

University of Montana

ScholarWorks at University of Montana

Graduate Student Theses, Dissertations, &
Professional Papers

Graduate School

1994

Flaked lithic artifacts from the Hogback Homestead site (24GN13)

Brenda Lynn Reed
The University of Montana

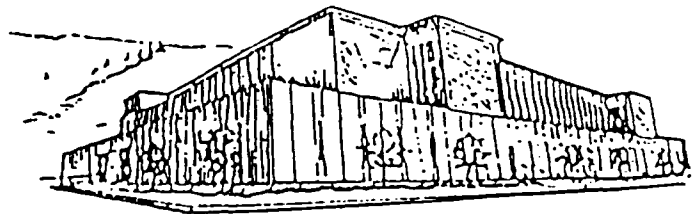
Follow this and additional works at: <https://scholarworks.umt.edu/etd>

Let us know how access to this document benefits you.

Recommended Citation

Reed, Brenda Lynn, "Flaked lithic artifacts from the Hogback Homestead site (24GN13)" (1994). *Graduate Student Theses, Dissertations, & Professional Papers*. 2371.
<https://scholarworks.umt.edu/etd/2371>

This Thesis is brought to you for free and open access by the Graduate School at ScholarWorks at University of Montana. It has been accepted for inclusion in Graduate Student Theses, Dissertations, & Professional Papers by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.



Maureen and Mike MANSFIELD LIBRARY

The University of
Montana

Permission is granted by the author to reproduce this material in its entirety, provided that this material is used for scholarly purposes and is properly cited in published works and reports.

*** Please check "Yes" or "No" and provide signature***

Yes, I grant permission

No, I do not grant permission

Author's Signature Freeda Reid

Date: 10/13/94

Any copying for commercial purposes or financial gain may be undertaken only with the author's explicit consent.

FLAKED LITHIC ARTIFACTS FROM THE HOGBACK HOMESTEAD SITE
(24GN13)

by

Brenda Lynn Reed

B. A., University of Montana--Missoula, 1990

Presented in partial fulfillment of the
requirements for the degree of Master of Arts (Anthropology)

University of Montana

1994

Approved by

Darshan S. Kang, Member
for Chairer, Board of Examiners

R C Murray
Dean, Graduate School

October 17, 1994
Date

UMI Number: EP36156

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI EP36156

Published by ProQuest LLC (2012). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

Flaked Lithic Artifacts from the Hogback Homestead Site
(24GN13)

Director: Thomas A. Foor *TF*

This thesis discusses the flaked stone artifacts from a historic and prehistoric archaeological site, 24GN13 or the Hogback Homestead, located in western Montana. Materials from the site are described and compared with those from other area sites. Analyses of the intrasite distributions of materials are provided. Where possible, the Chi-squared test for independence is used to analyze the intrasite and intersite distributions of artifact types and lithic material types.

These tests and other evidence are used to support the argument that 24GN13 is a campsite which probably saw at least some occupation by both males and females (not necessarily at the same time), that the variety of artifact types suggests that residents engaged in and/or prepared for a variety of activities, that Native Americans likely visited the site over a period of several thousand years, and that at least some of the site's occupants had probably visited obsidian quarries to the south, or traded with individuals who had.

Acknowledgements

Marge Lebinsky, a cartographer for the Lolo National Forest, prepared the maps in this thesis to my specifications, and offered helpful suggestions concerning their content. Milo McLeod, the archaeologist for the Lolo National Forest, not only permitted me to work with the 24GN13 collection in the first place, but has regularly contributed to my analysis by supplying materials, information, and suggestions.

A word of thanks to my thesis committee is also in order. Dr. Foor especially deserves my appreciation, as he has regularly contributed supervision, information, and suggestions.

