).

The Temple Lake deposits area in the upper Stillwater River area originated from a glacial advance after the Pinedale ice had nearly, if not entirely, dissipated. This period of glacial melting is concluded to have been during the altithermal or hypsithermal period (Ten Brink 1968: 74, 75).

Weathering profiles which are developed on all glacial deposits except Temple Lake and Gannett Peak, indicate that most interglacial periods were as warm or warmer than the present climate. Based on the lack of a caliche horizon about 7,500 feet above sea level in the Beartooths, an arid condition has extended no higher than that (7,500 feet) for any significant length of time since the Pinedale Glaciation. This period of maximum warmth was sometime between 8,000 and 5,000 years ago (Ten Brink 1968:116).

On the basis of a caliche horizon recognizable in the Pryor area, I believe that a hypsithermal period may have occurred in the Pryors. If Ten Brink's thesis is correct, the tops of the Pryor Mountains would have been a moister sanctuary for peoples living in that area during that time period.

Flora and Fauna of the Pryor Mountain Sub-Alpine Zone

A descriptive analysis of flora and fauna of the sub-alpine zone of the Pryor Mountains has been taken from a master's thesis by John E. Firebaugh (1969) on the "Relationship of Mule Deer to Livestock on Summer Range in the Pryor Mountains, Montana." Also much has been taken from field notes compiled by Steve Gentzer, Bachelor of Science, University of Missouri. Mr. Gentzer was a member of the Pryor Mountain Archaeological Survey Team during the summer field seasons 1970 and 1971.

The sub-alpine zone lies within the "Hudsonian Zone" described by Merritt (1917). In the Pryor Mountains this zone is approximately one-half to one mile wide and four to eight miles long at an elevation of 8,000 to 8,786 feet. The only units within the Pryor Mountain complex that exhibit the sub-alpine zone characteristics are East Pryor and Big Pryor Mountains. The topography of the sub-alpine zone is described as consisting of vast, rolling grasslands with the gentle roll of the land only occasionally broken by hills. The ground is rocky and occasional outcroppings of limestone form small erosional buttes within the zone.

Within the sub-alpine zone there are four vegetative categories: (1) timber type, (2) small fescue-sedge meadows, (3) sagebrush-fescue type, and (4) open-grassland type (Firebaugh 1969).

The timber type is composed of Engleman spruce (Picea engelmanni) and alpine fir (Abies lasiocarpa) which grow together in small, dense stands and are separated by small fescue-sedge meadows. In the small stands of timber the dominant undergrowth includes sedge (Carex spp.),

heart-leaf arnica (Arnica sororia), yarrow (Achillea mullefolium), and gooseberry (Ribes spp.).

In the small fescue-sedge meadows, important grasses and grasslike vegetation are Idaho fescue (Fescuta idahoensis), needleleaf sedge (Carex eleocharis), and other sedges. Major forbs are yarrow, prairie-smoke (Geum triflorum), phlox (Phlox spp.), field chickweed (Cerastium arvense), and Western bistort (Polygonum bistortoides).

On the southern slopes at the head of the drainages there is sage-brush-fescue vegetation. Big sage brush (Artemsia tridentata) is the dominant shrub, and Idaho fescue is the dominant grass. The common forbs are yarrow, pale agoseris (Agoseris glauca), Washington lupine (Lupinus polyphyllus), field chickweed, and phlox.

The fourth vegetative category, the large, open-grassland type, is composed mainly of sedges, needleleaf sedge in particular. The most important forbs are phlox and mountain death camas (Zygadenus elegans). Shrubby cinquefoil (Potentilla fruticosa) is the major shrub (see Table 4).

Animal Speciation and Their Utilization of the Sub-Alpine Zone

Reptilian

There are no reptiles in the alpine zone due to the zone's environmental conditions, which are too cold to support reptilian life.

Avian

In the alpine zone in the Pryor Mountains, or in any other mountain range, there are no permanent avian residents. But in the summer when the

TABLE 4

VEGETATION OF THE SUB-ALPINE ZONE

Plant	Timber type	Fescue-sedge	Sagebrush-fescue	Open grassland
TREES				
Picea engelmanni	x*	-**	-	-
Abies lasiocarpa	x	-	-	-
GRASS AND GRASS-LIKE PLANTS				
Agropyron spp.	-	x	x	x
Carex eleocharis	-	x	-	x
Carex spp.	x	x	x	x
Danthonia intermedia	-	x	x	-
Festuca idahoensis	-	x	x	-
Koeleria cristata	-	x	-	x
Melica spectabilis	-	-	x	-
Phleum alpinum	-	x	-	-
Poa spp.	-	x	x	-
Stipa spp.	-	-	x	-
FORBES				
Achillea millefolium	x	x	x	-
Agoseris glauca	-	x	x	x
Anemone patens	-	x	-	x
Antennaria rosea	-	x	x	x
Arnica sororia	x	x	-	-
Astragalus miser	-	x	x	x

TABLE 4--Continued

Plant	Timber type	Fescue-sedge	Sagebrush-fescue	Open grassland
Astragalus spp.	-	x	x	x
Campanula rotundifolia	-	-	x	-
Castilleja lutescens	-	-	-	x
Cerastium arvense	-	x	x	x
Cirsium undulatam	-	-	x	-
Delphinium bicolor	-	x	-	-
Dodecatheon conjugen	-	x	-	-
Erigeron speciosus	-	x	-	-
Erigeron umbellatum	-	x	x	-
Galium spp.	-	-	x	-
Gerancium viscossissimum	-	-	x	-
Geum triflorum	-	x	x	-
Lupinus poyphyllus	-	x	x	x
Myosotis sylvatica	-	x	-	-
Oxytropis sericea	-	-	-	x
Phlox spp.	-	x	x	x
Polygonom bistortoides	-	x	-	x
Potentilla gracilis	-	x	x	-
Senecio spp.	-	-	-	x
Taraxacum laevigatum	-	-	x	-
Townsendia parryi	-	x	-	-

TABLE 4--Continued

Plant	Timber type	Fescue-sedge	Sagebrush-fescue	Open grassland
Valeriana dioica	-	-	x	-
Viola praemorsa	-	-	x	-
Zygadenus elegans	-	-	-	x
SHRUBS				
Artemisia tridentata	-	-	x	-
Pontentilla fruticosa	-	-	-	x
Ribes spp.	x	-	-	-

x* = present in vegetation type.

-** = absent in vegetation type.

warmer weather comes, some small birds such as the white-crowned sparrow, juncos, warblers, and kinglets migrate from lower elevations in the south to mate in the zone (Bailey 1930:14).

Although the blue grouse spends most of its time in the leafy brush, it was noted utilizing the edge of the zone in early morning and evening. The grouse inhabit the zone in early June utilizing the abundant food, then leave when the weather becomes too severe. Food supplies are abundant in early August when grasshopper hatches are at a peak and the grouse feed almost exclusively on them.

Predatory birds, such as the golden eagle, utilize the zone as a hunting ground, preying upon the numerous small rodents and an occasional grouse. Many of the birds seen in the alpine zone are seen only because they are in transit through the zone.

The birds most frequently seen in the zone are the golden eagle (Aquila chrysaetos), marsh hawk (Circus syaneus), blue grouse (Dendragapus obscurus), Clark's nutcracker (Nucifnaga columbiana), common night hawk (Chordeliles minor), black-billed magpie (Pica pica), horned-lark, (Eremophila alpestis), and red-tailed hawk (Buteo jamaicensis) (see Table 5).

Mammals

For identification purposes, the mammals of the sub-alpine zone were divided into two groups: present mammals and those mammals no longer present.

TABLE 5

BIRDS OF THE SUB-ALPINE ZONE

Cathartes aura	Turkey vulture
Accipter gentilis	Goshawk
Accipter striatus	Sharp-shinned hawk
Buteo jamaicensis	Red-tailed hawk
Buteo regalis	Ferruginous hawk
Aquila chrysaetos	Golden eagle
Haliaeetus leucocephalus	Bald eagle
Circus cyaneus	Marsh hawk
Falco sparverius	Sparrow hawk
Dendragapus obscurus	Blue grouse
Zenaidura macrovra	Morning dove
Chordeiles minor	Common nighthawk
Colaptes cafer	Red-shafted flicker
Eremophila alpestis	Horned lark
Tachycineta thalassina	Violet-green swallow
Pertochelidon pyrrhonota	Cliff swallow
Pica pica	Black-billed magpie
Corvus corax	Common raven
Corvus brachyrhynchos	Common crow
Nucifraga columbiana	Clark's nutcracker
Spinus pinus	Pine siskin
Zonotrichia levcophrys	White-crowned sparrow
Junco oregonus	Oregon junco

Present Mammals

Unlike the birds which had no permanent residence in the alpine zone, a few animals live in the zone permanently. These are rodents that either live beneath the snows or hibernate during winter months. Such animals include the northern pocket gopher (Thomomys talpoides pryorii), whose runs are numerous on the surface of the ground in the zone, the yellow-bellied marmot (Marmota flaviventris), the Western jumping mouse (Zapus princeps), the red squirrel (Tamiasciurus hudsonicus), the bushy-tailed wood rat (Neotaoma cinerea), the porcupine (Erethizone dorsatum), the striped skunk (Mephitis mephitis), and the racoon (Procyon lotor). Such animals as the mountain cottontail (Sylvilagus nuttailii), provide ample reason for carnivores such as the red fox (Vulpes vulpes), coyote (Canis latrans), and the bobcat (Lynx rufus) to enter the zone. The black bear (Urus americanus) also visits the zone to hunt for various foods such as roots, insects and small rodents.

The three largest animals that utilize the alpine zone during the warmer months are the white-tailed deer (Odocoileus virginianus), the mule deer (Odocoileus hemionus), and the wild horse (Equus spp.). The white-tailed deer is scarce and seldom seen (only one has been sighted). Mule deer are abundant and can be seen grazing on various grasses, sedges, and forbs in the evenings and early morning. The wild horse is similar to the mule deer in its utilization of the food available in the zone, but differs in that it is less wary and not as abundant in the zone.

Since winters are severe and heavy snows limit the chance of pro-

curing food, most of the animals only inhabit the alpine zone during the warmer months of the year. Most of these animals come into the alpine zone only in search of food, or they cross the zone while traveling from one place to another. The coolness and lack of bothersome insects, coupled with plentiful food, make the zone ideal for larger animals during the summer.

Important large mammals that lived in the Pryor Mountains and utilized the sub-alpine zone within the past 170 years include the mountain lion (Felis concolor), the grizzly bear (Ursus horribilis), the bighorn sheep (Ovis canadensis), the elk (Cervus canadensis), and the bison (Bison bison bison and Bison athabasque).

Mountain lions formerly ranged over much of the United States and even now are found throughout the Rocky Mountains. Since there was an abundance of food in the Pryor Mountains, there is little reason to doubt that mountain lions inhabited this area and ranged into the sub-alpine zone while traversing their characteristicly large home range.

Grizzly bears also formerly had a large range over the western part of the United States. Shields (1888:118) describes the grizzlies in the Bighorn Mountains (twenty-two miles east of the Pryors) and in the Abasorka Range (thirty miles west of the Pryors). This is undoubtedly sufficient evidence to place the grizzly bear in the Pryor Mountains and in the sub-alpine zone, since they share a number of behavioral traits with black bears, and black bears are still present.

In the past bighorn sheep were probably found within the sub-alpine

TABLE 6

MAMMALS OF THE SUB-ALPINE ZONE

ORDER INSECTIVORA (Possible occurrence of a specimen)	
ORDER CHIROPTERA (Possible occurrence of a specimen)	
ORDER LAGOMORPHA Sylvilagus nuttallii	Mountain cottontail
ORDER RODENTIA Erethizon dorsatum	Porcupine
Thomomys talpoides pryorii	Pocket gopher
Marmota flaviventris	Yellow-bellied marmot
Eutamias munimus	Chipmunk
Tamiasciurus hudsonicus	Red squirrel
Zapus princeps	Western jumping mouse
Neotoma cinerea	Wood rat
Perumyscus maniculatus	Deer mouse
Perumyscus leucopus	White-footed mouse
Microtus ochrogaster	Prairie vole
Microtus pennsylvanicus	Meadow vole
Microtus longicaudus	Longtailed meadow mouse
Languius aurtatus	
ORDER CARNIVORA Lynx rufus	Bobcat
Felis concolor*	Mountain lion
Urus horribilis*	Grizzly bear

TABLE 6--Continued

Urus americanus	Black bear
Procyon lotor	Raccoon
Vulpes vulpes	Red fox
Canis latrans	Coyote
*Canis lupus**	Gray wolf
Mephitis mephitis	Striped skunk
ORDER ARTIODACTYLA	
*Cervus canadensis**	Elk
Odocoileus virginianus	Whitetail deer
Odocoileus hemionus	Mule deer
*Ovis canadensis**	Bighorn sheep
*Bison bison bison**	Buffalo
*Bison bison athabasque**	Bison
ORDER PRISSODACTYLA	
Equus spp.	Wild horse

*Mammals formerly represented in the zone.

zone. This was verified by a skeleton of a bighorn sheep which was found on the surface in the Pryors. A sinkhole located on the top of Big Pryor Mountain has also yielded remains of bighorn sheep, thus indicating that sheep grazed the area during the summer months.

Several other species were also recovered from the sinkhole on Big Pryor Mountain. Among these were elk and bison. The presence of these remains suggests the presence of these animals in the past. The bison remains cannot be identified as either Bison bison bison or Bison bison atheabasque, but the range of both subspecies extended throughout the Pryors (Fryxwell 1928:138). This supports the hypothesis that both subspecies were in the Pryors and that they were in the alpine zone, probably utilizing the abundant food sources available during the summer months.

Summary

As stated in the introduction of this chapter, Climate, Geology, Pleistocene Chronology, Flora and Fauna were important to the survival of prehistoric peoples. Unlike modern man, early nomadic peoples relied wholly on the environment in which they lived for their survival. The preceeding sections, then, give the researcher an insight as to what that environment was like, what it contained, and what may have been used within it.

CHAPTER III

ARCHAEOLOGICAL SITES IN THE SUB-ALPINE ZONE

Introduction

This chapter includes descriptions of the archaeological sites located and recorded during the survey of the sub-alpine zone within the Pryor Mountains. Legal locations have been provided for each site by using United States Geological Survey Maps to locate each site area. Not all sites recorded in the sub-alpine zone have been included in this study. Those which are discussed include a representative sample of all the sites in the zone.

In addition to survey, locating, and recording of archaeological sites, excavation was accomplished on several sites. The following chapter includes descriptions of the sites as well as the results of the excavations.

Big Springs 24CB777

Introduction

Big Springs site is located on Big Pryor Mountain at an approximate elevation of 8,200 feet. The site is a quartzite quarry with an abundance of surface lithics and artifacts. Although much surface collection has been carried out on the site, no testing or excavation was undertaken

until summer, 1971.

Site Description

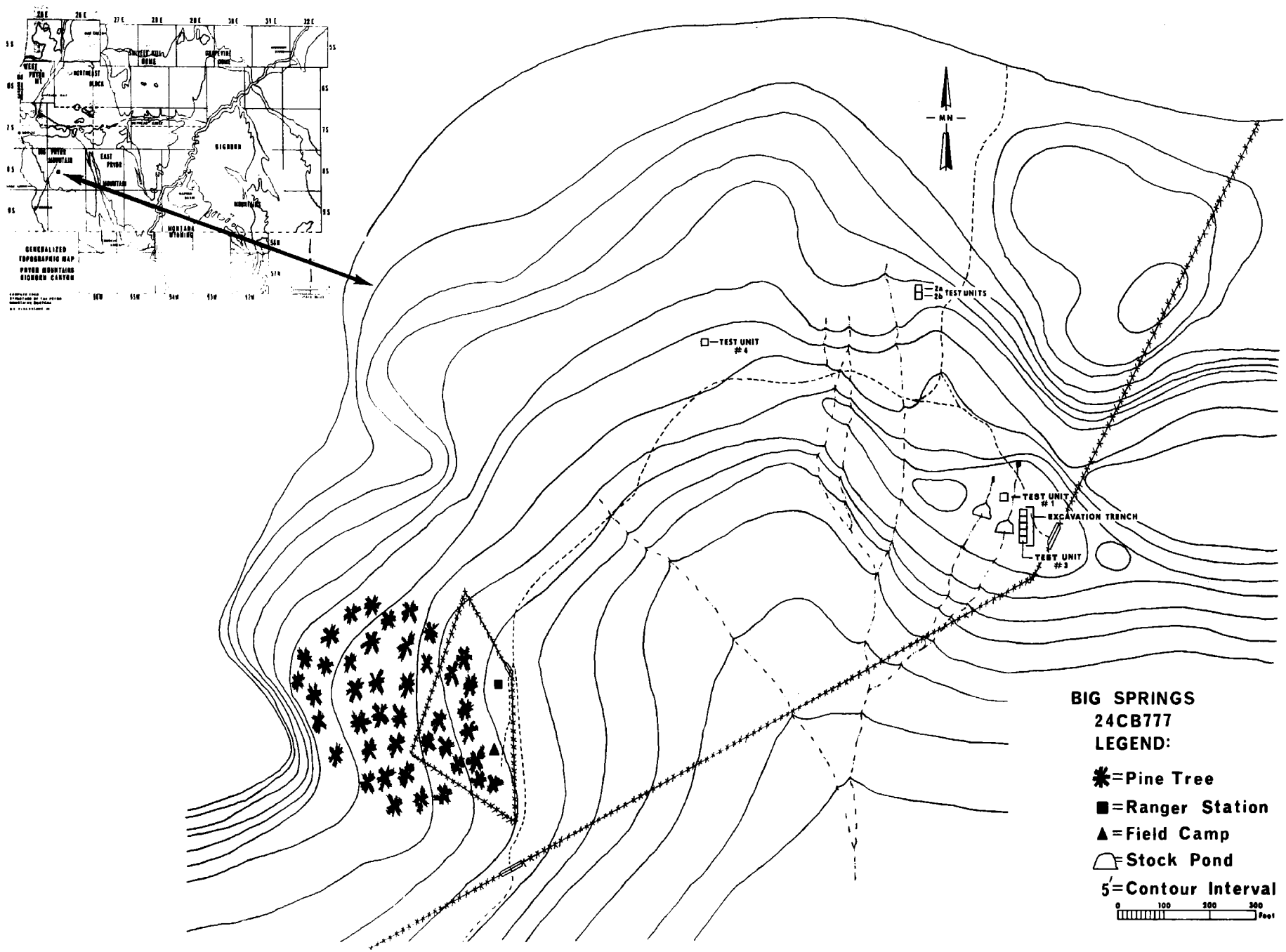
Big Springs is situated on the westward slope of Big Pryor Mountain on a grass-covered hollow below an "L"-shaped ridge. The site occupies an area approminately one and one-half miles long and one-half mile wide. The legal location for the site is the Western ½ of Section 10, Township 8 South, Range 26 East. Big Springs was first reported in 1969 and was designated 24CB777. Since the quarry site lies within the sub-alpine zone, flora and fauna are typical for the area surrounding the site (see Chapter I, section iv).

Excavation Procedure

The site was divided into six surface collection areas in which controlled surface collections were made to determine where the heaviest concentration of diversified material could be found. Four five-foot square test units were placed in areas of heavy surface lithic concentration. All units were excavated in four inch arbitrary levels until bedrock was reached. Fill from these units was sifted through one-quarter inch screens.

Test Unit Number 3 produced the greatest amount of cultural material and the greatest quantity of diversified lithics other than the indigenous quartzite. Test Unit Number 3 became the first unit of a 35 foot trench oriented from south to magnetic north (see Figure 3). A datum point was established in the southwest corner of Unit Number 3 by means of wooden stakes. From this point a horizontal line was laid out extending 35 feet in a south-north direction and marked off in five five-six inch intervals.

Fig. 3. Map of Big Springs.


GENERALIZED
TOPOGRAPHIC MAP
PRYOR MOUNTAINS
BIGHORN CANYON
MN
2a
2b
TEST UNITS
TEST UNIT
#4
TEST UNIT
#1
EXCAVATION TRENCH
TEST UNIT
#3
BIG SPRINGS
24CB777
LEGEND:
=Pine Tree
=Ranger Station
=Field Camp
=Stock Pond
5'=Contour Interval
0
100
200
300
Feet

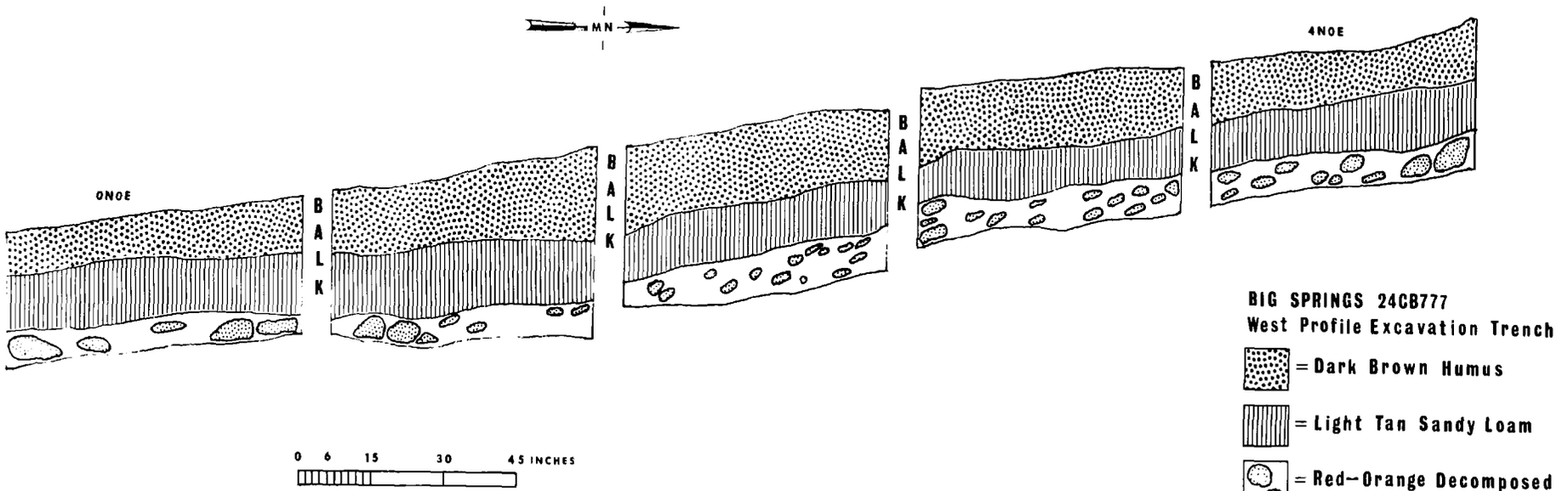
Excavation units corresponded to these intervals of five feet and a balk six inches wide divided each unit. This same level line was used later for vertical measurements. Horizontal measurements were taken from the west wall and south wall of each unit.

Stratigraphy

The natural stratigraphy at the Big Springs site is the result of erosion, run-off and frost heave. The data presented below is based upon the excavation of the main trench and may not correspond with the remainder of the site. In choosing the location of the trench, we decided that the collection of an adequate sample of the material culture should be our primary concern. We thought that if we dug our trench in an area where there was a high concentration of non-indigenous material (purple chert, agate, basalt, and obsidian) we should get maximum information within a short period of time.

The surface through which the trench was excavated was composed of short grasses and some sage. As the units were opened, three distinct soil levels were noted: a dark brown humic level, averaging eighteen inches in depth above a light tan layer ten inches in depth which overlay a red-orange decomposed limestone layer (see Figure 4). It became apparent as each additional unit was excavated towards the north, that the brownish layer decreased in thickness and the decomposed limestone level sloped toward the surface. (It should be noted that the red-orange decomposed limestone is called bedrock.) These strata were substantiated in a deep mining scar in close proximity to the excavation trench. Within

Fig. 4. Profile of Excavation (24CB777).


MN
0NOE
BALK
BALK
BALK
4NOE
0 6 15 30 45 INCHES
BIG SPRINGS 24CB777
West Profile Excavation Trench
= Dark Brown Humus
= Light Tan Sandy Loam
= Red–Orange Decomposed Limestone

the mining scar the red-orange layer was at the bottom and was approximately five feet in thickness.

On the average, 30 inches of deposition overlay the bedrock. Most cultural material came from a depth of 24 inches to 28 inches in units 0 North 0 East through 3 North 0 East. It was apparent by the profile of the trench that the area to the south was at one time flat and thus could have been suitable as an area of habitation. Unit 4 North 0 East was on a slope, thus it would have been less suitable as a living area.

The cultural material at a level of 24 inches to 28 inches was composed of approximately 30 bifaces and preforms and a few projectile points. This level, the tan-colored sandy loam, was apparent in four units at the same corresponding levels upsloping toward the north.

Stratigraphic Summary

The fact that there were no cultural levels noted during excavation is not surprising. In most sites found on the Northwestern Plains, charcoal lenses are usually the indicator of cultural levels. The amount of precipitation along with runoff from the nearby springs may have leached out the charcoal stains.

The biface level found between 24 and 28 inches deep included large side-notched projectile points similar in attributes to those that are dated circa, 5000 B.C. at Mummy Cave, Wyoming. These dates coincide with the beginning of the altithermal period for this area of the Plains. The heavy concentration of cultural material at this level may indicate a period of heavy use of the quarry. If this hypothesis is correct the

heavy use of the quarry at this time, (5000 B.C.) may further serve to increase the probabilities that the site was occupied during an altithermal period. The cultural evidence in the form of projectile points may therefore, indicate an adoption to a particular climate, with the high elevation Big Springs site used as a sanctuary from the hot and dry lowlands.

Quarry Material

The quartzite from Big Springs occurs in large nodules. Depressions and pits lie along the "L" shaped ridge and are probably the result of mining by the prehistoric peoples who occupied the site. These mining pits are from 3 to 4 feet deep and approximately 5 feet in diameter.

The quartzite nodules vary in texture, having a sugary cortex averaging approximately 4 inches in thickness, blending into a microgranular silica which is very suitable for tool manufacturing. This microgranular silica is probably the material that was most sought after by the prehistoric miners.

By using the Munsell Color Chart the range of color for the quarry material has been established. This microgranular silica ranges from a H2.5 7/4 (light yellow) to a H10R 5/3 (weak red). After examining specimens from both surface collections and excavations, it became apparent that there was no preference as to the color of the quarried material. There was, however, a preference as to texture. Blanks and/or preforms, scrapers, and projectile points were manufactured from the microgranular silica, while the large choppers were made from the yellow-white sugary

quartzite. The preference may have been due to the flaking properties of quartzite, the sugary quartzite is very suitable for direct percussion flaking but it will not pressure flake. The microgranular silica is suitable for the manufacturing of tools that require both percussion flaking and pressure flaking.

Quarrying Process

As stated previously the quartzite material from Big Springs occurs in large nodules. Probably a combination of heat and water was used to crack the nodules so as to expose the inner material. Abundant wood and water available on the site would have enabled peoples to use this process. Scattered bits of charcoal were observed during excavation and some artifacts exhibit "potlid fractures" indicating that fires have occurred on the site. Although fires have occurred, it was impossible to determine whether these were natural or were used in the quarrying process.

When the inner material of these nodules was obtained, hammerstones and/or batons could then be used to further the manufacturing process. It has been suggested by Sharrock (1966) that there are five stages in the manufacturing of blanks. A cobble or nodule of the size and dimensions of those found at Big Springs can best be reduced to a small thin blade with five steps or stages. Although some of these stages were observed in the Big Springs material, a distinction between stage I through stage V has not been made in this thesis.

> To summarize, any stone--be it a quartzite cobble, or a chert block or flake--to be reduced to a small symetrical object, must be refined by removal of the

> outer surface of the block, layer by layer, by successively fine flaking as the blank becomes thinner and smaller. To reduce a typical cobble to a small thin blade perhaps 3 inches long by 1 inch wide evidently could be done in no fewer than five stages. From quarried quartzite blocks, however, original blank size and dimensions were better controlled in that they were often large flakes that essentially duplicated later stages of the quartzite cobble manufacturing process (Sharrock 1966:45).

Stage I described by Sharrock (1966) is labeled "core or flake blanks." The overall size is determined largely by the size of the cobble or flake being worked. On cobble blanks, original cortex or bark is usually in evidence. On flake blanks, the striking platform is frequently in evidence. Edges are markedly zig-zagged, created by bifacial deep flake scars extending around the periphery. Estimated number of scars per face is 6-10. Estimated average thickness to width ratio is 1:2. These blanks are usually oval to elongated and vary greatly in size, from 2-3 inches to 12 inches in length. Average length is 4-6 inches. Occasionally, chipping is unifacial or does not extend around the periphery (such pieces appear to have been rejects). This stage is often bypassed in chert flake cores. This form, technologically and morphologically compares with the European coup de poing or the American "crude" chopper or chopping tool.

Stages 2 through 5 involve further thinning and stages of refinement. Stage 5 is described by Sharrock as "core or flake blanks generally thinner, smaller and more refined than Stage 4." Estimated average thickness to width ratio 1:10. These blanks are symmetrical blade forms, frequently elongated-triangular in form. Estimated average size is 1-2 inches long,

by 1 inch wide. Because all evidence of the original blank is lost, there is no manner of determining whether these originally were core or flake blanks. In all respects, morphologically these could be knives or unstemmed projectile points and many undoubtedly were (Sharrock 1966).

When the quarrying process was complete and when the time of year dictated the movement of the people, blanks that were now easily transported were taken off the mountain. Later these blanks were manufactured into particular tools as the need arose.

In the early fall, bison herds were beginning to move into the lush grasslands to the east of the Pryors. The people then were ready to descend from the area of Big Springs to procure bison. Having transported numerous blanks and/or preforms the peoples were insured of having an adequate tool assemblage in order to obtain large quantities of meat. Preforms could be manufactured into projectile points for killing the animals, or they could be used in their present form as knives in the butchering process.

Artifact Summary

When compared to the artifacts from Mummy Cave, Wyoming, the projectile points from the lower levels seem to be in correct stratigraphic order, however projectile points found near the surface seem to be somewhat mixed. Since there were no radiocarbon dates from the excavations at Big Springs all types and dates are based on comparable data.

As stated in the previous section, "Excavation Proceedure," all excavation was accomplished by arbitrary levels. The following is a summary

of projectile points by each arbitrary level as found during excavation at Big Springs. Each projectile point type is defined and described in the "Artifact Typology" section.

Level #8--28" to 32"

Type II projectile point (1 specimen, Figure 14b) is best compared to the Angostura Type. These projectile points are dated at approximately 7500 B.C. and are associated with Plano Culture (Wormington 1957).

Levels #6 and #17--20" to 28"

Type III projectile points (2 specimens, Figure 14c, d) are similar to the large side-notched types found at the Simonsen Site in northwest Iowa and at the Logan Creek Site in eastern Nebraska. The projectile points have been dated at Mummy Cave, Wyoming, at 5600 to 5200 B.C. (Wedel, Husted, Moss 1968). These projectile points were associated with the Early Middle Period.

Level #5--16" to 20"

Type VII projectile points (2 specimens, Figure 14m, Figure 15h) are corner-notched and are probably representative of the Late Middle Period. Projectile points similar to these were found at the Fallen Rock Site and at Bottleneck Cave during the survey of the Bighorn Canyon located near the study area. However, the occupation or occupations of these two sites cannot be dated with any degree of confidence.

At present, all that can be said is that during the long interval from about 1500 B.C. to about 500 A.D., 200 to 400 numerous styles of

large, corner-notched projectile points were in use on the northwestern Plains. Until such time that we have sufficient data to cross date these components containing large corner-notched points, those without Carbon-14 dates will have to be relegated to the general period between 1500 B.C. and A.D. 500 (Husted 1969:92).

Level #4--12" to 16"

Type VI projectile points (2 specimens, Figure 14k, l) are similar to Early Middle Period points of the "Hanna Type" which was first described by Wheeler (1954). Projectile points of this type have been dated at Mummy Cave, Wyoming, at circa, 2500 B.C. (Wedel, Husted, Moss 1968).

Levels #2 and #3--8" to 16" (No projectile points recovered)

Although there were no projectile points from these levels, there were broken blanks and/or preforms and other tools recovered.

Level #1--0" to 4"

At least four types of projectile points were recovered from the surface down to a depth of four inches: types V, VI, VII, and VIII. Type VII projectile points were also found in level #5 and Type VI projectile points were also found in level #4.

Type V (4 specimens, Figure 14g-j) is comparable to the "Oxbow Type" originally identified at the Oxbow Site in Saskatchewan. These projectile points have been dated circa, 2700 B.C. However, there is some controversy as to where Oxbow fits within the Middle Period,

chronology. Oxbow may be somewhat earlier than the McKean Complex or it may be contemporary with it (Syms 1969).

Type III projectile points are small side-notched and are referred to as "Plains Side-Notched" (9 specimens, Figure 15 i-q). These projectile points are found throughout the Northwestern Plains and Great Basin. Dates for these projectile points range from 720 A.D. to 1800 A.D. which correspond to what Wormington and Forbis (1965) call the Neo-Indian Period.

Evidence, i.e., the forms of our projectile points, seems to suggest that the Big Springs Quarry Site was extensively occupied during the Middle Period. (The ratio of "Early" to "Middle" to "Late" projectile points is 2/12/2.) As stated previously in the "Stratigraphic Summary" the projectile points associated with the "biface level" have been dated circa, 5000 B.C. The many bifaces in conjunction with the large side-notched projectile points may indicate a period of extensive occupation for the Big Springs Site.

It should be noted that our projectile points Types VI (Figure 14L, Type VII, Figure 15h) may actually be notched bifaces that were hafted knives. Several factors suggest this: (1) those specimens that are broken have a characteristic break labeled as a "torsion fracture," this occurs from side pressure on a hafted knife; (2) the angle of the base is on a slant to the outline of the blade. This probably indicates a handle was fastened on the base at an angle to the blade; (3) the battered condition of the side of the blade is characteristic of a stone tool used

for cutting; (4) the specimens are much thicker than projectile points (Loendorf 1969).

Microscopic analysis using magnification 10X through 40X did not reveal straiations, edge crushing, or any other evidence of use. However, the microgranular quartzite does not show flake scars or wear patterns clearly. Although the specimens did not show the characteristic wear patterns of the cutting tool, I feel that they are hafted bifaces and not projectile points.

Other artifacts, such as scrapers, knives, drills, abraders, and edge ground cobbles, serve to indicate that peoples who occupied Big Springs were migrating from different ecological zones as a unit. Therefore, I suggest that adult males, adult females, and children were occupying the site as a unit. The ratio of cores and blanks to scrapers, knives, choppers, and edge ground cobbles to projectile points (64/23/16) suggests that the emphasis was on the quarrying process. While preparing for the fall hunt the people occupying Big Springs were taking advantage of the environment of the sub-alpine zone as part of a seasonal cycle.

Site Summary

To better understand the subsistance patterns of the people who lived in the Pryor Mountains, it is important to hypothesize the time of year the site may have been occupied. The only times of the year that the site would have been suitable for occupation would have been mid-summer or late summer-early fall. At other times of the year, weather would have been too severe and snow depth too great to permit occupation.

The occupation of a particular zone at a particular time of year may reflect a cyclical subsistence pattern. Since the resources in the Pryor area are such that they would support a permanent population, peoples would have taken advantage of the resources within different zones. People probably lived in the valleys and canyons during the winter, occupying wooded structures, tepees, and caves for shelter. As spring approached they traversed the slopes utilizing plants and animals as they traveled. With the onset of the hot and dry summer months people would have climbed to the mountain tops to take advantage of the cool climate and animals that also migrated to the higher elevations.

Big Springs and comparable sites would have been occupied during the hot summer months while people were preparing for the fall bison hunt. I suggest that Big Springs was a "preparation site." While utilizing the quarry material to blank out preforms, the people may have carried on daily activities such as hide preparation and hunting. Artifacts from Big Springs indicate that such activities were taking place.

Projectile points from Big Springs indicate that this cyclical migration to different zones in different times of the year may have been taking place for more than 5,000 years. Projectile points further indicate that peoples were utilizing this zone most extensively during the Middle Period.

Recommendations for Further Work

Within the main excavation we were not able to see any cultural features, such as charcoal lenses, within the three natural soil horizons.

Also, many erosional and climatological processes seem to have effected this particular site, and we had much difficulty interpreting the stratigraphy. Since the cultural material in the area of the main excavation was mixed, I recommend that other areas of the site be fully investigated by excavation. The area of the site is so extensive that other areas may reveal cultural features that were lacking in the initial excavation.

Commissary Ridge Bison Kill 24CB863

Introduction

The Commissary Ridge Bison Kill Site is located in the NE¼ of the SE¼ of Section 34, Township 8 South, Range 26 East. The site was recorded and tested by the Pryor Mountain Archaeological Survey Team during the 1970 field season. Testing was to determine: (1) the number of individual bison represented, and (2) if these remains were a result of natural or "man-caused" death.

Site Description

The "kill" site is located on a small terrace formed by the convergence of Crooked Creek Canyon and Commissary Creek Canyon. The site is at an elevation of approximately 7,800 feet, 50 feet below the main slope of the "V" shaped ridge and approximately 150 feet above the floor of the two canyons. Flora and fauna of the surrounding area are typical for this zone (see section on Flora and Fauna).

The site consists of skeletal material from five individual bison.

Some bones were located on the surface, but the bulk of the material lay below. All skeletal material was located against three large limestone boulders approximately 7 to 8 feet high and 10 feet thick. These large boulders, along with the end of the "V" shaped ridge, formed a natural barrier in which the bison, if herded to this point, would have been trapped. They would then have been easy prey for primitive peoples.

Excavation Procedure

The site was first tested by the excavation of two units. These units were situated in the area of surface skeletal material located adjacent to the rock barrier. Unit #1 was located within a small crevice formed by two leaning boulders (see Figure 5). An additional 5'x5' unit was excavated east of the adjoining unit #1 to a depth of 15 inches (see Figure 6). The test units were excavated in three inch arbitrary levels and all soil was sifted through one-quarter-inch screen. The test revealed that these remains were not the result of some natural mishap, but rather that the animals were killed by primitive people. The discovery of four small side-notched projectile points made this hypothesis likely. The testing of the site was undertaken during the last part of the field season; and so more complete detailed excavation could not be completed at that time.

In July, 1971, three more 5'x5' units were excavated adjoining the 1970 units to the north and south (see Figure 6). These units were excavated to investigate the possibility that more remains lay along the rock barrier and to investigate the flat area of the terrace. These

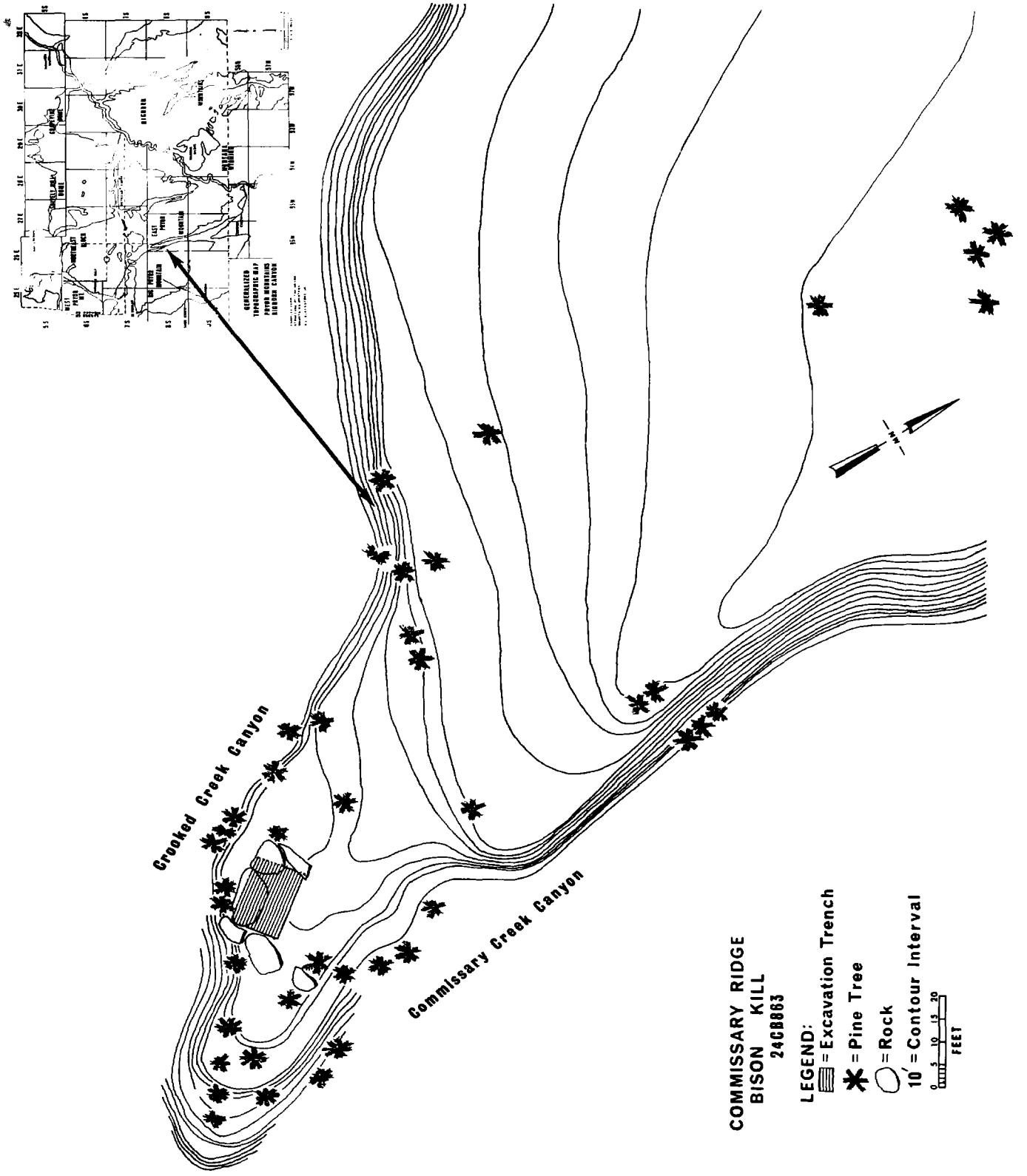


Fig. 5. Map of Commissary Ridge Bison Kill.

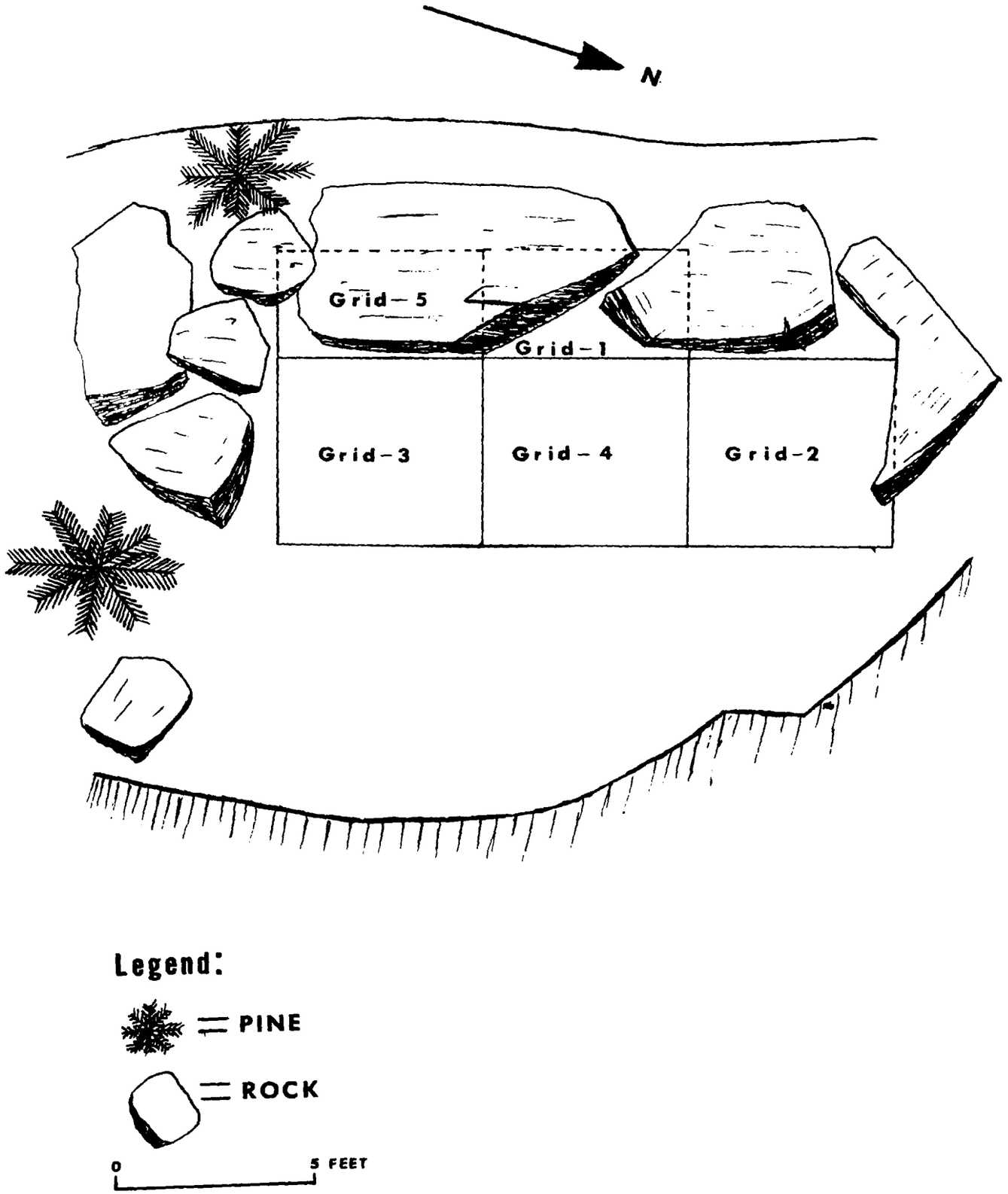


Fig. 6. Map of Commissary Ridge Bison Kill Excavation.

units were also excavated in three inch arbitrary levels and sifted through one-quarter-inch screen. Two additional small side-notched projectile points were found in situ in association with the skeletal material, making a total of six projectile points recovered (four from units #1 and #2, two from unit #4). In addition to projectile points a notched biface was recovered from unit #5. This notched biface was probably a knife that was hafted to a handle and was used in the butchering of the bison.

Excavation revealed no soil change to a depth of 15 inches. Soil was wind blown loess and sand intermixed with limestone cobbles which varied in size from a few ounces to approximately 500 pounds. The limestone cobbles along with numerous tree roots made excavation by trowel next to impossible.

Excavation Results

Although each unit was excavated to a depth of 15 inches, all skeletal material was found 5 to 10 inches below the surface. The bone material was scattered throughout the site. However, some of the vertebrae were articulated. Observations made of the sloping strata during excavation leads one to believe that the terrace was, at the time of the "kill," much more sloped toward the rock barrier. Probably the animals rolled toward the barrier when killed or were later washed against the rocks. The articulated bone suggest that the former may be the case.

The occurrence of a knife at the site suggests that this was a small kill site. Before the recovery of the knife, I felt that skeletal

material may have been the remains of a few wounded animals that had escaped from a larger herd. Now I suggest that the Commissary Ridge Bison Kill is a small site where the animals were trapped, killed, and butchered.

The site had only one cultural level represented by artifacts associated with the skeletal material. The six projectile points (Figures 15k, l, m, n, o, p, q) are of a late side-notched type usually associated with the bow and arrow, and probably the horse. The use of the horse by hunters may account for the small number of bison represented in the kill site. By employing the horse, the Indians may have been able to control the number of animals to be killed. Mounted people could traverse the mountain slopes, obtain the amount of meat needed and then return to their camp in a shorter period of time. The small number of animals represented may also reflect the fact that limited numbers of animals utilized the tops of the mountains during this late period. I suggest that both hypothesis may be true.

Site Summary

When comparing the Commissary Ridge Bison Kill to other "Bison Kill Sites," I feel that it is unique only in that it is found at a higher elevation than most "kill" sites. The physical attributes that make up the site fall within a typical pattern for bison kill sites. The site has no rock drive lines, in this case drive lines are formed by the deep canyons; it has a collecting basin, in this case, the upper end of the "V" shaped ridge; and the site has a cliff and/or corral which

is formed by the rock barrier. The site is unique in that most bison "kill" sites are located in the low grassy plains. In this respect the site is atypical and its importance lies in the fact that it gives us an insight into one aspect of man's utilization of the sub-alpine zone.

Projectile points from the site are typical small Plains side-notched, and have a wide distribution over the Plains and Great Basin areas. Projectile points of this type are associated with the "Late Hunter Period." This would give an approximate date for the site between 1500 and the late 1800s.

Dry Head Overlook Bison Drive 24CB833

Introduction

Another important site located in the sub-alpine zone is the "Dry Head Overlook Bison Drive." This site was first located and recorded by Loendorf in 1968, but it is included in this thesis as another example of a "high elevation" bison drive.

The site is located on Forest Service land near the top of East Pryor Mountain. It consists of a series of rock piles that form drive lines leading to a probable bison jump.

Site Description

There are two series of rock piles, one (line A) runs parallel to a limestone cliff. Line A is made up of ten rock piles and is approximately 82 yards long. Line B has 24 rock piles, in its course, and is

about 107 yards long. The rock piles vary in size from 3 to 30 rocks per pile. The distance between the two converging rock lines, at the cliff, is 32 yards and the drop-off itself is about 25 feet.

Loendorf tested this site in 1969 to investigate the bone deposit at the base of the cliff. However very few bones were discovered during the excavation of three test pits. Loendorf gives three explanations as to the absence of bone deposits. One, because of the continuous damp condition of the deposits, preservation would have been poor. Two, the drive was set up for mountain sheep, deer, and/or other game. Some of the game would be killed on impact and not require arrows to kill them. If the game animals were small enough the whole carcass might be carried away, and one would not expect to find skeletal material and/or butchering tools. Three, the drive may have been used after the introduction of the gun and metal tools. In this case the bullets may have lodged in the animals and iron butchering tools would have been kept by the hunters and not discarded like stone tools (Loendorf 1969).