Table of Contents

Introduction.....	p. 1
Chapter 1: The Interpretive Setting: Archaeological Investigations, Regional/Interregional Perspectives, and the Natural Environment...	p. 6
Surveys and Excavations.....	p. 6
Mixing of Deposits and the Site's Potential to Provide Information.....	p. 9
Research: The Historic Resource.....	p. 10
Research: The Prehistoric Materials.....	p. 11
The Regional/Interregional Perspective...	p. 11
Interpretations of NRM Site Types.....	p. 18
The Natural Setting.....	p. 22
Geology and Geography.....	p. 22
Plant Resources.....	p. 23
Animal Resources.....	p. 25
Other Resources.....	p. 25
Chapter 2: The Cultural Materials: Descriptions.....	p. 27
The Lithic Materials.....	p. 27
Terms.....	p. 27
Sourcing Results for Obsidian from 24GN13, with Discussions of Other Materials..	p. 27
The 24GN13 Collection.....	p. 31
Tools.....	p. 33
Tool Types.....	p. 36
The Projectile Points.....	p. 40
Unclassified Points, Point Fragments, and Artifacts Other Than Points.....	p. 50
Chapter 3: Analyses.....	p. 76
Tools and Debitage from 24GN13.....	p. 78
The Effects of Fire.....	p. 78
Material Types.....	p. 82
Statistical Analyses.....	p. 84
Debitage Analyses.....	p. 85
Intrasite Comparisons: Spatial Analyses.....	p. 94
Chapter 4: Interpretations and Comparisons.....	p. 106
Intrasite Data: Primary and Secondary Flakes and Material Types.....	p. 106
Intrasite Data: Differences in the Inventories of the Upper and Lower Terrace.....	p. 107
Intersite Artifact Distributions: The Local Cultural Setting.....	p. 109

Relatively Extensive Area Sites.....p.	110
Point Types.....p.	111
Other Comparative Materials.....p.	117
Intersite Comparisons: Distributions of Material Types.....p.	124
Intersite Comparisons: Distributions of Artifact Types.....p.	127
Lithic Source Sites Near 24GN13.....p.	128
Sites of All Types in the Vicinity of 24GN13.....p.	132
Chapter 5: Conclusions and Future Research.....p.	136
Site 24GN13: The Nature of the Site and Its Inhabitants.....p.	136
Site 24GN13 and Other Local Sites.....p.	138
Site 24GN13 and the Regional and Interregional Perspective.....p.	139
Looking Forward: 24GN13 and Plans for the Future.....p.	139
1993, and Future, Undertakings at 24GN13.....p.	140
Future Research on the Prehistoric Artifacts from 24GN13.....p.	140
Some Suggestions for Ongoing Research Emphasizing Relatively Large Local Sites.....p.	140
Some Suggestions for Ongoing Research Involving All Local Sites.....p.	143
References Cited.....p.	145

Tables

Table 1:	Chronology of Types of Projectile Points Represented at 24GN13.....p.	5
Table 2:	Classification of the Modified Flakes from 24GN13.....p.	74
Table 3:	Cores and Debitage other than Primary and Secondary Flakes, by Material Type.....p.	90
Table 4:	Primary and Secondary Flakes from 24GN13, by Material Type.....p.	91
Table 5:	Size Classes of Primary and Secondary Flakes, by Material Type.....p.	93
Table 6:	Distributions of Secondary and Primary Flakes.....p.	96
Table 7:	Distribution of Primary and Secondary Flakes by Material Type.....p.	98
Table 8:	Spatial Distribution of Secondary Flakes by Size Class.....p.	99
Table 9:	Spatial Distribution of Secondary and Primary Flakes by Size Class.....p.	100
Table 10:	The Spatial Distribution of Tool Types.....p.	102
Table 11:	Distributions of Formal Tools and Modified Flakes.....p.	103
Table 12:	The Distribution of Projectile Points by Point Type.....p.	105
Table 13:	Chronologically Arranged Comparison of Projectile Point Types/Materials at 24GN13 and 24GN61.....p.	113
Table 14:	A Comparison of Artifact Types at 24GN4, 24GN13, and 24GN62.....p.	120
Table 15:	Material Types for Flakes and Cores at Sites 24GN4, 24GN13, and 24GN62.....p.	121
Table 16:	Material Types (for All the Artifacts Listed in Table 14) at Sites 24GN4, 24GN13, and 24GN62.....p.	123
Table 17a:	Known Quarries and Associated Sites within Approximately 35 Miles of 24GN13.....p.	155
Table 17b:	All Known Sites within Approximately 12 Miles of 24GN13.....p.	156