As a fourth possibility, I suggest that a small number of animals (bison) may have been driven over the cliff. In this manner all animals could have been utilized to the fullest extent. The bison would have been butchered on the spot but erosion and/or scavengers may account for the lack of skeletal material. (The few bones recovered by Loendorf in the initial test of the site were later identified as bison.)

Summary

These sites, Commissary Ridge Bison Kill and the Dry Head Overlook

Bison Drive, are important to my study in that they reveal some of the activities that were taking place in the sub-alpine zone. They are also important in that if these activities (bison hunting) were associated with the horse, the seasonal migration of people may not have been the same as when people were on foot. These sites, if associated with the horse, are important only in understanding the overall use of the sub-alpine zone and not in understanding seasonal migration of people prior to the introduction of the horse.

Timber Town 24CB776

Introduction

Timber Town Site is located in Section 25, Township 8 South, Range 26 East. This site was first reported in 1968 by the Pryor Mountain Archaeological Survey Team.

One of the four structures was tested in order to determine the arrangement of the roof beams and to obtain evidence as the the reason for the structure's existence.

Site Description

Much of the information for the description of Timber Town Site has been taken from The Results of the Archaeological in the Pryor Mountain-Big Horn Canyon Recreation Area by Lawrence L. Loendorf (1969). Timber Town is made up of four cribbed log structures. The log structures were located along a ridge that runs adjacent to the East Fork of Bear Canyon approximately one-fourth mile from the top of Big Pryor Mountain.

Flora at the site was typical for the sub-alpine zone. Flora was composed of Limber Pine, Douglas Fir and the open meadows being composed of several varieties of grasses.

The area of occupation exhibited evidence of burning. Much of the deadfall was fire-scarred and many of the remaining standing trees showed evidence of having been struck by lightning. Since the last fire, many of the dead trees have been used in the construction of the log structures. The sparseness of the remaining trees has aided in the preservation of the structures as timber stands are too thin to support a fire.

It appears as though this particular ridge supplied a strategic position for view and also deadfall timber necessary for construction of shelters. The four structures were the only feature on the site as there was no lithic debris observable.

Structure #1 (see Figures 7 and 8) was made up of interlocking logs 6 to 12 feet in length laid horizontally. Slab wood was standing vertical and leaning against the outside of the structure. Limestone slabs from the immediate area had been laid against the base logs to plug the cracks next to the ground. The pattern formed by the collapsed roof beams suggested a conical roof construction. Some bark flooring was evident on the interior surface of the structure. In as much as the structure was in a partially collapsed state, there was still sections of the wall four and one foot high still standing.

Structure #2 (see Figures 7 and 8) was identical to #1 with the

Fig. 7. Map of Timber Town.

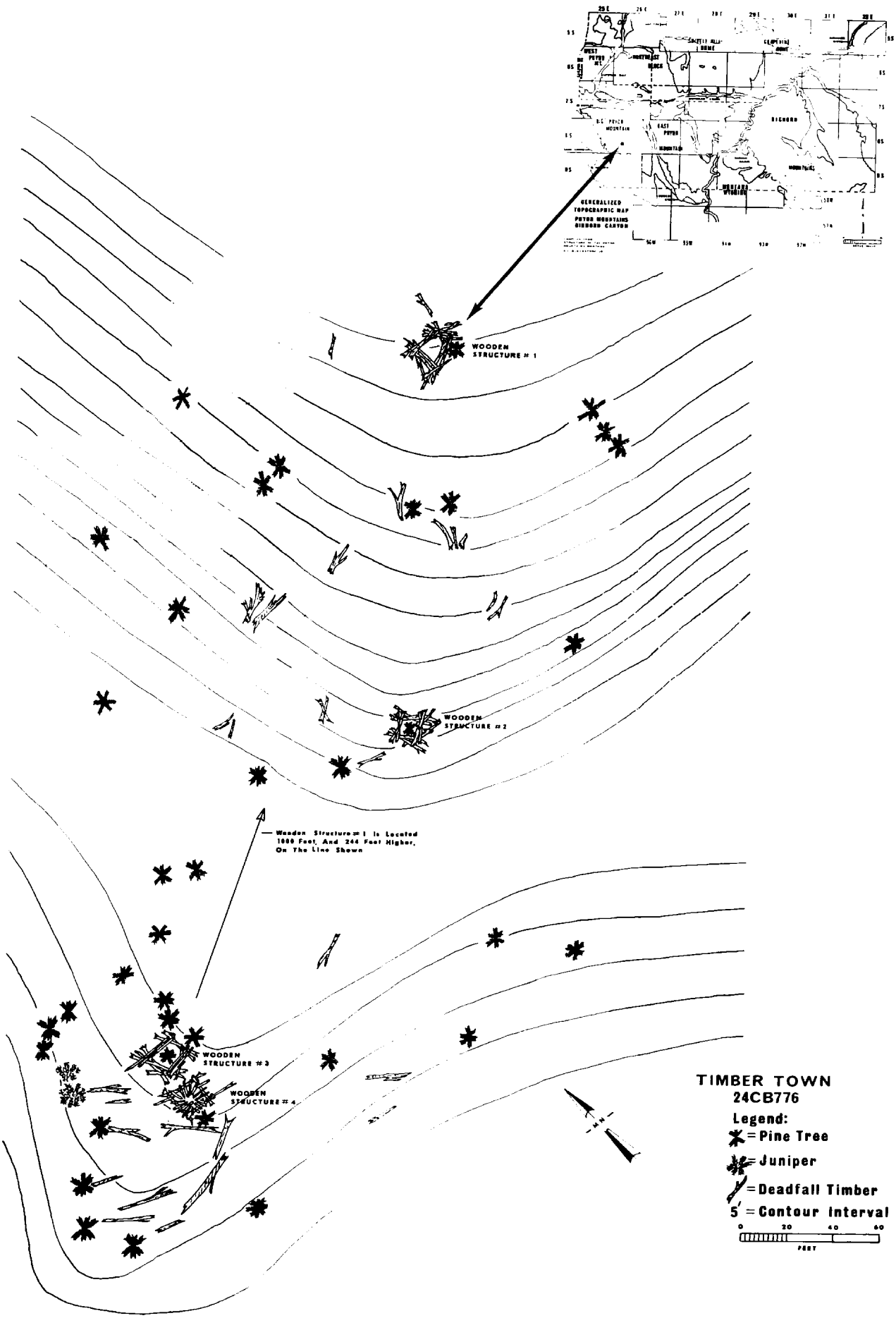
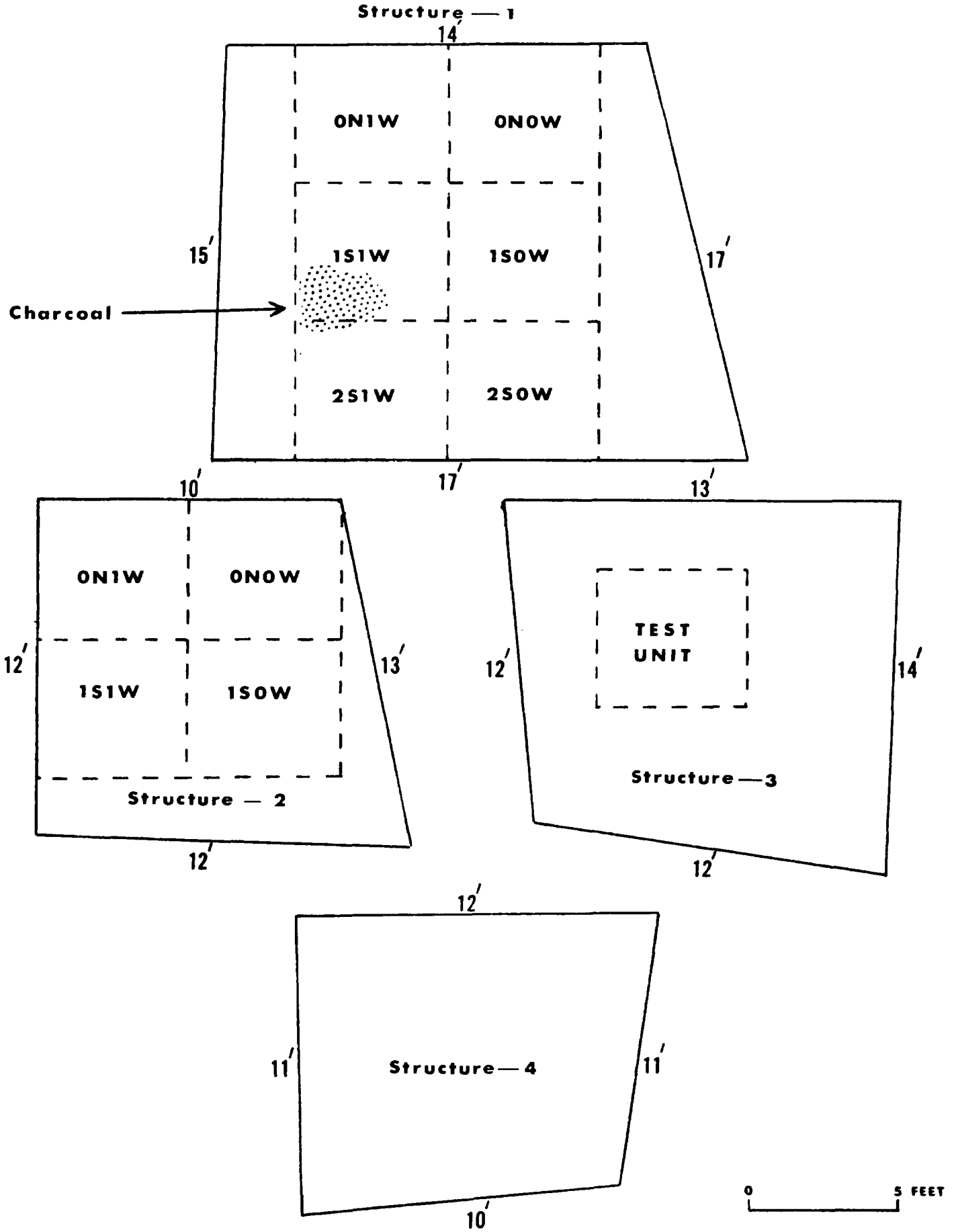

GENERALIZED
TOPOGRAPHIC MAP
PRYOR MOUNTAINS
BIGHORN CANYON
WOODEN
STRUCTURE # 1
WOODEN
STRUCTURE # 2
— Wooden Structure # 1 Is Located
1000 Feet, And 244 Feet Higher,
On The Line Shown
WOODEN
STRUCTURE # 3
WOODEN
STRUCTURE # 4
TIMBER TOWN
24CB776
Legend:
= Pine Tree
= Juniper
= Deadfall Timber
5' = Contour Interval
0 20 40 60
FEET

Fig. 8. Outline Map of Timber Town.


Structure — 1
14′
0N1W
0N0W
15′
1S1W
1S0W
17′
Charcoal
2S1W
2S0W
17′
10′
13′
0N1W
0N0W
12′
13′
1S1W
1S0W
Structure — 2
12′
12′
TEST
UNIT
14′
Structure — 3
12′
12′
11′
Structure — 4
11′
10′
0
5 FEET

exception of the logs used in construction were smaller than those used in #1. The height of the remaining wall of Structure #2 averaged three feet.

Structure #3 (see Figures 7 and 8) was somewhat different in construction as no roof beams were present. The absence of roof beams may indicate one of several possibilities. One, roof beams from this structure may have been used in the construction of one of the other structures. Two, pine boughs may have been substituted for roof beams. Three, hide may have been used to cover the structure. Four, this structure may have been used as a corral for housing animals. (These possibilities are discussed in the section dealing with excavation of the structures.)

Structure #4 (see Figures 7 and 8) was a collapsed cribbed log structure, however, the roof was intact. The roof was conical in shape and was made up of deadfall timber. The roof was constructed by spanning each of the corners with a log. This upper tier, then, had four logs placed across its corners, this left the logs resting on the tier below and in the same outline. The tiers continued, each played diagonally over the last and each smaller than the preceding one until the structure had a roof. All of the structures are built in this fashion, smaller at the top than at the bottom. Most of the wood used in the structures was deadfall; it appears however, that some live timber was also used. None of the timber used in construction exhibit cutting or chopping marks, however, some logs did have burned ends. Since some of the logs used in con-

struction were so large in diameter, it may have been easier for primitive people to burn the trees down by starting a fire at the base, than for men to chop them down with stone tools.

With the exception of Structure #4, all structures showed evidence of some fire without them. All structures were built of cribbed logs which is the style of construction used by early white men in the area. This may indicate that the idea for the construction of the structures was copied from the log cabin construction of the whites.

Excavation Procedure

In 1968, Structure #1 was tested by excavating a 5'x5' test unit in the floor of the structure. The test unit was excavated to a depth of five inches until limestone bedrock was reached. A circular fire hearth formed by eleven stones was exposed three inches below the surface. The fire hearth contained small flecks of charcoal mized with ash and sand.

The soil in the test unit included a humic zone about one inch thick. The sandy soil was sterile but the base of a small side-notched projectile point was recovered from the humic zone. No other lithics were found in the test unit.

In 1971, Structures #1, #2, and #3 were excavated and/or tested by members of the Pryor Mountain Archaeological Survey Team. Structure #1 had produced the base of a late side-notched projectile point, we thought that more extensive excavation might yield further information about the structures.

Structure #1 was large enough so as to enable six grids (each five feet square) to be plotted on the floor of the structure (see Figure 8). Grids were laid out on a north-south direction and were designated ONOW, 1SOW, 2SOW, ON1W, 1S1W, and 2S1W (see Figure 8). A datum point was established, by means of a stake, five inches above the surface in the northeast corner of ONOW. This stake was used for verticle measurement. All material from each grid was screened through one-quarter inch screen. Before any excavation was accomplished all timber from the structure was sketched in place so as to aid in reconstruction.

The surfaces within all grid squares were made up of small limestone pebbles, natural chert and pine needles from small limber pines that were growing adjacent to the structures. The flora on the surface of the grids was composed of Big Sage, Western Yarrow and Wild Currant. The latter is out of its normal ecological zone and this fact may indicate that the plants or its seeds were carried there. A few grass plants, two plants of Indian Paintbrush, and one Wild Onion plant were noted.

Excavation followed three natural soil levels. Level #1, the topmost layer, was a dark humic level composed of decayed plant material intermixed with wind-blown sand. This level averaged about one-half inch in thickness. No cultural material was observed within this first level.

Level #2 was composed of small limestone pebbles intermixed with a somewhat lighter sandy soil. This level contained the occupational material which consisted of three bison rib fragments and an area of charcoal concentration.

Level #3 which averaged ten inches in thickness, was composed of light brown sand and contained large fragments of limestone. This same level extended down to bedrock limestone. No artifacts or lithics were recovered from this level.

Excavation procedure for Structure #2 was identical to Structure #1. Four 5'x5' grids were plotted within the structure (see Figure 8). Excavation yielded much the same kind of evidence in that areas of charcoal concentration and two bison ribs were observed from level #2. Stratigraphy was also similar to that which we encountered in Structure #1 excavation.

Structure #3 which is atypical in construction was tested by excavation of one 5'x5' unit (see Figure 8). The surface of the floor within the structure was the same as the others in that it was covered with small pebbles and much decayed plant material. No features were noted on the surface in Structure #3. Soil levels were the same as in Structure #1. We noted charcoal concentrations were noted, but observed no faunal remains. Flora inside the structure was scant, small grasses being the only plants growing within the structure.

Loendorf (1969) had suggested that this structure may have been used as a corral, but the test revealed areas of charcoal concentration. With the evidence of fire, I suggest that this structure, like the others, was used as a shelter for people and not a corral for animals.

The shortness of time did not allow for the testing or excavation in Structure #4.

Site Summary

Several small hearths were noted during the excavation of Structures #1, #2, and #3. These fires may have been used for cooking and/or heat; concealed within the structure, the fire would have been hard to detect.

The evidence of fire may further indicate that the time when the structures were made was during a time of cool weather, either in early spring or late fall. Winter would have been too severe to enable people to hunt at this elevation and summer would have been warm enough as not to require the structures or the fires. The permanent type of structures may indicate repeated use associated with seasonal activities. Hunting parties could traverse the slopes with hunting supplies knowing that shelter would be provided by the permanent wooden structures.

Since it is known that game animals (deer, sheep, elk and probably bison) moved to higher elevations early in the spring and left in early fall, it is likely that peoples at this period were doing the same. Based on the excavations at Timber Town, I suggest that this site represents a seasonal hunting camp from the Late Proto-Historic or Historic Period. I further hypothesize that hunting parties set out from this hunting camp, located game animals and then killed and butchered the animals away from the camp. After butchering the animals, a few members of the hunting party would be sent down the mountain by way of the long sloping ridges to the main camp that was still located in the valleys below. Only the prime cuts of meat would be sent to the main camp while the poorer cuts, such as rib cages, would be taken back to the hunting

lodges to sustain the remaining hunters.

A dendro date of 1630 was established for Timber Town by Dr. Ward F. Weakly. However, as explained by Dr. Weakly, there could be some question as to the validity of relying solely on dendrochronology for dating the structures. The majority of the logs used were dead at the time of construction, consequently the date of 1630 represents nothing more than the year that the trees died. Preservation of existing deadfall is good, thus the construction may have occurred sometime after the given date.

On the basis of the dendro date, I suggest that the structures post date the introduction of the horse and metal tools (probably the gun). Use of horses would speed the movement of hunters to and from camp, while trade goods, such as guns and knives would reduce the need for stone tools in hunting and butchering activities. Although a late side-notched projectile point was found in the test of 1968, this does not negate the existence of metal tools. The absence of more stone tools from our excavation during 1971 would seem to suggest further that metal tools were used. If the structures were used before metal tools, one would expect to find broken artifacts within the structures. Adequate deadfall was available for the construction of the structures so evidence of cutting by metal tools would not be apparent on the logs.

Stick City 24CB894

Introduction

Stick City Site is located in Section 34, Township 8 South, Range 26 East. The site was first reported in 1970 by the Pryor Mountain Archaeological Survey Team.

No test of the site has been accomplished, however, I mapped the site during the 1971 field season.

Site Description

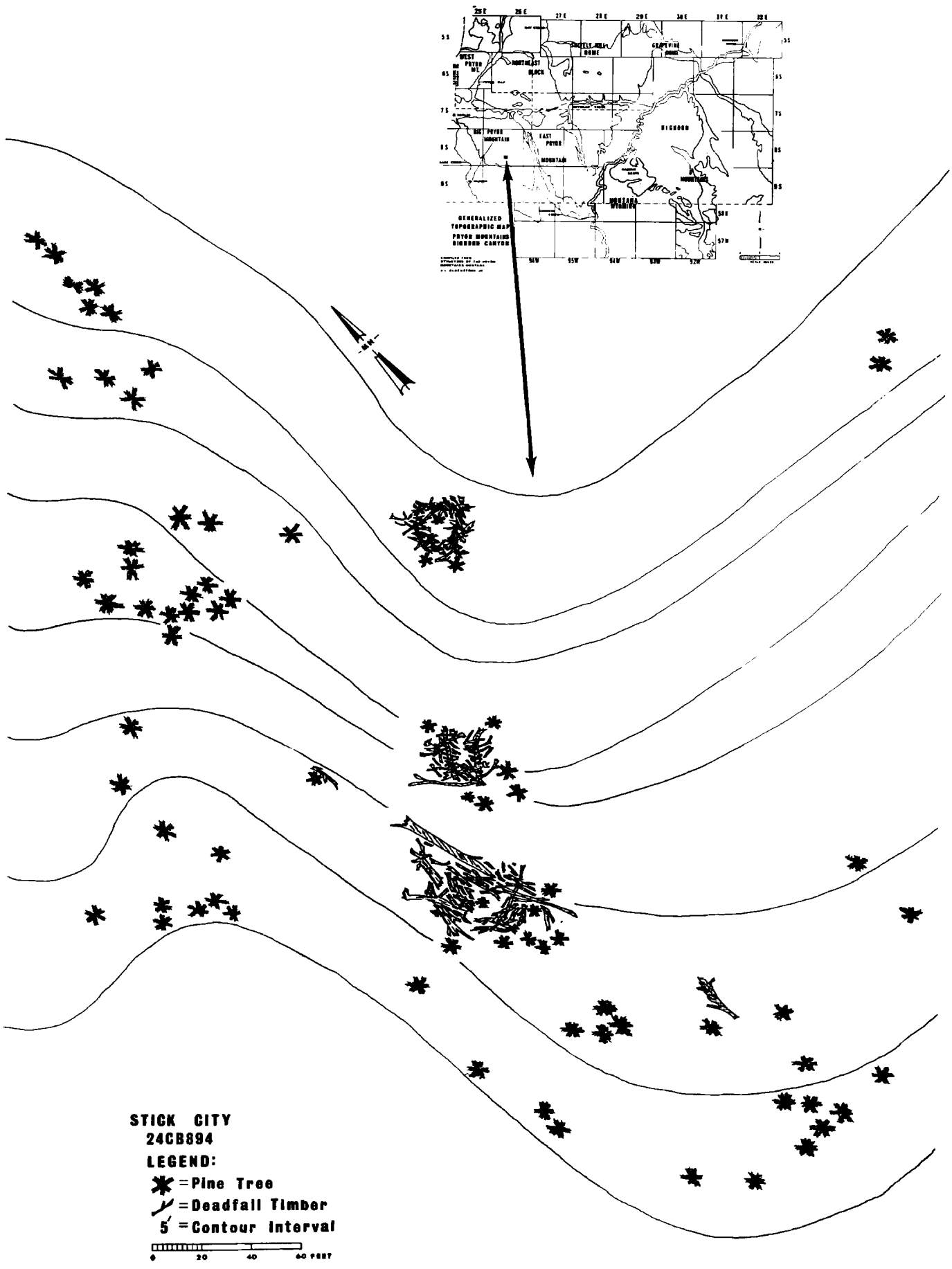
Stick City Site is made up of three cribbed log structures. The structures are located along a ridge next to an unnamed canyon, approximately one and one-half miles northwest of Timber Town (24CB776), and approximately four miles southeast of Big Springs (24CB777). It is located between these sites approximately one-half mile from the top of Big Pryor Mountain.

Flora at the site, like that of Timber Town, is composed of Limber Pine, Douglas Fir, Creeping Juniper, and several varieties of grasses. All of these are characteristic of the sub-alpine zone.

Like Timber Town, Stick City occupies a ridge that shows evidence of burning sometime in the past. The deadfall that was left after the fire has been used in the construction of the wooden structures. It is probable that the location of these sites was selected on the basis of the uninterrupted view of the valleys below.

The structures will be referred to as Structures #1, #2, and #3, numbered top to bottom as one proceeds down the ridge (see Figures 9 and

Fig. 9. Map of Stick City.


GENERALIZED
TOPOGRAPHIC MAP
PRYOR MOUNTAINS
BIGHORN CANYON
STICK CITY
24CB894
LEGEND:
= Pine Tree
= Deadfall Timber
5' = Contour Interval
0
20
40
60 FEET

10).

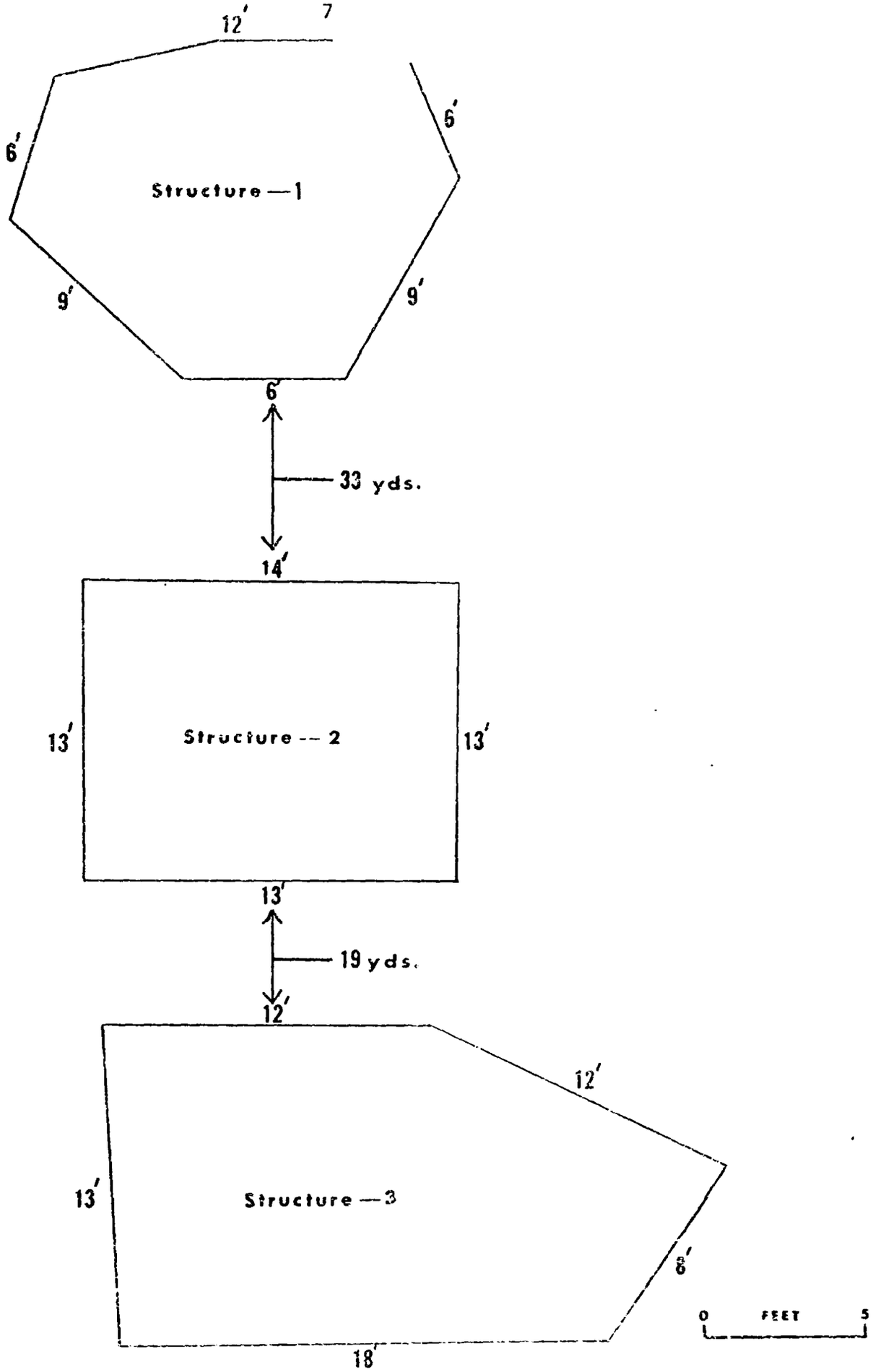
Structure #1 was hexagonal in shape, but it was not symetrical, (see Figures 9 and 10). The walls are made of logs approximately six to eight inches in diameter that were tiered in a cribbed-type construction. The average height of the standing wall for Structure #1 was four feet. Wood outside the east wall lay perpendicular to the structure, with the "crib-log" effect being least noticeable at this point. This collapsed section may represent the entrance to the structure. The roof beams, averaged seven feet long and were collapsed inward to form a conical shape in their collapsed position (see Figures 9 and 10 for the dimensions of the structures).

Limestone slabs, indigenous to the area, had been used to chink up cracks along the northeast section of the structure. These limestone slabs averaged from one to two feet square.

The floor surface of Structure #1 was covered with decayed plant material consisting mostly of pine needles from one Limber Pine that grew within the structure. The Limber Pine was twelve feet high and appeared to have been growing for only a short period of time. The condition of Structure #1 was poor. Logs from the construction had collapsed and were scattered.

Structure #2 was almost square in shape (see Figures 9 and 10). Logs used in the construction were larger than those used in Structure #1, averaging from ten inches to twelve inches in diameter. The number of logs used in the construction of Structure #2 was considerably less

Fig. 10. Outline Map of Stick City Structures.


12′
6′
6′
Structure — 1
9′
9′
6′
33 yds.
14′
13′
Structure — 2
13′
13′
19 yds.
12′
12′
13′
Structure — 3
8′
18′
0 FEET 5

than the number used in Structure #1. The average height of the standing wall for Structure #2 was approximately four feet.

There was no evidence of a roof for Structure #2. Unlike Structure #3 of Timber Town, Structure #2 of Stick City lacked evidence of fire and also lacked limestone slabs at the base of the structure. This evidence, along with the size number of logs used in construction, indicated that this structure may have been used for some purpose other than to provide shelter for hunters. It would seem likely that the structure may have been used to corral horses if the post-horse date for Timber Town is accepted and it applies here. However, I hesitate to hypothesize the use of the structure without evidence from testing and/or excavation.

The floor of Structure #2 was like that of Structure #1 in that it was a dense mat of decayed plant material composed of pine needles from four Limber Pines that are growing within the structure. The tallest of the four pine trees was approximately twenty feet in height.

The present condition of Structure #2 was good. The large logs used in the construction were for the most part in the same position as when the building was first constructed. Structure #2 was located thirty-three yards southwest and down ridge from Structure #1.

Both large and small logs were used in the construction of Structure #3. The outline of the structure was roughly rectangular with one end being triangular in shape (see Figure 10). The structure had some standing wall intact which averaged three and one-half feet in height.

There were several deadfall logs between Structures #2 and #3. One of the large logs, which measured two and one-half feet in diameter, had been incorporated into the construction of Structure #3 (see Figure 9).

One small Limber Pine and two stunted Juniper bushes were growing within Structure #3, and decayed plant material from these trees covered the floor.

Two holes had been dug in the floor of Structure #3, which were probably the result of pot hunters. There was no evidence of cultural stratigraphy or any other indications of occupation observable in the profiles of these holes.

Structure #3 was located 19 yards on a direct line from Structure #2, and lay 52 yards on this line from Structure #1 (see Figure 9).

Site Summary

These structures, like those of Timber Town, were probably used as seasonal hunting lodges. Although there has been no dendro dating established, and no testing and/or excavation on the site, I suggest, on the basis of construction and condition of material used, that the function of the lodges at Stick City Site were the same as for those at Timber Town Site.

It appears, however, that Structure #2 may have had a function different from other structures at both sites. The shape of this structure was definitely square, form by "cribbing" of logs. The structure lacked any evidence of roof construction, limestone slabs for chinking, and

evidence of fire.

Based on this evidence, I suggest that this structure had a particular function different from that of the other structures. As stated before, I hesitate to hypothesize what this function was until more evidence is gathered.

Conclusion

Wooden structures have been recorded in several places on the Northwestern Plains. Cribbed log structures like those found in the Pryors are much less well known. This type of structure was noted by Lewis and Clark in 1805 (Coues 1965:297, 324, 350) and by Morgan in 1862. Morgan (1959:197) describes them as:

> Along the Upper Missouri from the mouth of the Yellowstone these Forts occur very frequently. They are large enough to accomodate a war party of 20 persons. They are made of driftwood, and are on the bottoms near the river. They are hexagonal, sometimes pentagons. I have examined and measured them (has ground plan, top and side view sketched in original publication). The logs are piled up drawing inwards about six feet high and the top covered except an opening for smoke. At night they close up the opening after going in. They are thus safe against night attack. We saw them by the dozens, scattered along the river for 750 miles. The most together was three at a bend 150 miles below Fort Benton. The opening for smoke and light is five feet square.

It has been suggested by many archaeologists that the structures in the Pryors were forts or defensible citadels. In those that Morgan describes, the structures he recorded may very well have been war lodges. Based on excavation data my opinion is that, although the construction is identical, the structures in the Pryors are hunting camps. I further

suggest that these "hunting lodges" were constructed in the same way as "war lodges," but their function differed.

Signal Fire Site 24CB893

Introduction

The Signal Fire Site was first located and recorded by the Pryor Mountain Archaeological Survey Team during the 1970 field season. It was later mapped during that same season. There is no legal description for the Signal Fire Site as much of the top of Bighorn Mountain is unmapped. Its location is in a "bowl" shaped area adjacent to an abrupt scarp on the north side of Big Pryor Mountain.

This site was composed of twenty artifically constructed piles of deadfall logs and branches. The wood piles averaged two feet in height. The piles were composed of pine logs averaging ten feet long and eight inches in diameter (Table 7). There was not an abundance of scattered wood on the site, as most of the wood was incorporated into the existing piles and probably much wood was used for previous fires.

The piles of deadfall were the only features on the site; there was no lithic debris observable. Scattered charcoal was found beneath some piles indicating previous fires.

Scattered Limber Pine, Stunted Juniper and short grasses and forbes comprise the flora for the site. All are typical of the sub-alpine zone.

Site Summary

There has been no attempt to date the site by dendrochronology,

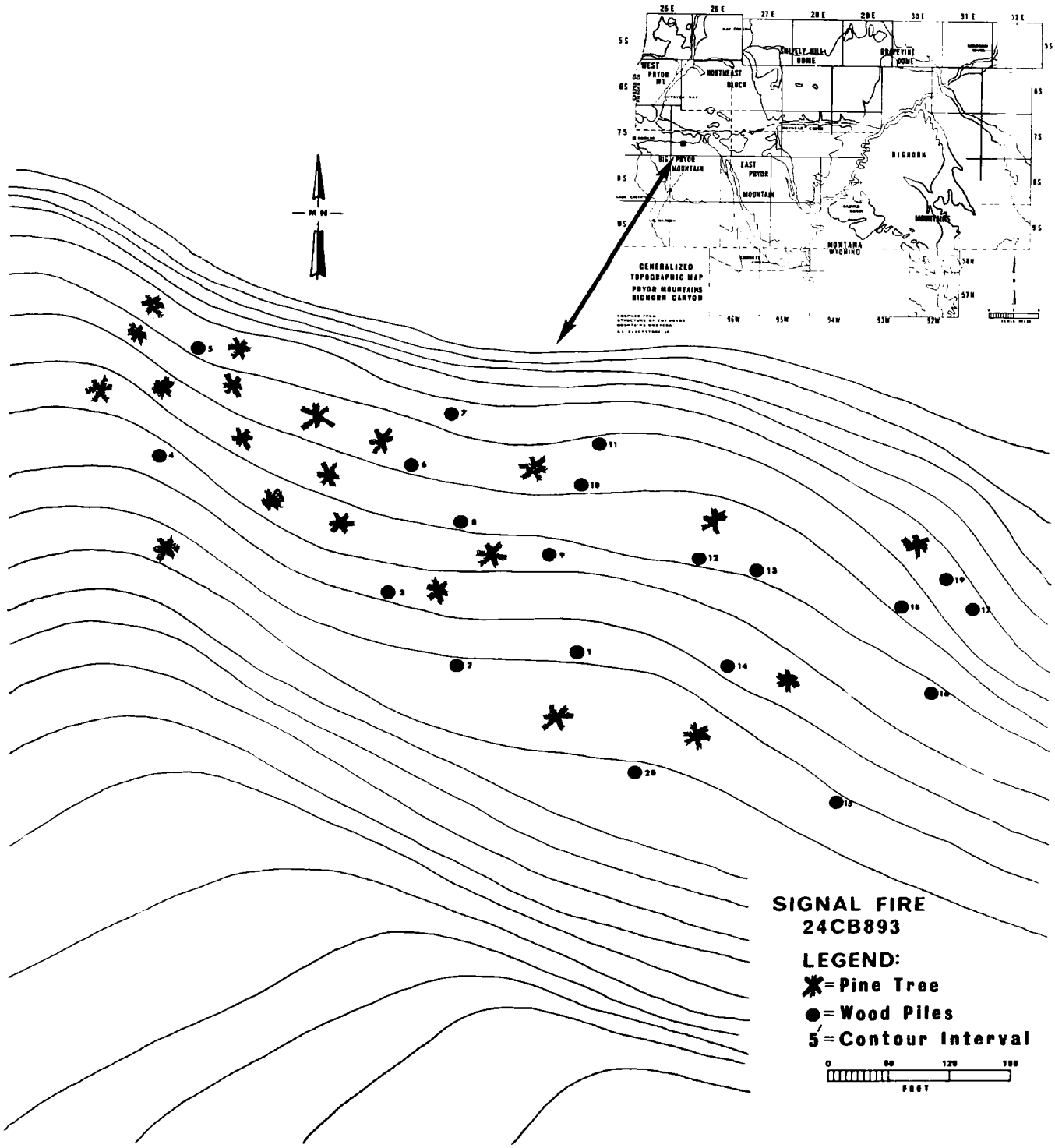


Fig. 11. Map of the Signal Fire Site.

TABLE 7

DIMENSIONS OF LOGS USED IN SIGNAL FIRE CONSTRUCTION

Number	Height	Dimensions (L&W)	Number of Logs	Size of Logs (L&L)	Evidence of Charcoal
1	1'10"	15'6"x14'6"	40	13'1"x8"	No
2	10"	12'7"x8'	25	12'7"x8"	Yes
3	1'6"	5'11"x8'8"	25	5'7"x6"	No
4	11"	5'10"x4'	15	7'5"x4"	No
5	11"	17'x12'8"	13	12'x7"	No
6	2'7"	10'x10'	50	6'x12"	Yes
7	4'	20'x12'5"	80	14'x8"	No
8	11"	12'x7'	13	4'7"x8"	No
9	1'2"	15'x5'	30	14'x12"	No
10	4'	11'x10"	70	12'x12"	No
11	1'6"	16'8"x11'3"	60	12'x8"	Yes
12	1'5"	6'8"x11'5"	30	12'x4"	No
13	3'	15'7"x10'3"	20	15'x6"	No
14	4'	16'3"x12'7"	75	12'x9"	Yes
15	11"	17'8"x8'	15	14'x12"	No
16	2'7"	13'x10'	30	12'x8"	No
17	2'	15'6"x5'8"	30	11'x5"	No
18	10"	10'x13'	15	8'x6"	No
19	1'1"	25'x4'	20	25'x8"	No
20	1'	15'4"x3'	15	15'4"x4"	No

consequently, no date for material on the site is available. However, the condition of the wood suggests that the site is not very old. The charcoal beneath four piles may serve to date the site. The ends of the logs do not exhibit evidence of being cut by stone or metal tools, however, some of the ends appear to have been burned. The burned ends may indicate the logs were gathered after a natural fire or they may have been cut into lengths by burning. However, the charcoal material may be too recent for use in radiocarbon dating. The charcoal does indicate there had been previous fires and that these piles of wood were restacked for later firing.

Since signal fires were used as a means of communication by Plains people, it seems possible that these unburned logs were used for such a purpose. Some ethnographic data suggests that white trappers and traders also used signal fires in the Pryors to communicate with friendly tribes. In 1805 Francis Laroque was to return to the Pryors to trade with the Crow. His plan was to light four fires on a high mountain where they could be seen for some distance. These fires were to be burned for four successive days. Upon seeing these fires the Crow would know it was safe to proceed to where Laroque was camped in order to trade with him. If less than four fires were visible it meant that there were hostile tribes in the area and the Crow would stay away (Payette 1962: 536).

The location of the Signal Fire Site is strategically situated so as to offer an uninterrupted view towards the north, west and east.

The view from the site is such that present day Billings, Montana, can be seen some forty miles to the north.

The position of the site, much evidence of previous fires, and ethnographic data documenting the use of signal fires, all suggest that these piles of wood were intended to be fired as signals. Since the wood used in the construction of the piles is in a good state of preservation, the people who used the site for signaling must have lived during the Late Hunter Period.

Virgin Springs 24CB739

Introduction

Virgin Springs is located in the Northwest ¼ of the Northwest ¼ of Section 29, Township 8 South, Range 27 East, near the top of Big Pryor Mountain. This site was located and recorded in 1968 by the Pryor Mountain Archaeological Survey Team. It was tested that same season and again during the 1971 field season.

Virgin Springs has been designated an "Occupation Site." An occupation site exhibits scattered lithic material as its only surface feature. Occupation sites have been referred to as "chip-strewn areas," "camp sites," "surface sites," and "open air sites" (Loendorf 1969: 100). I refer to Virgin Springs as an occupation site to distinguish it from the other sites discussed in this thesis.

Site Description

Much of the information on the following three sites, 24CB739,

24CB740, and 24CB475 has been taken from The Results of the Archaeological Survey in the Pryor Mountain-Big Horn Canyon Recreation Area--1968 and 1969 Field Seasons by Lawrence L. Loendorf.

Virgin Springs is situated near a fresh water spring which is located amidst a series of barren knolls. Surface lithic detritus lay over an area approximately one-quarter square mile. The only material on the site is the lithic debris in the form of flakes and chips.

The site has several small springs. However, the main spring, which has been improved by the United States Forest Service, was quite large and could have served primitive people with a water source well into the autumn. The knolls surrounding the site are barren except for areas below the springs which are heavily overgrown with lush grasses. A few scrub pine grow in the immediate area, but none on the site itself.

Excavation Procedure

Two 5'x5' square test units were excavated in 1968. One unit was placed on the knoll above the main spring and was completely sterile. The second test unit was placed in a cut bank near the main spring where lithic detritus had been washing out. Lithic debris was recovered continuously from the surface to a depth of sixteen inches. Chips and spalls were of different material but quartzite was the most abundant. The quartzite material was later analyzed and found to be the same material that was found at the Big Springs Quarry Site (24CB777). No cultural stratigraphy was recognized in the test unit, and no diagnostic

artifacts were recovered.

In 1971 another 5'x5' square test unit was excavated on the site. An area for testing was selected because of its lush vegetative cover We thought that a test trench in this area might have a better chance of showing stratigraphy because there were no erosional effects there. The test unit was placed 25 feet from the northeast edge of the pond formed by the main spring. The trench was excavated to a depth of 15 inches where we encountered limestone bedrock. Lithic detritus was continuous throughout the first eight inches. The remaining seven inches was sterile of any cultural material. As in the two previous test units excavated in 1968, Big Springs Quartzite was predominant in the lithic collection.

There was no cultural stratigraphy apparent in the 15 inches of excavation, however, two soil changes were observable. Soil level #1 was a dark brown clay-like layer with very lumpy consistancy. Level #2 was a reddish clay-like soil intermixed with limestone cobbles. The reddish layer is exposed on the barren knolls that surround the site.

Excavation Results

Since the area has several springs which have overflowed over the area for a considerable period of time, one might suggest that all cultural stratigraphy has been obliterated by the erosional effects. As well as displaying no cultural stratigraphy, extensive testing of the site did not yield diagnostic artifacts. However, our surface collection of the site contained corner-notched and side-notched projectile points.

These artifacts suggest that Virgin Springs may have been a constant source of water for peoples in the area over a considerable period of time.

Summary

The lithic debris recovered from surface collections and from test units suggest that Virgin Springs may be associated with Big Springs, located approximately four miles north. Virgin Springs may represent a secondary workshop area, or it may represent an occupation site that was inhabited by people "overflowing" from Big Springs. Virgin Springs would have been comparable to Big Springs in that subsistance resources were abundant.

Independence Site 24CB740

Introduction

Another site which may have been associated with Virgin Springs was the Independence Site (24CB740). The Independence Site is located approximately one-half mile from Virgin Springs and exhibited similar surface artifacts and lithic detritus.

The Independence Site is located near the top of Big Pryor Mountain in the Northwest ¼ of the Northwest ¼ of Section 29, Township 8 South, Range 27 East. This site was also recorded during the 1968 field season by the Pryor Mountain Archaeological Survey Team, and later tested that same year. Our crew resurveyed the site during the 1971 field season.

Site Description

Like Virgin Springs, the Independence Site is an occupation site. The only evidences of human activity at the site was the scattered lithic detritus in the form of waste flakes.

Flora for the site is typical for the sub-alpine zone, although there is no source of water near the site. A good stand of alpine grass covers a portion of the site. Along with grasses and forbs there are scattered Limber Pine and some stunted Juniper bushes.

The site is situated on a flat area, and lithic debris covered an area approximately 75 by 100 yards. Surface collections from 1968 continued three edge-ground cobbles and fragments of others. Three fragments of corner-notched and two fragments of side-notched projectile points were recovered. Also we found one midsection of a biface exhibiting parallel flaking.

Excavation Procedure

Two 5'x5' squares were excavated on the site in 1968. One was located below the main concentration of lithic debris on the mountain-side and was found to be completely sterile. The second unit was located in the center of the site and produced only a few flakes and no diagnostic artifacts. No cultural stratigraphy was observed in either test unit. Lithic detritus from the surface and from one test unit was identified as chert from the quarry at Swamp Frog Quarry Site (24CB726), recorded by Loendorf (1969). Quartzite from the surface and from the test unit was identified as quarry material from the Big Springs Quarry Site (24CB777).

Excavation Results

Test units excavated on the site did not produce cultural stratigraphy, diagnostic artifacts, or deposition. The Independence Site, like other occupation sites in the sub-alpine zone, leads one to suggest that these sites were occupied many times during several thousand years. Projectile points observed in surface collections from these sites (discussed in the "Artifact Typology Section") indicate that the surface of these sites exhibit at least 3,000 years of archaeological evidence.

Summary

I would suggest that the lack of deposition on these sites is due to the typography and nature of the erosional processes in the sub-alpine zone. Virgin Springs is an exception since outflow from the several springs is acting as an erosional agent.

As stated previously, the Independence Site is located only one-half mile from Virgin Springs. The short distance between them implies that the same people were probably using both sites. Since the Independence Site lacked water, Virgin Springs would have been the closest source.

The concentration of edge-ground cobbles poses a unique problem. When examined under magnification, the edge-ground cobbles show striations indicating that they have been used for grinding, rubbing, and/or polishing. They are unlike manos in that edge-ground cobbles do not exhibit wear patterns on the flat surfaces (see Figures 22 and 23). Instead, the wear patterns were along the lateral edges. The edge-ground cobbles

were manufactured from river cobbles that must have been transported to the tops of the mountains.

Butler (1966) suggests that edge-ground cobbles were used in the processing of root crops. He further suggests that these edge-ground cobbles were used the same way as the manos and metates were used in the processing of seeds in the Great Basin area. Butler suggests the edge-ground cobbles were used for the processing of roots in the Plateau area and the mano-metate complex was used for the processing of seeds in the Basin area.

I do not fully agree with Butler's hypothesis, for both complexes (manos-metates and edge-ground cobbles) are found in the Pryor Mountains. Furthermore, I cannot see how the edge-ground cobbles could exhibit such a distinguishable grinding surface from the processing of soft roots. I suggest these edge-ground cobbles are used in the abrading, thinning, and tanning of hides.

The most sought-after hides used in the manufacturing of clothing were from Mountain Sheep. Since people occupying the sub-alpine zone may have come there to hunt Mountain Sheep, it seems possible that the women would have been spending much of their time manufacturing clothing for the oncoming winter. The only tools other than knives and scrapers that may have been used for hide preparation are the edge-ground cobbles. By rubbing these cobbles back and forth over the hide while adding an abrasive such as sand or clay, the hides would become thinned and pliable. In a short period of time the cobbles would exhibit a flat surface where

pressure was applied against the hide. There is no ethnographic or archaeological evidence to support this interpretation, and until more evidence is gathered it must remain purely conjectural.

If one accepts this suggestion, it would seem probable that the Independence Site represents a site where a particular activity of hide preparation took place. If the presence of these edge-ground cobbles indicates hide preparation, the Independence Site may have been a hunting camp where hides were prepared. The cobbles could have been cached and used every season during the occupation of the sub-alpine zone.

Edge-ground cobbles have been found on other sites in the sub-alpine zone. This fact may suggest that hide preparation was an important activity during the period of occupation in this zone. I have suggested that occupation of the sub-alpine zone took place during mid-summer or early fall. With the anticipation of cold weather the manufacturing of warm clothing probably took place toward the end of the summer. Since it seems unlikely that clothing would have been transported to the tops of the mountains during hot periods in summer, manufacturing of warm clothing for the late fall would have been essential.

Site 475 24CB475

Introduction

This site was first recorded by Loendorf (1967) in his master's thesis, The Archaeology of the Clark Fork of the Yellowstone River. Site 475 is the third example of an occupation site found in the sub-alpine zone. Surface collections of the site have produced several

projectile points and numerous other tools.

Site Description

The site consisted of lithic detritus, burned bone, and fire-cracked rock. Projectile points found there are characteristic of the Middle Pre-Historic Period and of the Paleo-Indian Period. One projectile point found during the 1971 season by a member of the survey team has been identified as an "Eden Type" characteristic of the Plano Culture in the Paleo-Indian Period. (This projectile point is unavailable for description.) The site is covered with a lush covering of alpine grasses which makes surface collection very difficult. Most artifacts and lithic detritus seem to be eroding up from approximately six inches below the surface.

Summary

Since projectile point types representative of several periods have been found on the site, I suggest that the site has been occupied repeatedly, but not continuously, for a lengthy period of time. It is difficult to envision the reason for the repeated occupation. However, it should be noted that water in the form of snow is available during the summer months, and game would have been abundant in the forested areas to the east of the site.

The abrupt scarp of the Dry Head Overlook may have served as a feature that attracted people to the 475 Site. This "overlook" is approximately one-quarter mile from site 475 and offers an uninterrupted view of the grassy plains that surround the Dry Head Canyon below. The

scope of this view takes in approximately 100 square miles of the lush grassy plains. Primitive people may have camped near this overlook to spot game, then signaled by fire to hunters below.

Vision Quest Sites

Introduction

Numerous Vision Quest Sites have been recorded in the sub-alpine zone. The structures were not discovered or recorded until 1964 when Stuart Conner investigated some rock structures at Dry Head Overlook. Since that time, some 100 structures have been reported. Loendorf (1969) has recorded many of these structures during the survey of the Pryor Mountains. Since all structures are similar in construction, an overall discussion of them will be used in this thesis.

The structures are usually the only feature within a site. However, some lithic material has been found around the structures. Whether or not this lithic detritus was associated with the structures is difficult to determine.

Description

Vision quest structures are usually made of rocks stacked one on top of another to a height of one to two feet. Some structures employ wood in their construction which apparently served to roof over the structure. The shape of the structures is usually that of a "U" with the opening facing toward the east in the direction of the rising sun.