Figures

Figure 1:	The General Vicinity of Site 24GN13.....p.	21
Figure 2:	Outline Drawings of the Relatively Complete Projectile Points from 24GN13.....p.	70
Figure 3:	Line Drawings of a Selected Sample of Artifacts from 24GN13.....p.	72
Figure 4:	A Bird's-Eye View of the Hogback Homestead Site.....p.	151
Figure 5a:	Sites Listed in Table 17a.....p.	152
Figure 5b:	Sites Listed in Table 17b.....p.	153

Introduction

Archaeological site 24GN13 and the Hogback Homestead cabin (24GN167) are located in the Rock Creek drainage about twenty miles northwest of Philipsburg, Montana. They lie on primary and secondary terraces formed by Hogback Creek near its junction with Rock Creek.

Figure 1 shows the general vicinity of the sites. Since the Forest Service administers these cultural resources, and since agency personnel are concerned with protecting the prehistoric component and have requested that I not disclose its exact location, I have omitted a larger-scale location map. Forest Service personnel did permit me to use a computer-generated diagram (Figure 4: note that 24GN13's elevation above sea level is about 4600 feet) of the site to show the location of the cabin with respect to the landforms as well as something about the relative positions of the landforms. Figure 4, which appears at the back of this thesis, could not be printed to exact scale; note that the area shown is approximately one-fifth mile in length.

Cultural materials from 24GN13 include artifacts associated with the cabin as well as finds which imply that the site has been part of the lives of Native Americans for several thousand years. The cabin dates from the second decade of this century, and related artifacts reflect farming activities, household tasks, and the individuality of the site's occupants.

Projectile point styles suggest use of the site perhaps as early as ten thousand years ago (Table 1 below supplies a chronology). The 1993 finds, not formally described in this thesis, include a point which somewhat resembles Folsom; some examiners suggest that it's a relatively late, but still Paleoindian, projectile point. Certainly, people using Hanna (and McKean?) projectile points camped at 24GN13, and the sequence extends through Pelican Lake and Besant to Late Corner-Notched. Further, scarred ponderosa pines may demonstrate that Native Americans visited the area within the last two hundred years (McLeod 1992).

The point chronology is especially important because the site's stratigraphy is poor at best. Two natural, artifact-containing soil layers composed the excavated portions of the lower terrace; the upper, which is about 20 cm deep, contained a mixture of historic and prehistoric artifacts. The lower, at least to a depth of 50 cm, contained a relatively small number of prehistoric artifacts. On the upper terrace, burrowing rodents and plowing done by the homesteader have mixed the deposits.

This paper deals mainly with the prehistoric portion of the Hogback collection; excavators have recovered nearly 2,000 lithic artifacts from the site. However, another University of Montana student, May Faulk, and I completed a catalog of the historic materials; I've mentioned these finds briefly in appropriate contexts. Specifically, I've

discussed the historic materials as they relate to the Forest Service's treatment of and plans for the site, and in cases in which the activities they document relate to prehistoric ones. Otherwise, this component awaits and deserves its own analysis.