The structures are always located on high, prominent points or

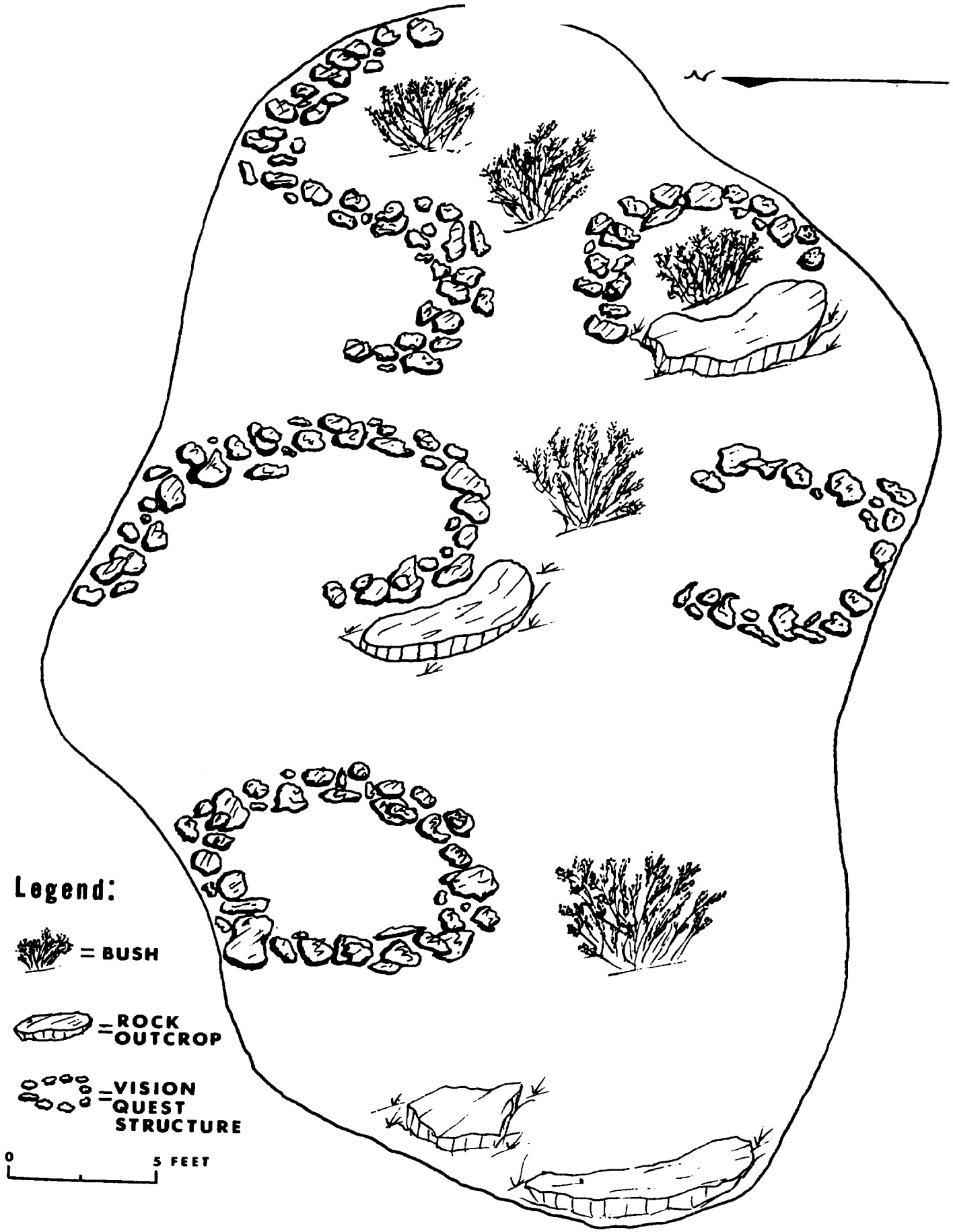


Fig. 12. Map of Typical Vision Quest (24CB881).

next to abrupt cliffs. Many structures have been found along the east side of Big Pryor Mountain next to the abrupt scarp that drops almost perpendicular for 1,000 feet. These structures are difficult to reach and sometimes require great effort and climbing ability by archaeologists.

Summary

The Vision Quest which was a ceremony that was performed by most Plains Indians is described in length by Benedict (1922) and by Lowie (1922).

Many of the structures recorded are in the sub-alpine zone. Other structures have been recorded at lower elevations, however, they are always found on prominant features of the landscapes. These structures are not unique to the Pryor area as may have been recorded in neighboring plains states.

CHAPTER IV

MATERIAL CULTURE--ARTIFACT TYPOLOGY

The only cultural material from Big Springs and other sites that are diagnostic for dating purposes are the projectile points. These sites lacked pottery or any other diagnostic artifacts useful for dating. Some artifacts are from surface collections and will be designated as surface artifacts.

Artifact Typology

Core Tools

Cores: Cores are quarried nodules which are usually irregular in shape and were used as the "quarry" source for flake tool manufacturing. Most cores exhibited flake scars where flakes were randomly struck from the surface. Cores were distinguished from other tools on the basis of percussion flaking over all or most of the surface and lack any other evidence of use (Breternitz 1970:130)

Total 26 (Not illustrated)

Material: Chert 2 Basalt 1 Big Springs Quartzite 23

Provenience: 24CB777--Surface

Choppers: Choppers were probably used as "smashing" or "chopping" tools for working bone or wood. These tools were usually ovoid in shape. Size was determined by the cobble or nodule

being worked. The edge of the chopper was usually scalloped resulting from the removal of large percussion flakes from both surfaces of the artifact. Choppers of Big Springs Quartzite were usually manufactured from sugary quartzite as this material was not suitable for the manufacturing of small flake tools.

Total 12 — Figure 13

Description: Percussion-flaking, unifacially and bifacially. Choppers are distinguished from cores on the basis of shape and evidence of use. Choppers showed definite "crushing" along the working edges of the tool. For those choppers manufactured from Big Springs Quartzite, texture and/or consistency of the quartzite may be used as a distinguishing characteristic to divide choppers from preforms or blanks.

Material: Big Springs Quartzite 12 (all sugary in texture)

Provenience: 24CB777--Main Excavation Trench

Comments: Figures 1-5 show a representative sample.

Flake Tools

Projectile Points

In establishing a typology for projectile points, I have utilized in part the "Type--Variety Concept" presented by Gifford (1960). Although this method of classification was used for ceramics, I feel it can also be applied to chipped stone tools.

It is believed that any individual group or culture holds a "mental template" as to what a particular tool should look like (Deetz 1967:45). When tools are made according to these templates, it should be possible for the archaeologist to create types that reflect the templates.

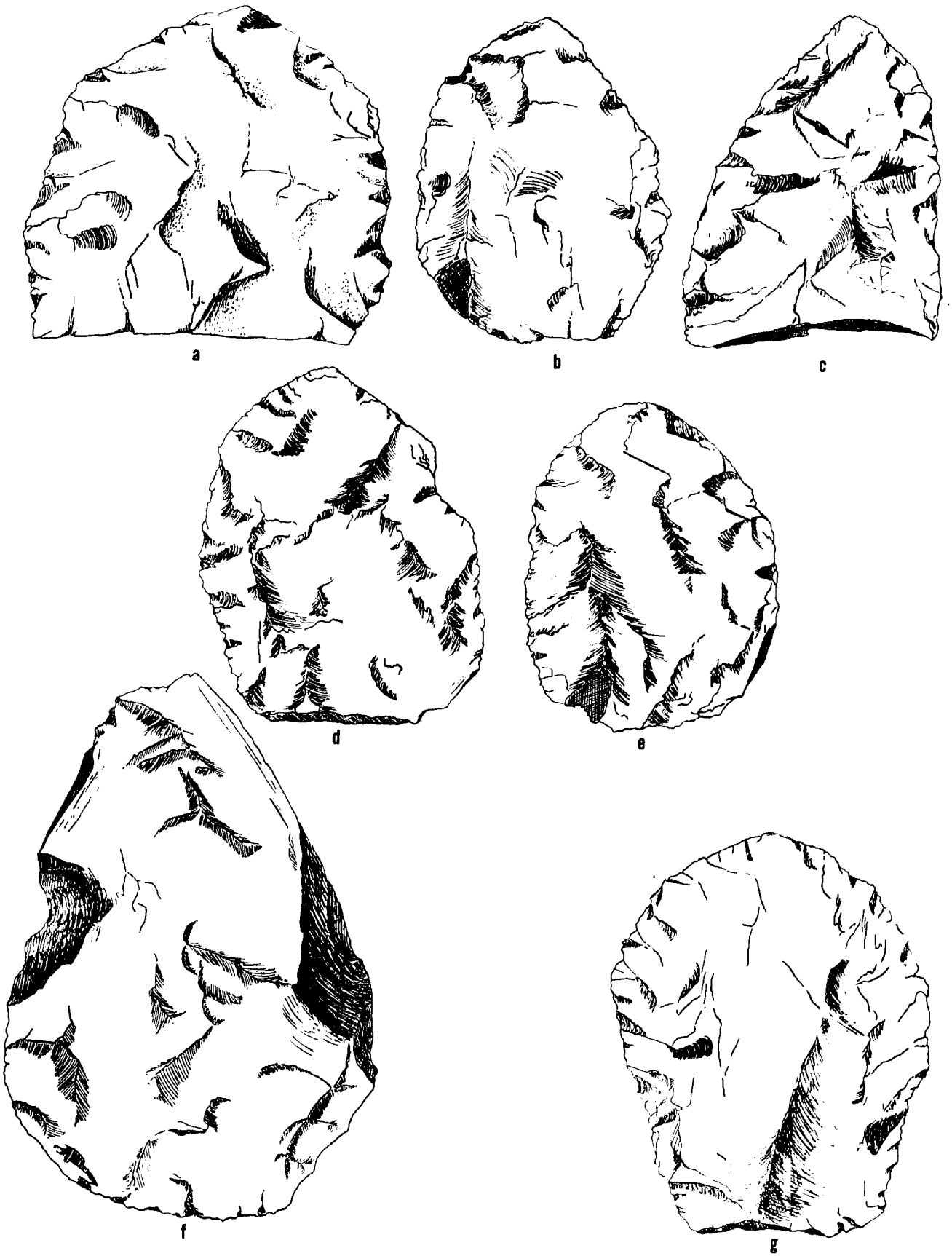


Fig. 13. Choppers (24CB777) Scale: 1:2.

Some individuals or small groups vary in their ability to produce the tools in the template. This variance may be the result of different artisan's skill, in a desire of the artisans for something new, or from differences in the workability of stone.

In this typology, I have set up individual types for those projectile points that have historical significance with names and dates. For those projectile points that have not been historically classified, I have used Types and Varieties. The typology is based on several attributes: (1) the presence or absence of notches; (2) the location of notches (side, corner, etc.); (3) the base shape (stemmed, straight, concave, convex, or notched); (4) the shape of the blade (lancelate, leaf-shaped, triangular). From these attributes a type is established. Within each type some projectile points may lack an attribute or exhibit additional attributes whereupon varieties are created.

Projectile Points:

Type I:	Type I projectile points are lancolate in shape, the blade having parallel sides and lateral edge grinding. The projectile points are of medium length (4.5 cm.) and are fairly wide (2.0 cm.) with a concave base.
Total 1	Figure 14a
Description:	Type I projectile point is lancolate in shape with parallel sides. The blade surface shows some parallel flaking and it has a concave base. The ratio or length to width is 2 to 1.
Material:	Red Jasper
Provenience:	Test Unit (24CB777) #2 Level #3, 8" to 12" in depth.

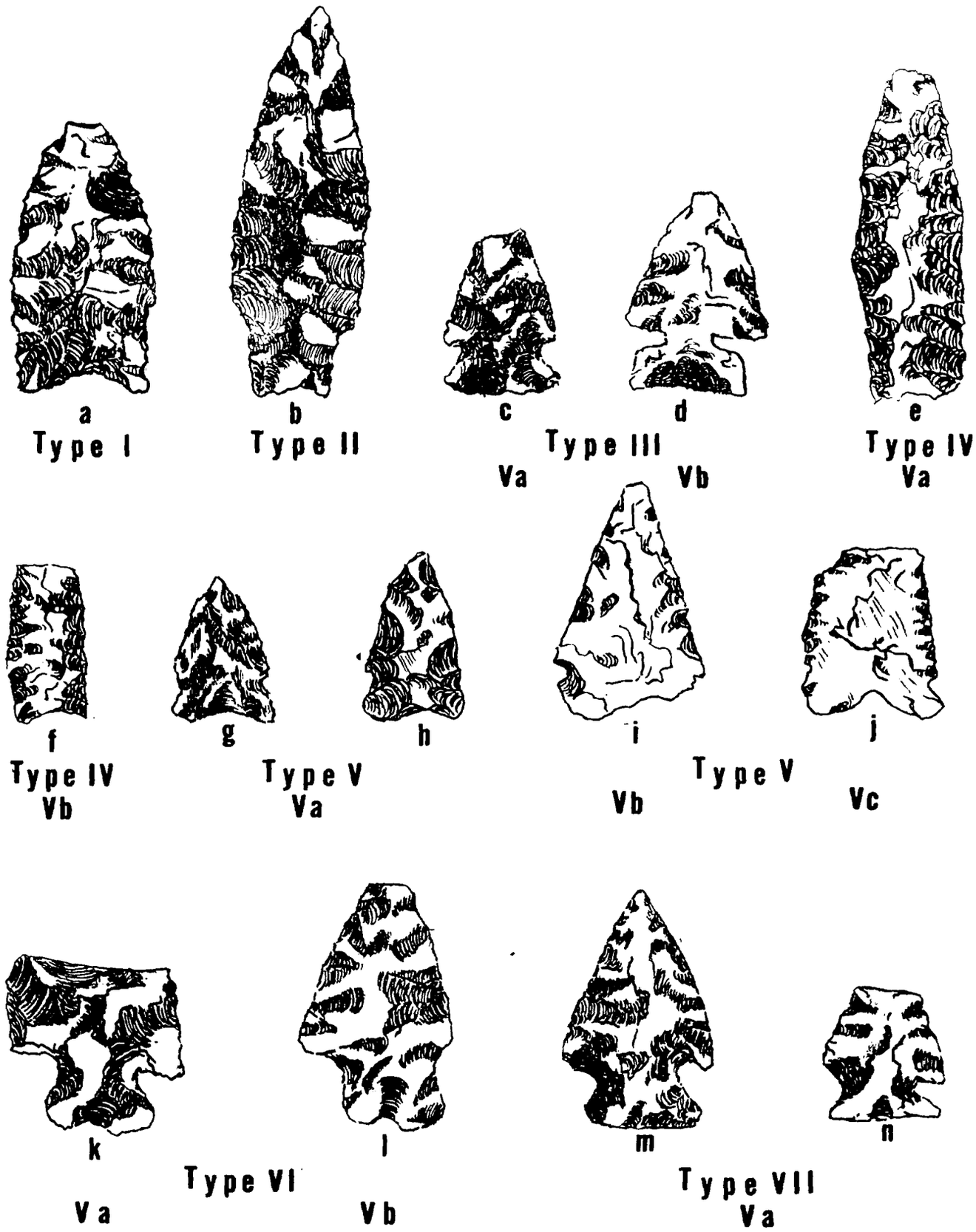


Fig. 14. Projectile Points.
Scale 1:1 24CB777 a-d, g, i, k, l
24CB475 e, f, h, j

Dimensions: 4.5 L x 2.0 w x 0.5 cm.

Comments: Type I projectile point does not have a common name attached to it. Personal communication with Wormington and Forbis (1972) suggests that although it resembles "Plainview" it should not be referred to as such, and dates associated with Plainview should not be attached to the Big Springs specimen. Forbis has found projectile points in Wyoming that closely resemble the specimen from Big Springs. These projectile points were found at a depth of 26 feet below the surface and radio-carbon dates for bone deposits associated with the artifacts average 7750± 620 B.C. It was further suggested by Forbis that these projectile points may be unique to the Pryor Mountain-Big Horn area.

Type II: Type II projectile points (Augostura) are slender lancolate points. The symmetrical sides incurve to the tip and taper to the narrow base forward from the base about two-fifths to one-half of the total distance from base to tip. The base is either shallowly concave or irregularly straight. Normally each face bears parallel ripple flake scars running obliquely from upper left to lower right. The ripple flake scars are usually of approximately equal length and the cross-section is lenticular, but in some instances the presence of flake scars of unequal length has produced one or two longitudinal ridges and some specimens are symetrical or trapezoidal in cross-section. In a few cases the flake scars are horizontal. Points range in length from 2½ to 3¼ inches. The bases were thinned by removal of small longitudinal flakes. The lower portion of the lateral edges, but not the basal edge, were smoothed by grinding (Wormington 1957:269).

Total 1 Figure 14b

Description: The Big Springs specimen is lancolate in shape incurving toward the tip and base. The blade is flaked over the entire surface and exhibits

some parallel oblique flaking. Instead of lateral grinding the artifact exhibits "burning" fractures used in smoothing the lateral edges, this gives the specimen a "stemmed" appearance. The concave base is irregular and is the result of the removal of small flakes from the base.

Material: Chert

Provenience: 24CB777--Main Excavation 1NOE--Level #8, 28" to 32" below surface

Dimensions: 6.6 L x 2.0 W x 0.7 T cm

Comparable Specimens:
Wormington. . . .Ancient Man in N. Am. (1957)
Wormington and Forbis . . .Arch. in Alberta (1965)
Sharrock. . . . .Pine Springs (48SW101) (1966)
Loendorf. . . . .Clark's Fork Survey (1967)
Arthur. . . . . .Upper Yellowstone (1966)
Hlady . . . . . .Ten Thousand Years (1970)
Taylor. . . . . .Yellowstone Park (1964)

Comments: Type II is distinguished from Type I on the basis of size and shape. Wormington (1972) suggests that this specimen most closely resembles the "Angostura" projectile point type. It should be noted that the "Angostura" projectile point type is now equated with the "Agate Basin" projectile point type, and both are a variant of a single basic type, rather than two distinct types. The radio-carbon date of 7400 B.C.$\pm$ 500 years for the Agate Basin-Brewster locality is very close to those for Angostura (Wormington 1957:139, 268).

Type III: Large Side-Notched--Type III projectile points are triangular in shape, are large compared to the late "Plains Side-Notched" type. The side-notches are shallow and exhibit moderate grinding and the base has both thinning and grinding. The points are lens shaped in cross-section and are widest at the shoulders just above the notches. The base is concave or straight. The total length of the artifacts range from 2.5 cm. to 5.0 cm.

Total 2 — Figure 14c, a

Variety a — Specimen is triangular with shallow side-notches which show evidence of grinding. The widest point of the artifact is above the notches. The base is straight and has been thinned by the removal of small flakes. The artifact does not exhibit basal grinding.

Material: Purple Chert

Provenience: 24CB777--Main Excavation 1NOE--Level #7, 24" to 28" below surface

Dimensions: (Broken) Width 1.6 cm. Thickness 0.5 cm.

Variety b — Specimen is a large triangular, side-notched projectile point. The notches are shallow and exhibit some grinding. The widest point of the artifact is just above the notches. The base is concave and great effort has been taken to thin the base by a series of small flakes. Variety b is distinguished from Variety a on the basis of size and the shape of the base.

Material: Red Jasper

Provenience: 24CB777--Main Excavation 1NOE--Level #6, 20" to 24" below surface

Dimensions: 3.5 L x 2.2 W x 0.5 T cm.

Comparisons:

Agogino and Frankfort. . . . .Simonson Site (1960)
Kivett. . . . . .Logan Creek Site (1962)
Wedel, Husted, and Moss . . . . .Mummy Cave (1968)

Comments: These projectile points resemble those found at the Simonsen Site in northwest Iowa, Mummy Cave near Yellowstone National Park, and at the Logan Creek Site in eastern Nebraska. They suggest that peoples or cultural influences from the east may have migrated to the area of the Pryor Mountains. Dates for these side-notched types have been dated at 5600 to 5200 B.C. at Mummy Cave (Wedel, Husted, Moss 1968).

This would suggest that peoples were moving onto the Plains from the east at the beginning of the Altithermal, a period of time when the "Plains" and "Great Basin" were largely abandoned by large groups of primitive peoples (Husted, unpublished manuscript).

Type IV: Narrow Lancolate--Type IV projectile points are narrow lancolate points with a concave base. They are bifacially flaked with no pattern in flaking evident. The range of lengths for these artifacts is 2.5-6.0 cm. with most specimens being under 5.0 cm. The sides may be curved or parallel but tend to converge towards the base. Lateral grinding is frequent but often difficult to detect by drawing a finger along the edge (Syms 1969: 21).

Total 2 Figure 14e-f

Variety a Specimen is narrow and lancolate in shape. The artifact is randomly flaked bifacially with some "potlid" fractures obscuring the flaking patterns. Lateral grinding towards the base is evident. The sides are parallel but tend to converge toward the base. The base is concave and shows some evidence of being ground.

Material: Quartzite (Not Big Springs) 1

Provenience: Surface Artifact (24CB475)

Dimensions: 5.6 L x 1.7 W x 0.8 T cm.

Variety b Specimen is small, narrow, and lancolate in shape. The artifact has been manufactured from a long blade with small flakes randomly pressure flaked along the edges. The sides are parallel to the base and are laterally ground. The base is concave and does not appear to be basally ground.

Material: Chert 1

Provenience: Surface Artifact (24CB475)

Dimensions: (Broken) Width 1.0 cm. Thickness 0.5 cm.

Comparisons: Hlady. . . . .Ten Thousand Years (1970)
Wormington
and Forbis. .Arch. Alberta Canada (1965)
Loendorf . . .Clark's Fork Survey (1967)
Husted . . . .Bighorn Canyon Arch. (1969)

Comments: Type IV projectile points closely resemble the "McKean" type. This projectile point was first described by Wheeler in 1952 and by Mulloy in 1954. Dates for the McKean Site in northeastern Wyoming cluster around 2600 B.C. Type IV is distinguished from Type III on the basis of shape and its historical significance as to name and dates.

Type V: Side-Notched, Concave Base--Type V projectile points are relatively small but thick, with shallow side-notches. These points tend to be broad with a concave base. The shallow side-notches and deep concave base give the artifacts an "eared" appearance. The blade shape tends to be triangular, however, some forms have parallel sides.

Total 4 Figure 14g-j

Variety a The two specimens comprising variety are small, side-notched, and have concave bases. They are both randomly bifacially flakes. Both artifacts are relatively thick compared to their width and length. The shallow side-notches and concave base give the specimens the characteristic "eared" appearance (Figure 14, illustrations g-h).

Material: Porcelainite 1 Chert 1

Provenience: 24CB777--Main Excavation 4NOE--Level 1, 0" to 4" below surface Surface Artifact (24CB475)

Dimensions: 2.8 L x 1.4 W x 0.8 T cm. <(24CB777)
2.4 L x 1.5 W x 0.9 T cm. <(24CB475)

Variety b Specimen is triangular in shape with shallow side-notches and a concave base. The blade is randomly flaked bifacially. Variety b is

larger and longer than variety a, however, its shallow side-notched and concave base give the artifact an eared appearance. It should be noted that one "ear" has been broken (Figure 14, illustration i).

Material: Big Springs Quartzite 1

Provenience: Surface Artifact (24CB777)

Dimensions: 4.0 L x 2.2 W x 0.6 T cm.

Variety c: Specimen exhibits shallow side-notches with a deep concave base. Unlike the other varieties in this type, variety c has parallel sides. The sides seem to converge toward the tip, however, the artifact is broken and it is difficult to speculate as to the tip shape. The blade is randomly flaked bifacially and has been manufactured from a flake as the "bulb of percussion" is still observable (Figure 14, illustration j).

Material: Big Springs Quartzite

Provenience: Surface Artifact (24CB475)

Dimensions: (Broken) Width 2.0 cm Thickness 0.7 cm.

Comparisons:

Wormington and Forbis . . . . Arch. in Alberta (1965)
Hlady . . . . . Ten Thousand Years (1970)
Good . . . . . Roseau River Survey (1973)
Bentzen . . . . . Powers-Yonkee Bison Trap (1966)
Stallcop . . . . . The Distribution in North-Central Montana of Indented-Base Projectile Points (1966)
Wedel, Husted, and Moss . . . . . Mummy Cave (1968)

Comments: The McKean Complex projectile points are frequently associated with broad, concave-based and side-notched points that have an "eared" appearance. These projectile points have been classified the Oxbow Type. Some researchers have tended to classify the Oxbow Type as antecedent to the McKean Complex. Based on

dated components at the Long Creek Site in Saskatchewan, Oxbow dates at 2693 B.C.± 150 and 2663 B.C.± 150. Other researchers tend to lump the Oxbow Type as part of the McKean Complex and in many cases this Oxbow Type has simply been referred to as a McKean Varient (Syms 1969:125).

Type VI: Stemmed, Indented Base. Type VI projectile point is characterized by a straight converging and incurving blade; straight or insloping and slightly notched or straight, thinned base. It is 25.0 mm. or more in total length and the stem represents from one-fourth to one-half of the total length. The blade is 13.5 mm. or more in maximum breadth and 3.5 mm. or more in maximum thickness. The point is made of a flake chipped by pressure on both faces in a random fashion or fully chipped by pressure on one face and retouched only along the edges of both faces. The blade is lenticular or plano-convex in cross-section. The base is notched, or thinned, by pressure, chipping on both faces from the base toward the tip. The edges of the blade are generally thin, straight, even, and sharp. The sides or the stem are usually smoothed by retouching or grinding (Wheeler 1954:7-14).