A description of 24GN13 and discussion of studies involving the site appear at the beginning of this thesis. They provide an introduction to the archaeological setting for the document. Description of the site's natural setting, including several factors which have made it an attractive place to visit or inhabit for millennia, follows. Next, I describe lithic tools from 24GN13, provide a spatial analysis of the artifact distributions, and compare the lithic artifact collection (using various classes) with materials from other area sites. In the latter section, I discuss temporal diagnostics, material types, and artifact classes, and offer some possible interpretations. Research notes, including the results of sourcing tests run for selected obsidian samples, precede the final topic: conclusions on 24GN13's nature and its potential to contribute to our understanding of local, regional, and perhaps interregional archaeology. Ultimately, I use the data to argue that prehistoric/ethnographic Native Americans carried out a variety of activities (which may or may not have remained similar through time) at 24GN13. Further, the material evidence of these activities suggests certain conclusions

about the nature of the occupations and the composition of groups at the site; it also implies the existence of at least some long-distance movements or trade contacts.

Table 1: Chronology of Types of Projectile Points
Represented at 24GN13

<u>Point Type</u>	<u>Years Before Present</u>
Cascade (?)	c.10,000-c.3,500
Pinto (?)	c.5,000-c.3,300
McKean Lanceolate Hanna Duncan	5,000-3,000
Pelican Lake Besant	3,000-1,500
Fine Triangular (?)	c.400

Note: I examined various sources to discover widely accepted dates for the various point types; I've tried to list the broadest time spans which seem reasonable (see Frison 1978, Heizer and Hester 1978, and Leonhardy and & Rice 1970).

Chapter 1: The Interpretive Setting: Archaeological Investigations, Regional/Interregional Perspectives, and the Natural Environment

Surveys and Excavations

Excavators have examined only a small percentage of the deposits, so planned work may well yield unexpected finds. Yet the test pits and other excavations discussed below have already yielded a wide variety of historic and prehistoric artifacts.

In bringing these finds to light, excavators took distance-below-surface measurements, removing the deposits in ten-centimeter internal levels. This use of arbitrary excavation layers reflects the fact that frost action, burrowing rodents, plowing of the secondary terrace above the cabin, and other influences have seriously disrupted the site's natural and cultural strata. Everywhere, the majority of artifacts came to light from the top twenty centimeters of earth.

Site 24GN13 received its first formal investigation in 1974, when University of Montana archaeologists recorded the prehistoric component. In 1979, when the Forest Service acquired the property, Lolo National Forest workers examined the cabin. They considered it a cultural resource in its own right, and thus it has its own site number: 24GN167.

In administering the prehistoric component at 24GN13, Forest Service archaeologists monitor the location; in 1979,

1983, and 1988, they noted lithic artifacts. Also, in June and July of 1989, staff members and volunteers dug test pits to determine whether the prehistoric site--more accurately component--was eligible for inclusion in the National Register of Historic Places. They excavated seven one-meter-square units on the upper terrace, reaching a maximum depth of 60 cm.

Artifacts did appear in this level, and still deeper deposits may contain cultural materials. The finds, which include flakes and tool fragments, demonstrated the prehistoric component's eligibility for listing in the National Register of Historic Places.

These and other excavations yielded the stratigraphic information mentioned in the introduction. Overall, the administering agency conducted investigations to meet three Cultural Resource Management objectives: evaluation, mitigation, and preservation. Regarding the latter, Agency personnel wanted to preserve and restore the historic cabin (24GN167). However, since it sits within 24GN13's boundaries, Forest Service archaeologists knew that buried historic and prehistoric materials existed in the vicinity of the building. They therefore designed their restoration efforts to mitigate potential harm to the archaeological record.

Participants in the restoration project, anticipating buried cultural materials, formally excavated the associated

areas of expected ground disturbance. Thus, workers placed trenches along the north and east walls, where they planned to replace rotting sill logs. They also dug in each of the building's four corners to allow jack pad placement, and excavated the northeast corner of the cabin to permit addition of a floor joist. Further, in September 1991, investigators preparing for front porch reconstruction placed a 1 m x 9 m trench outside of and parallel to the cabin's west wall. For the mentioned locations, Lolo Zone Archaeologist Milo McLeod and Archaeological Technician Kirby Matthew established a grid system, enabling workers to record artifact proveniences accurately.