Total 2 Figure 14k, 1

Variety a Specimen is stemmed with an intended base and straight sides. The body is fully chipped by pressure flaking on both faces. The base is notched and thinned by pressure flaking and smoothed by grinding. The stem of this artifact is slightly restricted toward the body.

Material: Porcelainite 1

Provenience: Surface Artifact (24CB777)

Dimensions: (Broken) Width 2.5 cm. Thickness 0.5 cm.

Variety b This specimen is asymetrical in shape, this attribute setting it off from variety a. The artifact is stemmed, with an indented

base. [illegible] fairly straight while the other tends to converge toward the tip. The shape of the sides constitutes its "asymetrical" characteristic. The base is much straighter than the base of variety a and exhibits both pressure flaking and grinding.

Material: Big Springs Quartzite 1

Provenience: Test Unit #1 (24CB777) Level 4, 12" to 16" below surface.

Dimensions: (Broken) Width 2.2 cm. Thickness 0.5 cm.

Comparisons:
Wheeler. . . . .Duncan and Hanna Points (1954)
Taylor . . . . .Yellowstone Park Survey (1964)
Arthur . . . . .Upper Yellowstone Survey (1966)
Loendorf . . . .Clark's Fork Survey (1967)
Sharrock . . . .Prehistoric Occupation Patterns in Southwest Wyoming (1966)
Wormington and Forbis. . .Archaeology in Alberta (1965)
Hlady. . . . . .Ten Thousand Years (1970)

Comments: Variety a and variety b fit well within the description of the "Hanna Type" projectile point described by Wheeler (1954). This projectile point is part of the McKean Complex described by Mulloy (1954) and is dated circa, 2500 B.C. at Mummy Cave (Wedel, Husted, Moss 1968:184). Although the Hanna Type has been found scattered throughout the Northwest Plains the dates at Mummy Cave are the most applicable.

The projectile points in the remaining two types (Type VII and Type VIII) are referred to as simply "Corner-Notched and Side-Notched." In my opinion attaching type names such as Lincoln's Corner-Notched, Anderson's Side-Notched, or Smith's Deep-Notched has little value in understanding these artifacts. Toward the end of the "Middle Pre-Historic Period" and through the "Neo-Indian Period" variations of these two basic types become so numerous that attaching names to every variety only serves to con-

fuse researchers in the task of comparison. Although several projectile points representative of these types were recovered, I feel only side-notched varieties with type names have been well accepted by researchers. These two types are the "Besant Type" and the "Avonlea Type." Besant projectile points are characterized by shallow side-notches, which produce a broad flaring stem, almost always convex. Most specimens are bifacially dressed with secondary flakes scars replacing the primary flake scar. Basal thinning is not uncommon; but basal grinding is general and may be light to heavy. The dates given for this type from the Old Woman's Buffalo Jump are circa, A.D. 310± 60 years (Forbis 1960: 106).

A second projectile point type that is well accepted by researchers is a side-notched variety commonly referred to as the Avonlea Type. This type is described as being a small side-notched point predominantly concave based, corners usually rounded, with small flake scars projecting at a 65 degree angle to the longitudinal axis of the point (Kehoe 1966b: 829). In this typology projectile points Type VIII (Figure 15i-j, n-p) seem to fall within the description of Avonlea given by Kehoe. Dates associated with the Avonlea Type range from A.D. 210 to 660 A.D.

Type VII: Corner-Notched. Projectile points in this type are basically triangular in shape, with straight sides that converge toward the tip. All specimens are manufactured from flakes which are randomly pressure flaked bifacially. These projectile points have a wide range of sizes, measuring from 4 cm. to 2.8 cm. in length, 2.6 cm. to 1.9 cm. in width, and average 0.5 cm. in thickness. The notches are placed at the corners of the "triangle"

Fig. 15. Projectile Points.

Scale 1:1 24CB777 a-c, h, i, j
24CB475 f, g, m
24CB739 d, e
24CB863 k, l, n-q


a


b


c


d


e

Type VII —— Va


f

Vb


g

Type VII

Vb


h

Vc


i


j


k


l


m

Type VIII —— Va


n

Vb


o

Vb


p

Vb

Type VIII


q

Vc

and tend to angle in toward the body of the projectile point. These corner-notches restrict the width of the base, thus the widest measurement is just above the notches. Base shape may be either concave or straight.

Total 10 — Figure 14m, n Figure 15a-h

Variety a — There are seven specimens comprising this variety. All specimens are triangular in shape with straight sides that converge toward the tip. All specimens have corner-notches that restrict the width of the base, thus the widest measurement is just above the notches. Variety a is distinguished from other varieties in this type on the basis of the shape of the base. The base of variety a is straight.

Material	Provenience	Dimensions
Figure 14		
(m) Quartzite* (NBS)	Surface (24CB777)	4.0 L x 2.2 W x 0.5 T cm.
(n) Quartzite** (BS)	Surface (24CB777)	W 1.9 T 0.5 cm.
Figure 15		
(a) Quartzite (BS)	1NOE (24CB777) Level 5 16" to 20"	W 2.6 T 0.5 cm.
(b) Quartzite (NBS)	Test (24CB777) Unit #1 12" to 16"	2.8 L x 2.7 W x 0.5 T cm.
(c) Quartzite (NBS)	ONOE (24CB777) Level 4 12" to 16"	2.9 L x 2.1 W x 0.4 T cm.
(d) Chert	Surface (24CB739)	W 1.9 T 0.5 cm.
(e) Yellow Jasper	Surface (24CB739)	W 2.1 T 0.5 cm.

*Quartzite (Not Big Springs)
**Big Springs Quartzite

Variety b — The two projectile points comprising this varient triangular in shape, with straight sides that converge toward the tip. Both artifacts are corner-notched with a restricted base. Variety b has a concave base, the attribute that distinguishes variety b from variety a (Figure 15f, g).

Material: Porcelainite 2

Provenience: Surface (24CB475)

Dimensions: 6.0 x 2.4 x 0.6 cm.
(Broken) Width 2.3 Thickness 0.5 cm.

Variety c The projectile point in this variety is asymetrical in shape. One side is straight while the other is rounded, both sides converging toward tip. Only one corner-notch is clearly distinguishable and in this case the base is not restricted by the notches (Figure 15h).

Material: Big Springs Quartzite

Provenience: 24CB777--Main Excavation ONOE--Level #5, 16" to 20"

Dimensions: 3.2 L x 1.6 W x 0.6 T cm.

Comparisons:
Loendorf. . . .Clark's Fork Survey (1967)
Arthur. . . . .Upper Yellowstone Survey (1966)
Mulloy . . . .Pictograph Cave (1958)
Napton. . . . .Galatin Survey (1966)
Hlady . . . . .Ten Thousand Years (1970)
Sharrock. . . .Prehistoric Occupation Patterns in Southwest Wyoming (1966)

Comments: At the present time there is not much to say about the names and dates associated with Type VII. During the long interval from about 1500 B.C. to about 500 A.D., numerous styles of large, corner-notched projectile points were in use on the Northwestern Plains. Some, with radio-carbon ages of 1000 B.C. or older, closely resemble others dating around 0 A.D. Until we have sufficient data those projectile points with corner-notches will have to be attached to the period between 1500 B.C. and 500 A.D. (Husted 1969:92-93).

Type VIII: Small Side-Notched. Projectile points in this type are very small and triangular in shape. The projectile points are manufactured from small flakes and randomly pressure flaked on both faces. Shallow side-notches are situated

directly across from each other so not to restrict the base. The base shape may be either straight, concave, convex, or notched.

Total 8 — Figure 15i-q

Variety a — The five projectile points comprising this variety are small and triangular in shape. All exhibit pressure flaking on both faces of the artifact. The "triangular" form is side-notched with a non-restricted straight base (Figure 15, illustration i-m).

Material	Provenience	Dimensions
(i) Chert	24CB777--Main Excavation 3NOE--Level 4, 12" to 16"	2.2 L x 1.6 W x 0.5 T cm.
(j) Chert	Surface Artifact (24CB777)	Width 1.3 cm Thickness 0.3 cm. (Broken)
(k) Chert	24CB863--Grid #4	2.0 L x 1.2 W x 0.3 T cm.
(l) Chert	24CB863--Grid #4	2.0 L x 1.9 W x 0.3 T cm.
(m) Red Jasper	Surface Artifact (24CB475)	Width 1.3 Thickness 0.4 cm. (Broken)

Variety b — The three projectile points comprising this variety exhibit attributes similar to those of variety a, however, the attribute characteristic of variety b is that of a concave base (Figure 15n-p).

Material	Provenience	Dimensions
(n) Quartzite* (NBS)	24CB863--Grid #4	2.8 L x 1.5 W x 0.3 T cm.
(o) Chert	24CB863--Grid #4	2.0 L x 1.0 W x 0.3 T cm.
(p) Obsidian	24CB863--Grid #1	1.8 L x 1.1 W x 0.3 T cm.

*Quartzite (Not Big Springs)

Variety c — The single projectile point comprising this variety also exhibits the majority of the attributes found in the preceding varieties. The attribute that is characteristic of variety c is that of being basally notched, or sometimes referred to as "tri-notched" (Figure 15q).

Material: Purple Chert

Provenience: 24CB863--Grid #4

Dimensions: 1.7 L x 1.2 W x 0.3 T cm.

Comparisons:
Loendorf. . . .Clark's Fork Survey (1967)
Loendorf. . . .Pryor Mt. Survey (1969)
Arthur. . . . .Upper Yellowstone Survey (1966)
Napton. . . . .Galatin Valley Survey (1966)
Johnson . . . .Montana Projectile Points Types: Avonlea (1970a)
Sharrock. . . .Prehistoric Occupation Patterns in Southwestern Wyoming (1966)

Comments: These small triangular projectile points are associated with the Neo-Indian Period and are found throughout the Northwestern Plains and Great Basin area. Husted (1969) gives a date of 1300 A.D. or later for these small projectile points recovered at the Mangus Site (24CB221). These projectile points have been referred to as "Plains Side-Notched" (Kehoe 1966). At Mummy Cave levels containing these small side-notched points have been dated from 720 A.D. to 1850 A.D. (Wedel, Husted, Moss 1968).

Preforms or Blanks: Preforms and/or Blanks are tools representing the first stages in manufacturing of flake tools. Sharrock (1966:43-44) discusses five stages in the process of "blanking" the quarry material. The preforms were blanked into this form and later manufactured into a variety of tools.

Total 38 Figures 16, 17 shows a representative sample.

Description: Preforms or blanks are worked on both sides and around the entire artifact. They are bifacially percussion flaked, however, some specimens show pressure flaking. These artifacts are usually ovoid in shape most having a straight base in the final stage of manufacturing. Preforms are differentiated from choppers on the basis of size and form and may be differentiated from knives on the basis of absence of wear patterns typical of

Fig. 16. Blanks and/or Preforms (24CB777).

Scale 1:1

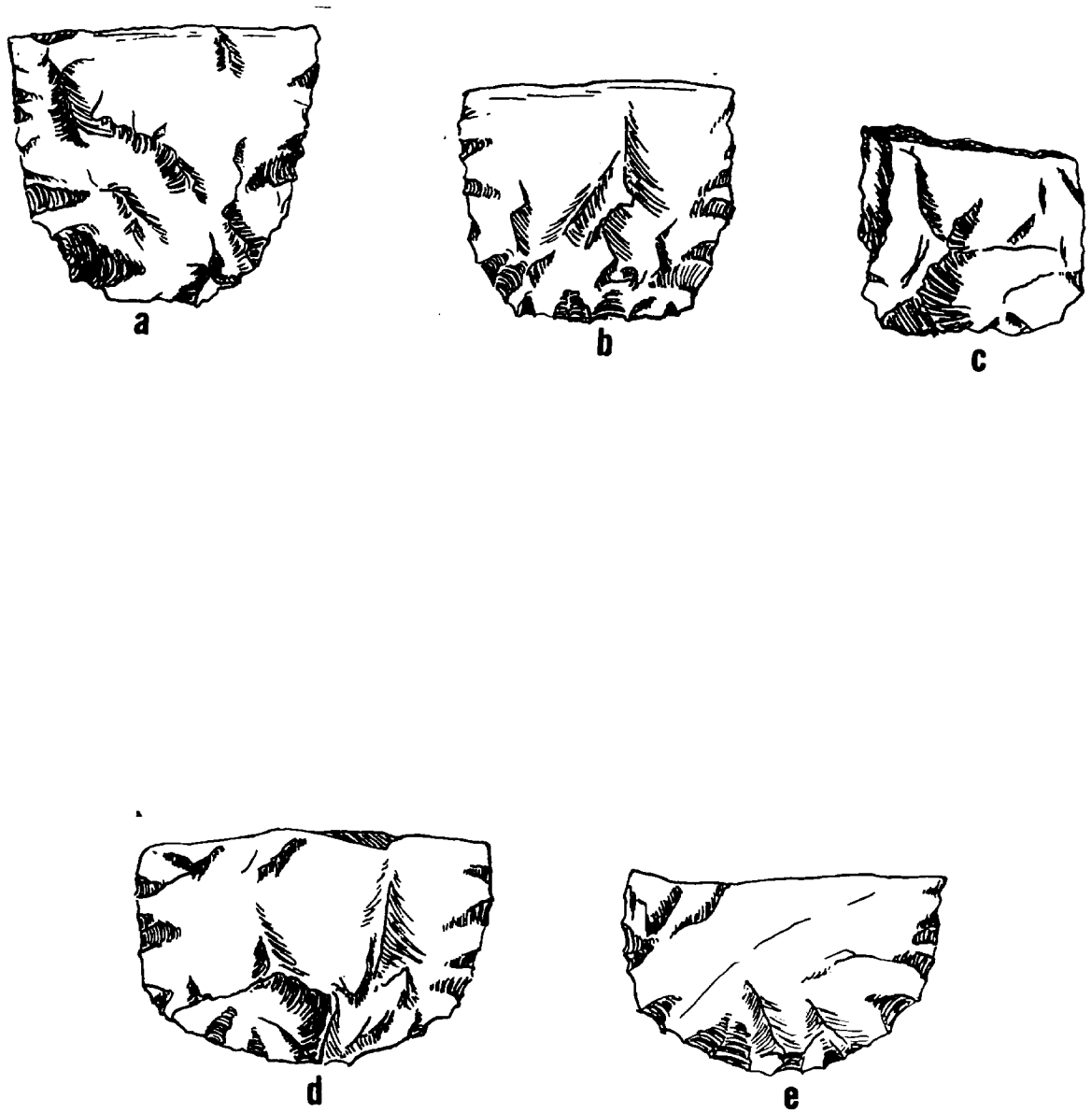


Fig. 17. Blanks and/or Preforms (24CB777).

Scale 1:1

a cutting tool. It must be noted, however, that preforms in the final stage of manufacture may be used as a cutting tool and do exhibit wear patterns. Thus size, shape, and material remain the most reliable characteristics of preforms.

Material: Big Springs Quartzite 38

Provenience: 24CB777--Main Excavation Trench

Comments: Figures 16 and 17 show a representative sample. (The artifacts illustrated have all been broken during the "blanking" process.)

Knives: Stone knives probably served many functions. Basically a knife was used for cutting, however, it was also used to pry, stab, and to scrape. Some knives could probably be classed as preforms or bifaces, but on the basis of several characteristics such as size, shape, material, and evidence of prolonged use, I have classified them as knives.

Type I

Total 4 Figure 18 shows a representative sample.

Description: Type I knives show bifacial flaking, both percussion and pressure flaking. These tools are distinguished from preforms and/or blanks on the basis of shape and by evidence of prolonged use as a cutting tool. Wear patterns along one edge gives the tool a slightly smoothed surface. These knives are ovoid to round in shape and resemble "rocking" knives.

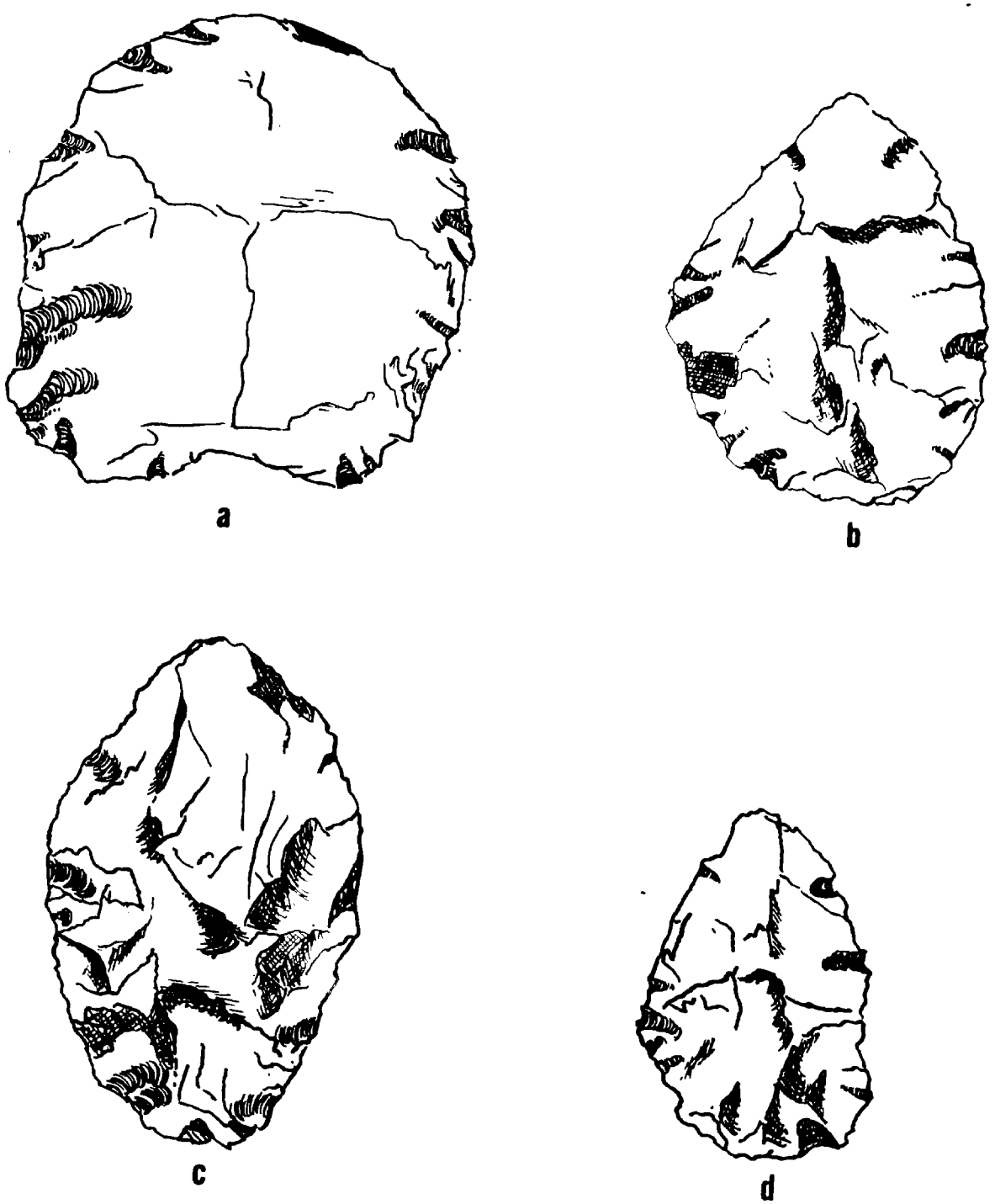
Material: Big Springs Quartzite 3 Porcelainite 1

Provenience: 24CB777--Main Excavation Trench

Type II

Total 6 Figure 19 shows a representative sample.

Description: Type II knives are lancolate in shape. These knives could easily be classed as preforms since the shape of this type more closely



Type I

Fig. 18. Type I Knives (24CB777).

Scale 1:1

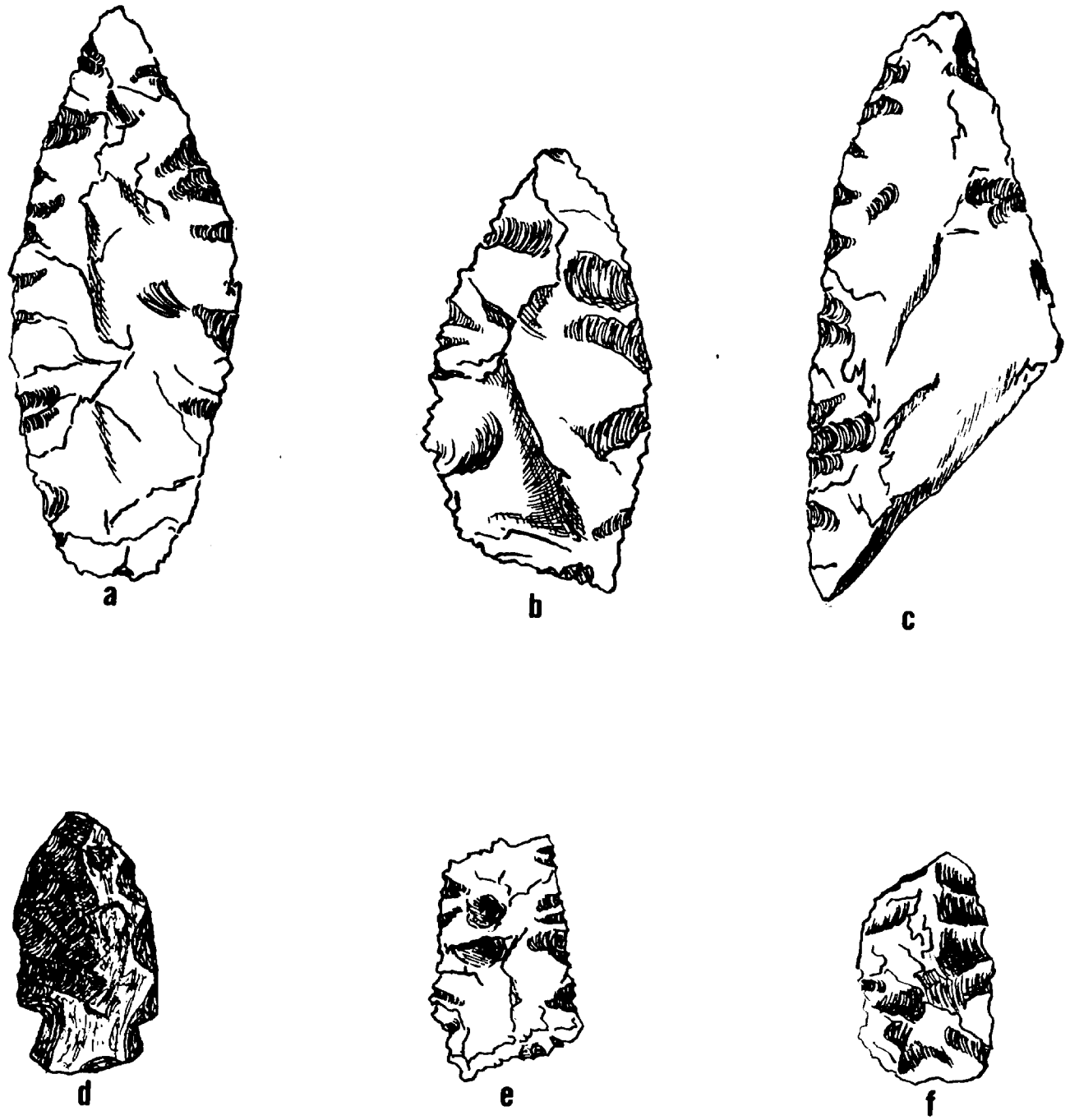


Fig. 19. Type II Knives (24CB777 a-c, e-f) (24CB863 d).

Scale 1:1

resembles the characteristic preforms than does Type I knives. These tools, however, exhibit wear patterns, torsion fractures, and curved blade edges all of which are typical for cutting tools. Furthermore, the material of which this type is manufactured is not usually Big Springs Quartzite which may indicate these tools were knives transported to the site.