The cabin soon joined the prehistoric component on the National Register. Work by Historical Research Associates (HRA), begun when the cabin underwent stabilization treatment between October 1991 and October 1992, helped establish the structure's eligibility. (Since HRA personnel nominated the building as an example of vernacular architecture, I've treated it as a separate resource and considered the historic artifacts with the prehistoric ones. I believe that this approach is appropriate, given the artifact distributions. Also, it's convenient when one wants to discuss the entire sequence of materials within the boundaries of 24GN13.)

Mixing of deposits and the site's potential to provide information. Historical evidence (see Bolton and Hubber 1990) indicates that the upper terrace of the site received plowing. Odell and Cowan (1987:456) note, in discussing the effects of a series of plowing experiments, that the potential effects of plowing on prehistoric sites include a "lack of relationship between displacement and artifact size" and "possible spurious clustering, depending upon the analytical methods employed." With three-meter test squares (p. 478), test results suggested little clustering. With two-meter squares (p. 479), however, variance:mean and chi-squared tests both suggested that plowing can create aggregations which one might mistake for cultural concentrations. These results suggest that the one-meter test squares on the upper terrace might not provide an archaeologically meaningful picture of the horizontal distribution of artifacts.

On the lower terrace, horizontal movement of materials is clearly demonstrated by projectile point 24GN13-1706; workers recovered the body in two pieces from Unit N-2. A flake potlidded from the point, however, came from Square 7, over a meter away. Thus, artifact associations on both terraces warrant suspicion, at least for small-scale investigations.

Vertical mixing is present as well. For example, the possible Cascade point midsection came from the surface, as

did some of the Pelican Lake points, while a Besant point lay in the ten-to-twenty-centimeter level (which also contained historic artifacts).

The absence of good stratigraphy handicaps our efforts toward temporal interpretations. Yet Hogback may well have more to tell us about area prehistory. Further obsidian samples could suggest unsuspected travels or contacts. Additional projectile points may help us clarify the times of occupation and perhaps even the duration or intensity of site use by groups using particular types. Seasonal indicators (such as fetal animal bones, seeds, or bone fragments suggesting bone-grease processing) may come to light, clarifying the annual cycle of activities (assuming the presence of permanent residents) in the mountain regions.

A

Research: The Historic Resource

HRA employees prepared a National Register Nomination for the homestead (Bolton and Hubber 1990). As this document notes, the story began when Charles Gerhardt, a miner from Butte, arrived on the scene in May of 1913. While building the cabin, he lived in one of two nearby miner's cabins (now site 24GN166) which lay within the boundaries of his claim.

Gerhardt completed his one-and-one-half story home in 1917; he also constructed outbuildings, notably a barn and chicken coop, which are no longer present. He grew

potatoes, rutabagas, and various other crops on the upper terrace; an irrigation ditch is still visible.

Gerhardt sold the property to William Miller in 1923; Miller sold it to John Myers only six years later. Myers, who lived at the nearby Puyear Ranch, retained the property until the 1950s. He perhaps never intended to occupy the cabin; currently, Forest Service personnel are investigating this and other questions about the site's history.

Research: The Prehistoric Materials

Regarding 24GN13's prehistory, various agency publications (e.g., McLeod 1992) exist. This thesis incorporates much of the relevant material, and provides original descriptions as well as analyses.

The Regional/Interregional Perspective

In terms of physiographic provinces, 24GN13 lies within the Northern Rocky Mountain (NRM) region (Figure 1 below shows the local setting). From the archaeological viewpoint, traditional approaches have treated the region as a sort of cultural buffer zone. What McLeod and Melton (1986:V-2) note of the Lolo and Bitterroot National Forests has held for the entire region: they are essentially between generally accepted major cultural areas. As these writers put it, "most often the study area is thought of as being marginal to the salmon areas to the west and buffalo areas to the east."