Material: Big Springs Quartzite 1 Chert 4 Quartzite (Not Big Springs) 1

Provenience: 24CB777--Main Excavation Trench 5
24CB863--Grid #5

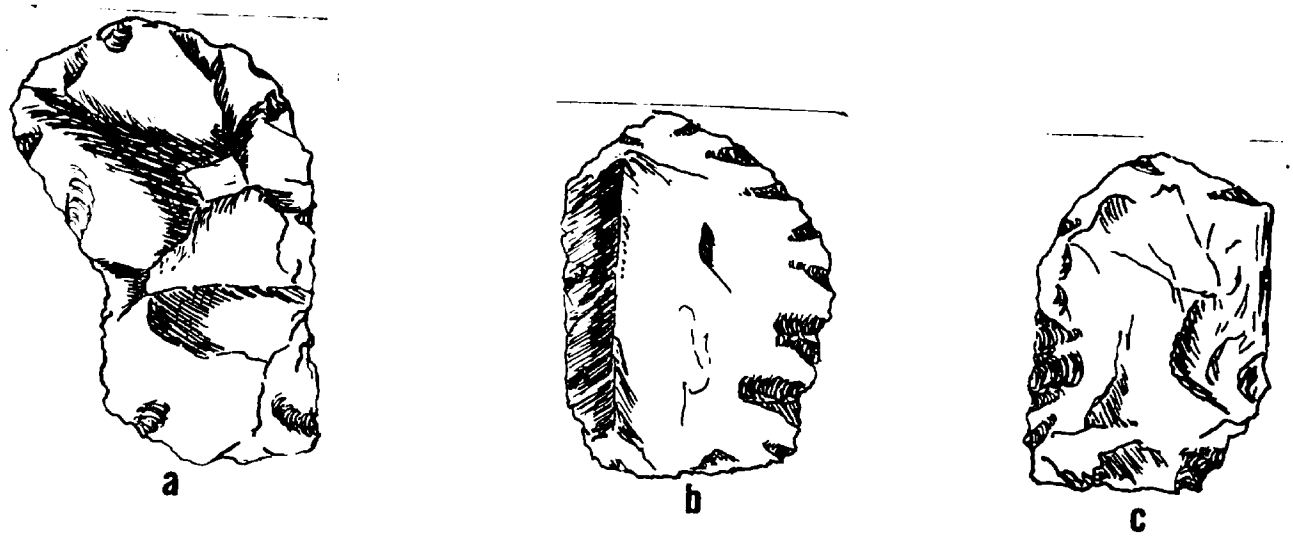
Scrapers: Scrapers are abrading tools used in the thinning, cleaning, or shaping of a variety of materials including hide, wood, and bone. Scrapers are manufactured from a flake and are unifacially worked along one edge or around the entire artifact. Scrapers appear in a variety of forms, however, I have classified scrapers recovered from Big Springs into two types referred to as "end scrapers" and "side scrapers."

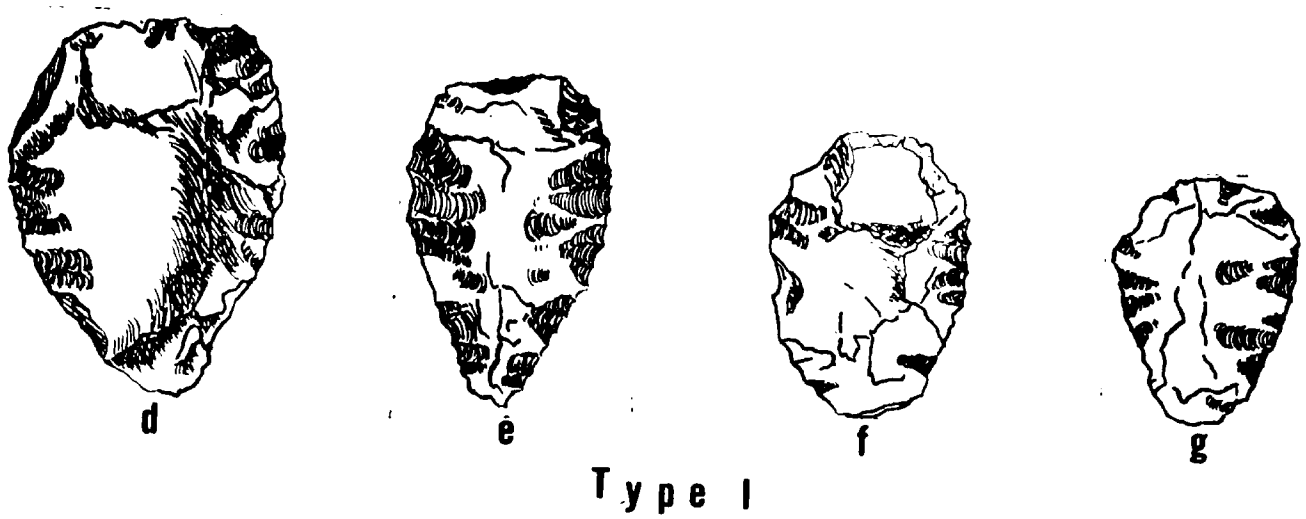
Type I End Scrapers

Total 7 Figure 20a-g

Description: Type I scrapers are unifacially flaked along one edge. They are distinguished from knives on the basis of flaking patterns and shape. This type sometimes has a "humped" appearance, hence the term "turtle backed" or "humped backed" scraper. The basic form is due to the shape of the primary or secondary flake from which the scraper is manufactured. These scrapers are usually small compared to other tools and measure as small as two centimeters long by one centimeter wide. The smallness of the artifact may indicate that they were "finger" held.

Material: Big Springs Quartzite 3 Chert 3 Quartzite (Not Big Springs) 1





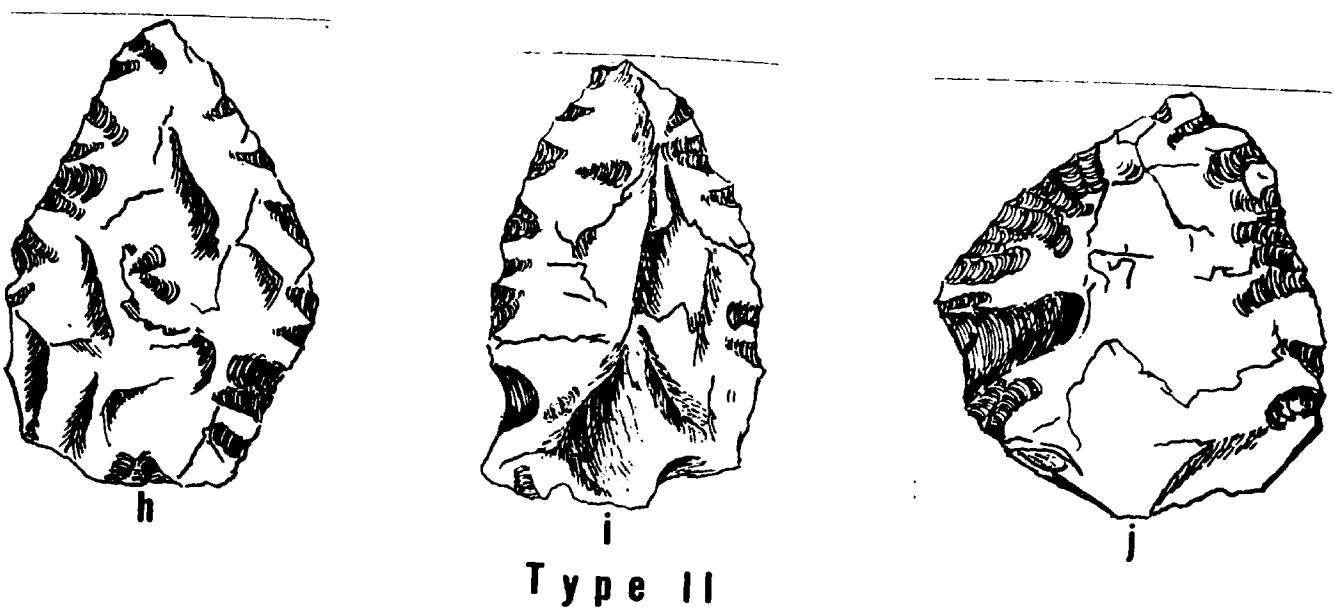


Fig. 20. End Scrapers (24CB777). Scale 1:1

Provenience: 24CB777--Main Excavation Trench

Type II: Side Scrapers

Total 4 Figure 20h-j

Description: Type II scrapers are asymetrical in shape and are basically larger than Type I scrapers. They exhibit unifacial flaking which the atribute used in classifying these tools as scrapers. Unlike Type I scrapers, Type II are unifacially flaked along the long axis of the flake or around the entire tool. The difference in size and shape of these tools may indicate a difference in use.

Material: Big Springs Quartzite 4

Provenience: 24CB777--Main Excavation Trench

Drills

Drills are perforating or boring tools; they were used to drill holes in a variety of materials such as wood, hide, stone, bone, shell, and horn. These tools could be either hafted to a wooden shaft or they could be hand held. The presence or absence of a notched base may indicate whether or not the tool was hafted or hand held. It seems likely that the tool with a notched base would be easier to haft than a tool with an unnotched base.

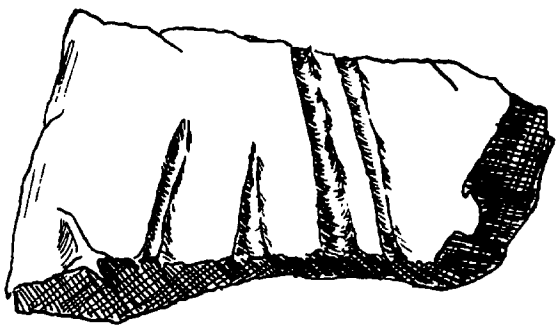
Total 2 Figure 21b, c

Description: These tools are unifacially flaked over the entire surface of the artifact. The bases may either be notched or unnotched. Both specimens recovered have been broken probably from the result of use.

Material: Chert 1 Jasper 1

Comments: Figure 21 shows only specimens recovered (illustration b, notched base; illustration c, unnotched base).

Provenience: 24CB777--Main Excavation Trench



a

b

c

Fig. 21. An Abrader and Drills (24CB777).

Scale 1:1

Ground Stone Tools

Edge Ground Cobbles: These artifacts exhibit a flat smooth surface along the lateral edge as the only indication of use. Butler (1966) suggests that these tools were used in the preparation of plant foods. I have suggested that possibly they were used for hide preparation. The lateral edge grinding is a result of a "rubbing" action against another surface, be it hide, plants and/or another hard surface.

Total 4 Figures 22 and 23 show a representative sample.

Description: The edge ground cobbles are flat, ovoid in shape, and exhibit lateral edge grinding. All but the one specimen illustrated have been broken during use. Unlike chipped stone artifacts these tools are manufactured from "riber cobbles."

Provenience: Surface 24CB777
24CB777--Main Excavation
Surface 24CB740

Material: Conglomerate 3 Limestone 1

Abraders: These artifacts were used to smooth or sharpen other tools. Like sand paper the abrader is usually of a highly abrasive material. In the case of the only specimen recovered it is made of coarse sandstone. Abraders might have been used to smooth arrow shafts and to sharpen horn flaking tools.

Total 1 Figure 21, illustration a, shows the only specimen recovered.

Description: The artifact is manufactured from a small block of sandstone. It exhibits a series of four groves probably used in sharpening other tools. The groves are the only indicators of use.

Material: Sandstone 1

Provenience: 24CB777--Main Excavation Trench

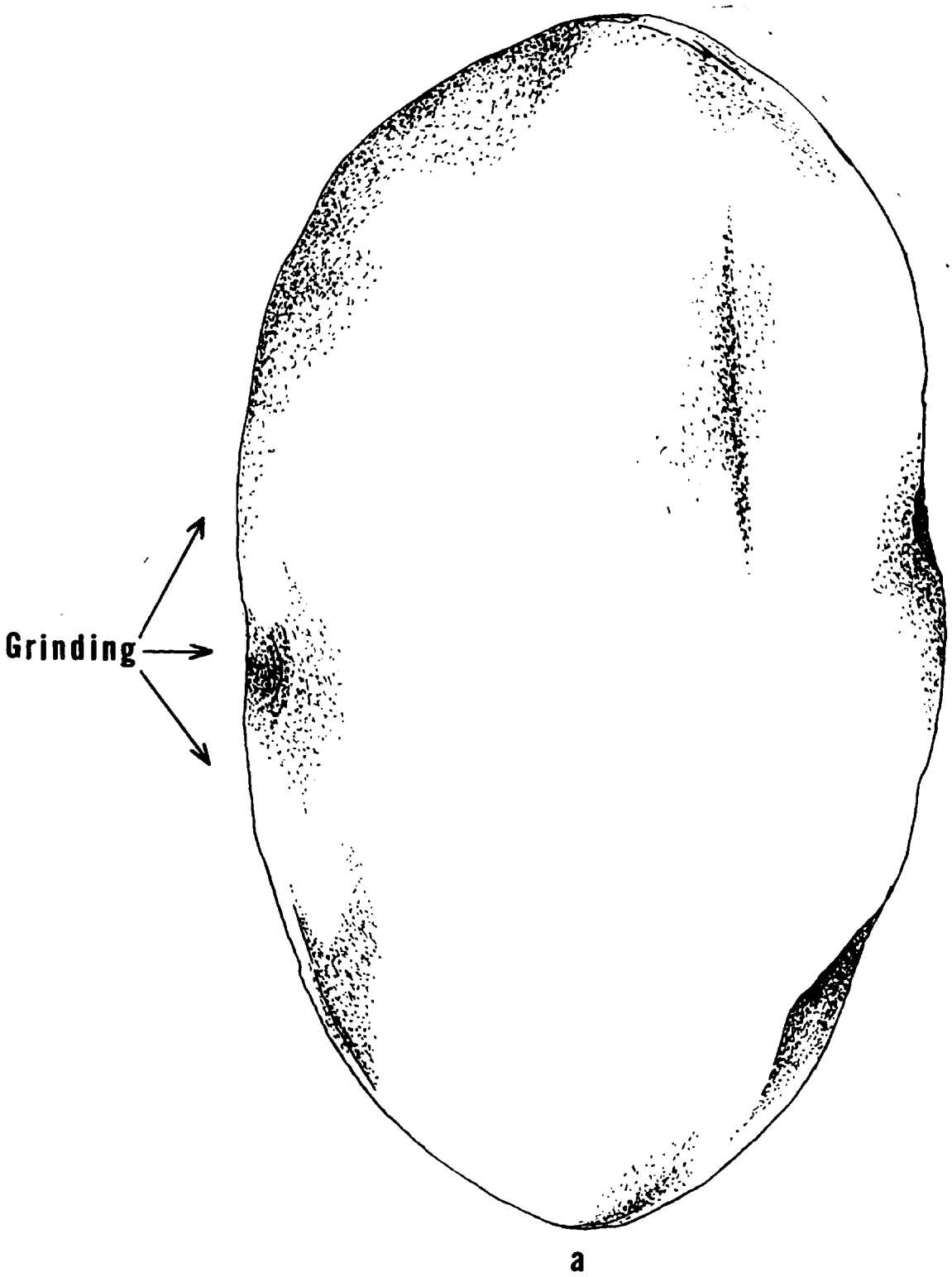


Fig. 22. An Edge Ground Cobble (24CB777).

Scale 1:1

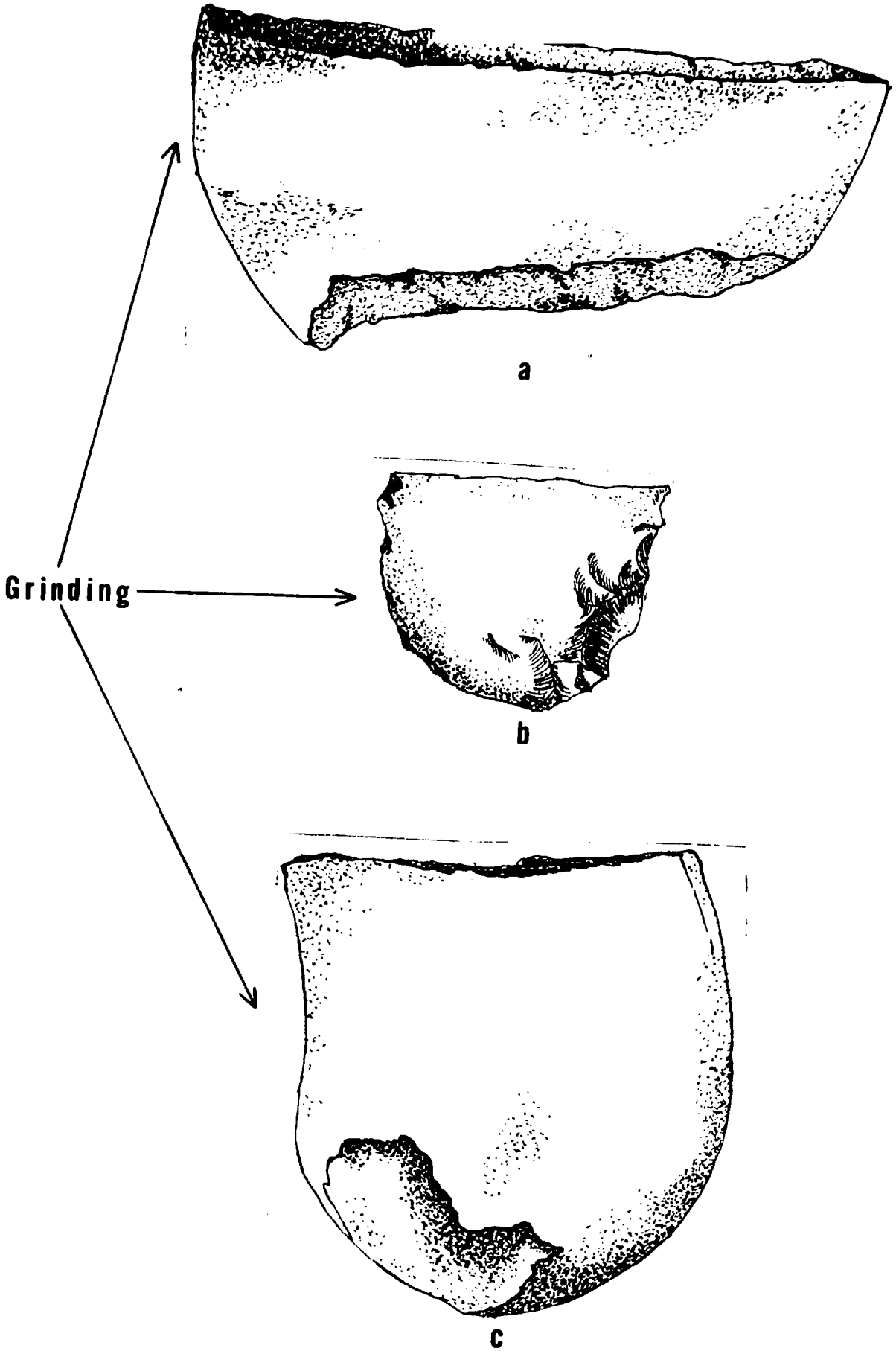


Fig. 23. Edge Ground Cobbles (24CB777).

Scale 1:1

Site Summary

Twenty-three archaeological sites have been recorded in the sub-alpine zone. One of the functions of the Archaeological Survey Team during the 1971 field season, of which I was Field Supervisor, was to record some of the more important sites and to resurvey the sub-alpine zone. Sites that had not been assigned Smithsonian River Basin Survey numbers were recorded and assigned numbers. Sites that had been previously numbered were revisited to acquire further surface collections; then they were tested and/or mapped. Mapping involved the use of instruments to construct contour maps of these sites in anticipation of further interpretation.

Testing and/or excavation was accomplished on a number of sites to investigate the possibility of subsurface cultural remains. Dendrodating was attempted on structures that were constructed of wood, however this technique for dating wood was only carried out on one site where no other dating technique could be used.

Several different types of sites have been recorded in the sub-alpine zone. (1) Occupation Sites, sites which exhibit lithic detritus on the surface as the only cultural feature. (2) Wooden Structures, these sites include wooden habitation structures and artificially constructed wood piles. (3) Quarry sites, these sites are composed of a vast amount of lithic detritus acquired from a nearby quarry source. (4) Bison Kill Sites, these sites are composed of several parts: drive lines, grazing areas, a cliff, and the kill area. (5) Vision Quest Sites,

these sites are rock structures usually "U" shaped and are found on prominant points of the topography.

There are other types of sites in the Pryor Mountains that are not present in the sub-alpine zone, but are present in other zones. These are as follows: (1) Tipi Ring Sites, (2) Rockshelter Sites, (3) Petroforms, (4) Fortification Sites, (5) Burial Sites, (6) Rock Art Sites. These sites do not appear in the sub-alpine zone within the Pryor Mountains; however, this does not mean that they do not exist in the sub-alpine zone of other mountain ranges. During the 1972 field season, I conducted a preliminary survey in the nearby Big Horn Mountain Range and sites such as Tipi Rings and Rockshelters were recorded at elevations that fall within the sub-alpine zone.

There are several reasons why Tipi Rings and Rockshelters do not appear in the sub-alpine zone of the Pryors: (1) the topography of the sub-alpine zone of the Pryors is such that there are few outcroppings in which caves or rockshelters may have been formed; (2) The skin lodge may have been secured by means of wood stakes, thus no evidence of them would remain; (3) fortification sites probably used by trespassing hunters, are found in the grasslands where the principle hunting activity was carried on. These fortification sites are not likely to be found at high elevations.

The presence or absence of particular sites is important in that it is a good indicator of how prehistoric people utilized the different zones. For example: since tipi rings are absent in the sub-alpine zone

of the Pryors, people may have been living in different types of structures at this elevation. Their absence may also be due to a lack of resources or in the case of rock art site and rockshelter sites, the absence may be due to the lack of topographic features such as rock outcroppings, where these types of sites are usually found.

CHAPTER V

SUMMARY

Introduction

Since "high altitude" archaeology is relatively new in American Archaeology, the number of surveys that have been accomplished are few. Information gathered for this thesis has been from surface sites in the sub-alpine zone of the Pryor Mountains. Comparisons to other "high altitude" sites have been made through artifact assemblages, kind of site, size of site, and variety of chipped stone material. Comparisons have been made to the Yellowstone Park Survey (Taylor 1964); Upper Yellowstone River Survey (Arthur 1966); Survey of the Gallatin Area (Napton 1966); Big Horn Canyon Survey (Husted 1969); and to work accomplished in the Big Horn Mountains by the Pryor Mountain Archaeological Survey Team during the 1972 field season.

Comparisons to these other "high altitude" areas is important in understanding the utilization of the sub-alpine zone of the Pryors. It has been hypothesized by Loendorf (1969) that the utilization of the sub-alpine zone was part of a seasonal settlement cycle that found people of the Plains area near the tops of the mountains during the hot summer months. To better substantiate this hypothesis comparisons to other

sites in similar environments must be made. If the material recovered from similar sites in similar environments produce like information, then it would seem possible to project a similar kind of utilization for high altitude zones throughout the Plains.

Evidence from surface collections and excavation within the sub-alpine zone has been divided into three categories or time periods: (1) Early Hunters, (2) Middle Period, (3) Late Hunters.

The Early Hunters

The Early Hunter Period or Paleo-Indian Period is divided into the Llano, Lindenmeier, and Plano Cultures. The earliest evidence of people in the Montana and Wyoming area is represented by fluted "Clovis" projectile points which are characteristic of the Llano Culture of the Early Hunter Period. Clovis points have been found throughout much of the Plains from Canada to Mexico. Many of these projectile points are from surface collections, but some specimens are associated with mammoth remains.

Little is known about the "Clovis People" other than that they were nomadic hunters who pursued the megafauna of the Plains. These nomadic hunters were present in the Plains between 9,000 and 13,000 years ago (Mason 1962:230). A number of surface finds of Clovis projectile points and mammoth remains have been found throughout the state of Montana. Although these finds are not from stratified sites, the surface finds do indicate early hunters were utilizing the Plains area that is now Montana (Taylor 1960; Jasmann 1963; Arthur 1966).

There is no evidence of Clovis hunters in the Pryor Mountains, but there seems to be no reason to believe the Clovis hunters would not have frequented this area.

The Lindenmeier Culture of the Early Hunter Period, named after an assemblage of chipped stone artifacts from the Lindenmeier Site in Colorado, includes "Folsom" projectile points. Radiocarbon dates on Folsom material tend to cluster around 10,000 years ago (Wormington 1957:40). These fluted points, which are consistently found with bones of extinct bison, overlap temporarily somewhat with Clovis material. However, stratified sites that have both Folsom and Clovis material represented exhibit Clovis material below that of Folsom.

Folsom projectile points have not been found in the Pryor area, but Folsom projectile points have been reported from surface sites as well as stratified sites in several localities in Montana. The MacHaffie Site, near Helena, Montana, has a Folsom component representing the lowest occupation level (Forbis and Sperry 1952). Folsom points have been discovered near Dillon, Montana, on the Beaverhead River (Taylor, 1960). Other Folsom points have been observed in collections from Bridger, Montana, which is only twenty miles from the Pryor Mountains (Loendorf 1967). I have observed Folsom projectile points at the museum at Pryor, Montana, and in collections at Billings, Montana. Pryor, Bridger, and Billings are all in close proximity to the area of study.

Although no Folsom material has been recovered from the Pryor Mountains, I feel that further excavation of sites within this area will

indicate that Folsom hunters were in the Pryor Mountains. The one projectile point recovered from the excavations at Big Springs (24CB777) suggests that people have been utilizing the Pryor Mountains for at least 9,000 years (Figure 14a, Type I). The date of 7750± 620 B.C. for a comparable specimen falls well within the range of dates for Folsom material (Frison 1972). These dates along with the Folsom find from the immediate vicinity of the study area, indicated that people were in the Pryor Mountains at a period of time that coincides with some Folsom material.

In the Plains the characteristic Folsom artifact is followed by several well manufactured projectile points (Mason 1962:231). Some projectile points characteristic of the Plano Culture are Scottsbluff, Eden Valley, Agate Basin, and Angostura. These projectile points are found stratigraphically above Clovis and Folsom material. Radiocarbon dates for the Plano Culture range from 9,500 to 6,000 years ago, which in some cases overlap with the Folsom and Clovis material (Mason 1962: 321). To understand the problem of overlapping time periods, one must recognize that the extinction of animals and the introduction of new projectile points did not take place at the same period of time over different areas of the Plains. The extinction of animals may have occurred sooner in some parts of the Plains, while other areas may have supported a breeding population. Consequently the Llano and Lindenmeier Cultural Periods may have lasted longer in one area, while in another area people may have had to adapt to hunting of smaller game animals.

Bison antiquis became the main food source for peoples of the Lindenmeier Culture and Plano Culture. Bison antiquis is usually associated with Folsom hunters, but people of the Plano Culture also hunted this extinct form of bison (Jennings 1968).

The Scottsbluff, Eden, Angostura, and Agate Basin projectile points found in the Pryor Mountains, indicate that Early Hunters of the Plano Culture were present and utilized the area. These projectile points have been found in all zones within the Pryors, including the sub-alpine zone. Since projectile points representing the Plano Culture have been found in all zones, these people may have been the first people in the Pryors to initiate a seasonal settlement cycle.

Middle Period (Middle Prehistoric Period)

The Middle Prehistoric Period which is also referred to as the Meso-Indian Period or the Plains Archaic Period is divided into an "Early" and "Late" phase. The early phase is represented by large side-notched, McKean Lanceolate, and McKean Complex projectile points. The late phase is represented by a series of corner-notched types including Besant and Pelican Lake.

In this thesis I will refer to this period as the "Middle Period" which was originally defined by Mulloy (1958). Dates for this period vary with geographic location; Wormington and Forbis (1965) consider 5,000 to 2,000 years ago for the early phase. However, the large side-notched projectile points which are associated with the early phase of the Middle Period have been found at Mummy Cave, Wyoming, and have been

dated at 5600± 150 B.C. (Wedel, Husted, Moss 1968). Although Husted (1969) found no evidence of these large side-notched projectile points in the survey of Big Horn Canyon, side-notched varieties comparable to those at Mummy Cave were recovered from Level #6 at Big Springs (Figure 14c, d, Type III). Husted (1969) did find McKean Complex projectile points during the survey of Big Horn Canyon. Dates for these projectile points range from 2950± 250 B.C. to 1870± 200 B.C. and are earlier than the dates given by Wormington and Forbis (1965).

The late phase is somewhat more confusing. Husted (1969) maintains that until there are significant dates to cross date components, the large corner-notched projectile points will have to be assigned dates between 1500 B.C. and A.D. 500.

I feel since the study area is close to Mummy Cave and the Big Horn Canyon, the dates given by Husted (1969) and Wedel, Husted, and Moss (1968) are more applicable than those given by Wormington and Forbis (1965).

Middle Period sites commonly have milling stones which suggests that food gathering became an important subsistance activity during this time period (Mulloy 1958). Seeds, berries, roots and some insects were important food sources for the Middle Period people of the area. This "forager" way of life is characteristic of the Great Basin and probably spread northward to Wyoming and into southern Montana. However, it does not seem to have spread wholly throughout the Northwestern Plains (Loendorf 1969). Projectile point types associated with the Middle Period have been found in the Northwestern Plains, but evidence for this "foraging" way of

life is not present north of the Missouri River. The lack of grinding stones (manos and metates) suggest that the Middle Period people in our study area were more oriented toward a hunting and gathering subsistance, while peoples farther north were oriented more toward hunting.

In Montana a number of Middle Period sites are associated with bison remains. Pictograph Cave has more bison remains than any other fauna, but there are tools present that are associated with plant gathering and preparation. Although these tools are present, they are still in the minority when compared with tools associated with hunting (Mulloy 1958:226-229). It appears that Pictograph Cave may be a site representative of the most northern expansion of people carrying on this "forager" subsistance.

Arthur (1966) suggests a seasonal transhumance (seasonal settlement cycle) for people who utilized the Upper Yellowstone Valley during the Middle Period. During this period, people were exploiting different food crops which matured at different elevations at different times of the year. Arthur further suggests that sites with grinding stones are usually found at low elevations, and sites at high elevations contain a hunting and gathering tool assemblage. I agree with Arthur that during this period people were involved in a seasonal cycle. It seems to me that Arthur (1966) implies that small numbers of people followed and utilized maturing plants toward the tops of the mountains, and that their subsistance was mainly based on hunting. This would seem to imply that groups of hunters were traversing the slopes and then returning to a base

camp. Evidence in the form of lithic detritus gathered during survey by Loendorf (1968 through 1972) suggest that Arthur's "base camp" hypothesis was not in effect in the Pryor Mountains. I would suggest that whole family units were traversing the slopes in order to reach the tops of the mountains by mid-summer. I further suggest that these "base camps" implied by Arthur (1966), were winter camps as part of the seasonal settlement cycle.

Survey carried out within all ecological zones revealed that sites in lower elevations are small or medium-sized as to area of occupation and are many in number. These sites tend to be concentrated around the many fresh water springs as one proceeds up the slopes. In the sub-alpine zone there are no medium-size sites; they are usually very small or very large. The large sites are always concentrated around the few sources of water at the mountaintop. Small sites are not situated around water and may represent small hunting camps away from the main occupation site.

At winter sites in the valleys below people probably used snow as a water source, thus sites seem to be situated in areas that offer good protection from the winter elements. As people traversed the slopes they entered a geographic area which was large enough and had abundant water sources. This enabled people to stay in small groups as they had been in the winter sites. Traveling up the slopes people probably followed maturing plants and also the animals that fed upon the plants. As the summer days became hot and plants disappeared at lower elevations, both man and animals moved toward the tops of the mountains for food. The

greatest portion of energy expended by the peoples who occupied the sub-alpine zone would have been in the procurement of game animals and in the gathering of plant foods. Although our collections of artifacts from these sub-alpine sites contained many tools associated with the procurement of animals, there was a definite lack of tools associated with preparation of plant foods (manos and metates). An explanation that I would suggest for the lack of these tools, is that the variety of plants utilized during the spring and summer months were probably tuberous varieties such as "Sego Lilly." Plants that produced berries and nuts would not have matured until late summer or fall, consequently, these "grinding" tools would not have been needed during the spring or summer and would not have been transported to the sub-alpine zone. Manos and metates are found in sites at lower elevations, this fact may indicate that these sites were occupied during the late summer or fall when foods such as nuts and berries were utilized by crushing and grinding.

Methods of hunting employed by the peoples of the Middle Period are fairly well understood. A "corral method" was sometimes used to trap animals so that they could be easily slaughtered. The Powers-Yonkee Site in south-central Montana is one such site. There McKean variant projectile points were found in association with bison bones identified as being intermediate between Bison bison and Bison antiquis. Radiocarbon dates from a charcoal sample produced a date of 4445± 125 years ago (Bentzen 1966).

The "buffalo jump" was also used during the latter part of the

Middle Period. The transition between the "corral" and "jump" methods probably occurred during the Middle Period and may have been due to a lack of wood or because the jump was found to be a more efficient technique. The "jump" technique was probably more suitable to the Plains environment because of the scarcity of wood, however, both techniques may have been used simultaneously depending upon local topography. Other forms of traps such as the "arroyo," "snow drifts," and "sand dunes" also were used as natural entrapments to procure bison (Wormington and Forbis 1965: 193).

With an onset of an altithermal period, which may have accounted for the disappearance of the megafauna in certain areas of the Plains, people would have had to concentrate more on the gathering of plant foods. However, most economic activity would still have been oriented toward hunting. I agree with Bryan and Gruhn (1964) and Ten Brink (1968) that the altithermal or hypsithermal probably did not affect all areas at the same time, and that one must demonstrate arid conditions for any particular area. Leopold and Miller (1954), in a paper on water resources and soils of southern Montana and Wyoming, have found a well-developed paleosol which they believe to be the result of an altithermal interval. A similar paleosol has been identified in the Pryor Mountains. This paleosol has not been correlated with that of an altithermal period, but it is definitely representative of a stable climatic period. If in fact, this paleosol indicates an altithermal interval in the Pryors, both man and animal would have found the high elevations of the Pryors

a sanctuary during this arid period.

I suggest that part of the population remained in the area and utilized this sub-alpine sanctuary, while others of this indigenous population may have migrated out of the area. Frison (1968) has suggested that those Middle Period bison traps reported and excavated in southern Montana and Wyoming may represent the first movements of people back into the area after the end of the altithermal.

If this dry period affected the Pryors, this may account for the high incidence of Middle Period components in sites located in the sub-alpine zone. With a drier-warmer climate, snowfall and overall precipitation would have been less for the entire Pryor Mountain Range. Thus, part of the population living during the Middle Period in the Pryor area may have moved to the moister mountaintops and remained there for longer periods of time.

During the Middle Period people seemed to have lived in small nomadic groups using caves, brush wickiups, and tepees for their living structures. Although no evidence of tipi rings was found in the sub-alpine zone, tipi rings that may be associated with Middle River people have been recorded at lower elevations in the Pryors. Excavations of tipi rings along the North Platte River and in the Shoshone Basin have revealed evidence in the form of McKean varient projectile points which are associated with the Middle Period (Mulloy 1954, 1965).

These nomadic groups of people possessed tool assemblages and techniques that enabled them to exploit a variety of environments and

resources. Possibly these people were the descendents of the Late Hunters, and it is also possible that these people were ancestors of Shoshonian speaking people who occupied the Pryor area during the Late Hunter Period.

Prehistory in the Northwestern Plains has been investigated by Strong (1940) and Mulloy (1952). The Middle Period according to Mulloy (1958), was characterized by semi-arid conditions with few or no large game animals. The inhabitants of the Northwestern Plains then exhibited a way of life similar to that of cultures of the Great Basin; the most common artifacts were flat metates and manos which indicates that the subsistence economy was greatly dependent upon berries, nuts, seeds, and/or insects. Mulloy (1965) suggests that a seasonal variation took place between mountain sheep hunting in the mountains and vegetable gathering on the Plains. This is possible since sites which are contemporary reveal these two complimentary subsistance activities and exist close to each other in the Absorokas, Big Horn, and Pryor Mountains. However, it is also quite possible that the different activities were carried on by different Shoshonian-speaking groups, just as the salmon eaters and sheep eaters have been close neighbors along the Lemhi and Salmon Rivers in Idaho.

When climatic conditions improved about 500 A.D. large herds of bison once again populated the Northwestern Plains. At this time Plains people adopted a bison-hunting cultural pattern which remained until the breakdown of Plains Indian culture in the 1870s.

The "forager" economy of the Middle Period had a wide range over the Plains, extending to the Black Hills of South Dakota in the East. On the periphery it was mingled with the hunting subsistance pattern. Wedel (1963) suggests this forager way of life had spread into Wyoming from the Great Basin. Since the area of northern Wyoming and southern Montana is actually an extension of the Great Basin, this diffusion could have been easily accomplished. Mulloy (1954) also considers a migration of people into this area bringing with them cultural traits from the Great Basin.

Because of the altithermal conditions the Northwestern Plains probably did not support large populations. It is not improbable that with an improvement of climatic conditions there was a repopulation of this Montana-Wyoming region by western people. As stated before Frison (1968) feels that the Middle Period bison traps which he has recorded and excavated in southern Montana and northern Wyoming may represent the first movements of people back into the area after the end of the altithermal.

It is difficult to speculate as to who these people were and to what extent they populated the Northwestern Plains. Hultkrantz (1968) suggests that proto-Shoshoneans introduced their cultural traits to the former hunters of this area, some 3000 years ago.

The Late Hunter Period

There is some question as to when the altithermal may have ended on the Plains. Hultkrantz (1968) states that climatic conditions may have improved by 500 A.D. Loendorf (1973) feels this period of improved climatic conditions may have occurred as early as 1000 B.C. Sometime between 1000 B.C. and 500 A.D. increased amounts of moisture allowed the grasslands to support large herds of game animals. With large herds of game animals present, the Plains would once again support large populations of people.

During the Late Hunter Period the Northwestern Plains was inhabited by large herds of modern bison, which were the main source of food for these nomadic hunters. The most successful method of procuring these animals was by the use of a "buffalo jump." For nomadic hunting people, certain unique characteristics of the bison made him an ideal source of food. In the first place, although he was fast and could only be killed instantly by being struck in a relatively small area behind and below the left shoulder, his mental peculiarities provided hunters with a definite advantage. For defense the bison relied on his numbers rather than on his individual fighting ability. Instead of standing his ground and fighting like the grizzly bear, or using the scattering maneuver of antelope, bison, when surprised, tended to consolidate the herd and flee in a straight line into the wind if possible. Bison could have readily routed their pursuers by charging at them in mass, but the only defense used was to escape at the greatest possible speed (Moss 1951:28).

The buffalo jump was a highly coordinated group effort, with a knowledge of wind factors and precise timing required. If the hunters could predict the flight of the bison into the wind, all they needed was a drop-off in the path of the fleeing herd to make the hunt a success (Loendorf 1969:138).

A large male bison weighing over 2,000 pounds could supply large quantities of meat. Besides the meat, horn, hide and bone were also used to manufacture tools, clothing, and other necessities. Since there probably was no way to control the numbers of animals killed using the jump, hundreds of animals were left to spoil. If the buffalo jump was used mainly in the late autumn, the people were probably only interested in getting enough meat, hides, and horn to survive the winter (Wormington and Forbis 1965:196).

The lush grasslands east of the Pryor Mountains offered an ideal habitat for bison. Some fifteen buffalo jumps have been recorded along the Grapevine Creek drainage system. Although most jumps have been located in grassland areas, there have been two buffalo jumps recorded in the sub-alpine zone. These are referred to in this thesis as the "Commissary Ridge Bison Kill" and the "Dryhead Overlook Bison Drive." No artifacts were recovered from the jump at Dryhead Overlook, but six small side-notched projectile points were found at the jump located at the end of Commissary Ridge. This type of projectile point is associated elsewhere in many sites with the Late Hunters.

Although these projectile points were probably associated with the

bow and arrow, it cannot be stated for certain whether or not they are associated with the horse. If these jumps are associated with the horse, they need not necessarily indicate use within a seasonal exploitation or seasonal cycle. With the use of the horse people could have traversed the slopes, procured game, and then returned to camps at the bottom of the mountain. This whole process of acquiring game and returning to camp could have been accomplished in one or two days if the horse was used.

The seasonal settlement cycle referred to in this thesis was probably interrupted somewhat by the introduction of the horse. With the introduction of this mode of transportation, people could take advantage of different zones and different environments when the need arose. However, during different seasons the Late Hunters probably followed a modified seasonal cycle which found them at high elevations in the summer months and in the grasslands during the fall. Historic tribes probably followed this modified cycle until the disappearance of the bison.

Other large game animals, small mammals, fish, and plants must have been used to supplement the diet of the Late Hunters in the Pryor area. Other food sources were probably insignificant in comparison to the bison, but they may have played a greater role than has been generally assumed (Loendorf 1969:140).

The shelter most often used during the Late Hunter Period was the hide-covered tipi. Although there is much evidence in the form of rock

rings for use of the tipi in other zones in the Pryors, there is no evidence for their use in the sub-alpine zone. As stated in the "Site Summary" there are probably several reasons for lack of evidence and/or the non-use of these structures in the sub-alpine zone. (1) The sub-alpine zone was probably occupied during the warm summer months and during these times a lean-to type structure would have been suitable shelter. The tipi was either stored in the valleys below or it simply was not erected. (2) If the tipi was used in the sub-alpine zone wooden stakes may have been substituted for rocks to hold down the hide covering. If this was the case no evidence of the structures would have been left behind.

Throughout much of the Late Hunter Period the Pryor Mountains were probably occupied by these "tipi dwelling nomads." Around 1800 the Shoshoni were centered in all of Wyoming west of the Wind River and up to Yellowstone Park and in eastern Idaho, northern Utah, east of the Great Salt Lake, north into southern Alberta, and east into Sioux country (Hultkrantz 1968). These people probably returned to the Pryor area via the Yellowstone River, Wind River, and/or the Big Horn River all of which are in close proximity to the study area. Along with their migration, some "Desert Cultural Traits" such as small side-notched projectile points, manos and metates, and steatite bowls were brought into the area. How far east and down the Yellowstone the Shoshoni extended is not known, but they are thought to have held the territory around the Big Horns and Pryor Mountains south of Billings, Montana. Although the Shoshoni con-

trolled the Pryor area they were driven out by the Blackfoot and the Crow before 1805 (Hultkrantz 1968).

The date for the Crow's coming into the area after their split from the Hidatsa is not well established. The Hidatsa stayed in North Dakota and the Crow moved up the Missouri River and then up the Yellowstone. The Hagen Site on the Yellowstone River is probably the last known earthlodge village established by the Crow. At the Hagen Site the Crow continued some maize horticulture, but as they moved further west they became more oriented toward the "nomadic bison hunting" subsistance of the Plains. The Crow's movement onto the Plains is thought to have been sometime in the late sixteenth or seventeenth century (Hewes 1948:51).

The reduction in size of Shoshonean-held territory seemed to have begun in the far north. The Blackfeet, having acquired steel and the gun from the whites and finally the horse from the Shoshoni, were considered to be one of the strongest groups on the Plains (Hultkrantz 1968). After acquiring the gun and the horse the Blackfeet started an advancement toward the south into Shoshoni country. After being ravaged by smallpox in 1781, the Shoshoni were no match for the Blackfeet who had acquired both horse and gun. After the Shoshoni left the Red River country of Canada in 1790 they resided around the Rocky Mountains and around the Pryor-Big Horn area. The Shoshoni later allied with the Nez Perce and the Flathead. This alliance made possible the yearly bison hunting exploits in areas east of the Rockies (Hultkrantz 1968).

The Blackfeet advance continued along with intrusions by other tribes such as the Crow and Cheyenne; the Shoshoni nation was broken up and scattered. (It seems the Crow were in the lower Yellowstone country before the Blackfeet.) Since the Shoshoni had been driven out of this Yellowstone area before the arrival of the Blackfeet, the Crow were probably responsible for the ousting of the Shoshoni from the Pryor area. As early as 1795 the Crow were reported as living close to the Rocky Mountains, and ten years later they held their historical territory along the Tongue River and along Pryor Creek (Hultkrantz 1968).

Some of the Shoshoni remained in the Yellowstone area living with the Crow. Francis Larocque, a French trader, reported finding Shoshoni living with the Crow in 1805 (Payette 1962:561). However, the majority of remaining Shoshoni, after 1800, started to move west of the Continental Divide. They made their homeland there, but still traversed the Continental Divide occasionally back to their old hunting grounds (Hyde 1959).

During historic times the Crow did have some trouble with the Blackfeet, Atsina, and Cheyenne groups. However, during this time the Crow were allied with the whites who were now in the area. This alliance resulted in the forceful control of the fertile bison hunting country.

Conclusions

As stated previously, this thesis presents the result of a survey and synthesis of archaeological sites located in the sub-alpine zone. All periods or traditions discussed were identified on the basis of projectile point types which were identified by comparing them to specimens from other sites throughout the Northwestern Plains.

A typology was established to place artifacts into workable categories. The typology follows a chronological sequence starting with projectile points characteristic of the Early Hunter Period, through the Middle Period, and ending with artifacts characteristic of the Late Hunter Period. Since projectile points characteristic of the Middle Period seem to be in a majority in the sub-alpine zone, more attention was given to this period than to the others.

Although archaeologists have divided the Middle Prehistoric Period into an "Early" and "Late" phase, I have lumped all projectile points characteristic of the Middle Prehistoric Period under the heading the "Middle Period." In as much as a proliferation of artifact types can sometimes lead to much confusion, I feel it is more important to lump artifacts into categories that can be easily described. This description of artifacts makes possible an understanding of the variation within types which other scholars have already defined and described.

Through the use of the typology, I have attempted to establish that people occupied the Pryor Mountains and the sub-alpine zone during periods of time spanning the three major temporal divisions. With this

in mind, I feel it is important to concentrate on how these people were taking advantage of their environment and more particularly how they were utilizing the sub-alpine zone.

To better understand this utilization, I compared my material with similar sites in similar environments. I feel that since other like environments exhibit similar archaeological information, then it is probable that the seasonal settlement cycle proposed by Loendorf (1973) was also in operation in other mountain ranges throughout the North-western Plains. Since there has been relatively little work accomplished in the area of high elevation archaeology, I feel that my data has contributed to a greater understanding of man's utilization of high elevation environments.

Comparisons to other surveys done in similar environments have been compiled in the form of the following chart (Table 8). Archaeological material was divided into three major periods or traditions. Items compared were: (1) the number of specimens characteristic of a particular period; (2) the number of sites associated with a particular period; (3) the size of the sites calculated on the basis of the estimated area of occupation. The comparison of occupation area was difficult to do as many survey reports lack this information, and the estimates are not accurate. I suggest that surveys should include an accurate measurement of "area of occupation" as this data could be a useful tool in predicting the period of occupation for a particular site that lacks artifacts characteristic of a particular period.

TABLE 8

HIGH ELEVATION SURVEY COMPARISON CHART

	Yellowstone Park (Taylor 1964)	Upper Yellowstone (Arthur 1966)	Gallatin Valley (Napton 1966)	Pryor Mountains (all) (Loendorf 1968,69,71)
Late Hunter Period				
No. of Specimens	97	33	25	15
No. of Sites	48	8	11	15
Size of Sites	70,000 sq. ft.	100,000 sq. ft.	50,000 to 100,000 sq. ft.	110,000 sq. ft.
Middle Period				
No. of Specimens	36	67	52	41
No. of Sites	19	9	16	20
Size of Sites	13,800 sq. ft.	10,000 sq. ft.	11,000 to 20,000 sq. ft.	18,000 sq. ft.
Early Hunter Period				
No. of Specimens	26	15	21	10
No. of Sites	8	5	10	*
Size of Sites	2,000 sq. ft.	1,100 sq. ft.	1,000 to 2,000 sq. ft.	*

* No sites recorded exhibiting single component.

Napton (1966) calculated an area of occupation of sites in the Gallatin Valley. Area of occupation for the Early Hunter Period fell within a range of 1,000 to 2,000 square feet. Middle Period sites fell within a range of 11,000 to 20,000 square feet. Late Hunter sites fell within a range of 50,000 to 100,000 square feet. Area of occupation estimated on sites recorded in other similar environments fell within this range established by Napton. However, there are many factors that can upset this prediction: (1) the kind of site and (2) inaccurate estimation of area of occupation and (3) whether or not the site is multicomponent as to time periods. Sites listed in the "High Elevation Comparison Chart" are only those that have been assigned to a particular period.

When comparing the artifact assemblages from high elevation sites throughout the Northwestern Plains, one seems to find a high incidence of artifacts characteristic of the Middle Period. I suggest that this high incidence of Middle Period artifacts may indicate that high elevation zones were used to a greater extent during the Middle Period than in any other period of time. Because of altithermal climatic conditions these high elevation environments would have been a sanctuary from the hot and dry lowlands. Based on projectile point types, there seems to be a high incidence of sites that are Middle Period in age or have Middle Period components in high elevation environments throughout the Northwestern Plains. Loendorf (1969) states that of all sites recorded in the sub-alpine zone, seventy percent are Middle Period in age or have

Middle Period components. Two-thirds of all Middle Period sites recorded in the Pryors, in all zones, are represented in the sub-alpine zone. When comparing the sub-alpine zone to other similar environments throughout the Plains high elevations seem to contain a high incidence of Middle Period sites. I would thus hypothesize that environments similar to that of the sub-alpine zone within the Pryor Mountains were also used as sanctuaries during a period of drier warmer climate.

Unfortunately, there has not been adequate survey accomplished in areas of high elevation to test this hypothesis. With further research this hypothesis can be tested. I suggest that areas where there are not high numbers of sites and artifacts characteristic of the Middle Period may be atypical. That is to say, these unique areas may have offered people a resource not found in other Plains areas. The obsidian quarry in Yellowstone Park may be one such resource. Since obsidian was a highly sought after material used for trade and tool manufacturing, its value may have increased during the Late Hunter Period, thus accounting for the high number of artifacts and sites characteristic of the Late Hunter Period, thus accounting for the high number of artifacts and sites characteristic of the Late Hunter Period recorded by Taylor (1964) during the Yellowstone Park survey. Other areas may not be comparable as they do not exhibit the unique environmental features of the Pryors. In an area of approximately ten linear miles the Pryor area exhibits five ecological zones: (1) desert, (2) grasslands, (3) juniper breaks, (4) conifer slopes, (5) sub-alpine meadows. With further research it

may be discovered that the seasonal settlement cycle and the high incidence of Middle Period sites in the sub-alpine zone may be due to this unique ecology. However, the few comparable areas studied seem to yield information similar to that of the sub-alpine zone of the Pryor Mountains.

All sites recorded in the sub-alpine zone are not included in this thesis. Loendorf (1969) has recorded scattered sites in the sub-alpine zone. I included only those sites that represented different activities that were occurring in the zone. Many of the sites not included were small occupation sites that exhibited scattered lithic detritus as their only feature. I feel to have included these small sites would have only been redundant.

In my opinion the most important concepts to come out of this study are: (1) the data contributed to the discipline on high elevation archaeology; (2) the added data contributed to seasonal settlement cycle hypothesis and (3) the hypothesis that environments similar to the sub-alpine zone throughout the Plains may have also been used as sanctuaries during a period of hot and dry climate during the Middle Period.

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