Patricia Flint (1982), in contrast, sees the region as archaeologically distinct. She characterizes (p. 6) the associated human lifeways as "diversified and stable," noting (p. 50) that "diversification tends to stabilize a system, giving it the ability to overcome perturbations in the natural setting from which it draws its energy." Peoples in neighboring regions, in contrast, may have depended more heavily on particular resources. For example, Flint states (p. 5) that "ethnographies of the native [Columbia] Plateau people emphasize a dependence on salmon fishing; ethnographies of Plains people emphasize their mounted bison hunts; and ethnographies of Great Basin people emphasize their seed gathering and rabbit hunts." Yet all of these groups, and others, potentially contributed to the archaeological record of the Northern Rockies through trade, long-distance movements, or migrations. Archaeologists and ethnologists have essentially identified some of these interactions (the movement of the Shoshoni into the region from the south and journeys made by Plateau and Northern Rocky Mountain peoples to the Plains to hunt buffalo are but two examples), but the picture is by no means complete.

Flint (1982), however, stresses the natural environment, rather than cultural factors, as the primary determinant of the nature of prehistoric lifeways in the Northern Rockies. She argues that these lifeways probably resembled ethnographically known ones, at least during the past few

thousand years; during this time, environmental conditions were evidently similar to present ones (p. 51). She presents a hypothetical settlement pattern based (p. 49) on "combined data from ethnographies of Blackfeet, Shoshoni, Nez Perce, Kutenai, and Interior Salish, all peoples who were ranging in the area at the time of white contact."

This settlement pattern (p. 51) should, she believes, fit reality for the period from 2000 BC to AD 1850. However, the climate may have been drier-than-present between 5000 and 2000 BC, and cooler-than-present before that. For these times, she notes that the model may require adjustment.

One major point ethnographers make is that all the groups Flint considered occupied the NRM Region throughout the year (pp. 53-54). Based on the ethnographic accounts, Flint suggests a seasonal round of activities in which groups scheduled their time to take best advantage of the available resources, such as berries, game animals, and lithic outcrops, which took their turn as a major focus of activity. The nature and distribution of some resources led people to exploit them in family groups rather than in bands; for example, families scattered into the forests to gather berries in July and August (p. 94).

Some resources, such as lithic material, were always available, although deep snow or other conditions

potentially complicated procurement. Fishing, for example, went on year-round (p. 96).

Other resources are available only seasonally, and these perhaps received priority in scheduling over those which people could exploit whenever they found it convenient. Of course, such scheduling does not imply that groups weren't doing several things at once, or that they didn't choose camp sites that allowed them to take advantage of a variety of resources without going too far out of their way.

In some cases, visits to permanent resources might be compulsory given urgency (e.g., groups running low on lithic materials perhaps moved or perhaps sent task groups to stone sources). However, such visits often might have reflected preparation for the future and been conducted at appropriate times.

Ethnographically, one example of scheduling to meet future needs is found in the fact that the groups mentioned in Flint's study did most of their hunting in the fall (p. 96), in preparation for winter. Winter was, of course, the season offering the fewest options in the way of fresh food, and was potentially the time of greatest hardship. Flint notes (p. 96) that "in the Northern Rocky Mountains it was winter that was the limiting factor upon early human populations...".

Binford (1980:15) notes that, in areas wherein all resources aren't available during all seasons, there exist

three ways to survive the winter. First, one may exploit animals which stay in the area during this season. Second, one may store plant foods acquired during the growing season. Finally, one may acquire animal foods when these are available, then store them. The ethnographically known Native American groups in the Northern Rockies employed all these approaches to varying extents. For example, they fished during the winter, conducted fall hunts, and dried (see Malouf 1952) a variety of plant foods appropriate for storage. Further, they sometimes supplemented these approaches (as Malouf 1952 notes) with journeys to the Plains to conduct winter bison hunts. Given the ethnographic data and the regional environment, Flint's characterization of prehistoric food procurement in the Northern Rockies as diversified seems an appropriate one.

Flint's approach stresses the natural environment, and she uses six types of locations (p. 2) in discussing a general pattern of ethnographic behavior. These types are "streamside, grassland, marshes, forest, geological formations, and topographically distinct formations." Her study, which takes differences in ground visibility into account, emphasizes the types of activities associated with particular location types.

This environmental emphasis helps make Flint's ethnographic approach useful for investigators examining such issues as site location choices, seasons of use, and

population densities and distributions. Regarding the last of these, Flint (p. 91), based on ethnographic data, cites for AD 1800 an estimated population density of two to five people per 100 square miles. Concentrations occurred at favored locations; for example, streamside encampments (pp. 91-92) contained as few as 15 people or as many as 6,000.

The ethnographic groups evidently favored streamsides as camp spots. As the above figures suggest, such locations were apparently the primary places for large gatherings, although grassland areas also attracted sizable groups who met to conduct communal hunts (pp. 94-95). Also (p. 223), "from the ethnographic model it was expected that long term occupation sites in the Northern Rocky Mountain Region would be found at streamside or other water sources, with protection from adverse weather and near an adequate source of firewood and wild game." Malouf (1952:48) similarly states of his Western Montana Region that "wherever two streams came together, wherever there was a good supply of culinary water, wood, and materials for shelters, trails, and nearby game and plants one can expect to find a former Kutenai camp."

Another point is that one can divide human endeavors (and, by implication, sites) in the region into three classes of activities: semipermanent camping, specialized subsistence, and religious. At semipermanent campsites, people constructed shelters, prepared and preserved food,

made tools and utensils, adorned themselves, and traded (p. 54). Specialized subsistence activities normally involved a trip to the resource; people usually built shelters at such sites (p. 54). Religious activities (p. 56) often "took place at unusual topographic formations." For example, Malouf (1952:55) notes that groups in western Montana sometimes sought guardian spirits on hilltops, or in other places associated with spirits.

Site classes and activities thus may demonstrate some correlation (see Flint 1982:58-59 for details). Some tasks are, of course, more likely to leave traces in the archaeological record than others; Flint (pp. 61-83) provides a list of the potential material remains of particular activities. Such materials proved, Flint adds (p. 60), "remarkably similar between groups." Further (p. 160), according to her study, the ethnographic evidence successfully predicts locations for material evidence of particular prehistoric activities.

Regarding the overall way of life, Flint emphasizes (see, for example, p. 50) its continuity. She adds (p. 51) that "theoretically then, quantitative ethnographic modeling of the types and amount of archaeological remains to be found in certain contexts ought to apply as well to the archaeological remains found in a surface survey investigation."

Interpretations of Northern Rocky Mountain (NRM) Site Types. Choquette (1987:57) notes that some of the features recorded during early archaeological surveys in the Kootenai Valley include hearths, stone cairns, concentrations of fire-cracked rock, and ash lenses.

With the possible exception of cairns, the features Choquette mentions could indicate campsites; they could also be the products of particular activities.

Thoms, who describes (1987:232) campsites as "the hub of domestic activities," states (1987:260) that one can distinguish such sites from those primarily demonstrating a single activity, since "...domestic activities such as hide processing, clothing manufacture, and secondary processing of foodstuffs should not be well represented at places that served exclusively as limited activity sites."

Ultimately, of course, the class of those sites--such as talus slopes, which Flint (1982:126) describes as the usual burial sites for peoples in the NRM Region--which may in fact represent only one activity is rather small. Most campsites, however temporary, probably saw a variety of activities, among them eating, sleeping, cooking, and other tasks of daily life. Even temporary stopping places may have seen more than one activity. For example, the hunter watching for game from a lookout may have taken time to chip some projectile points during his vigil.

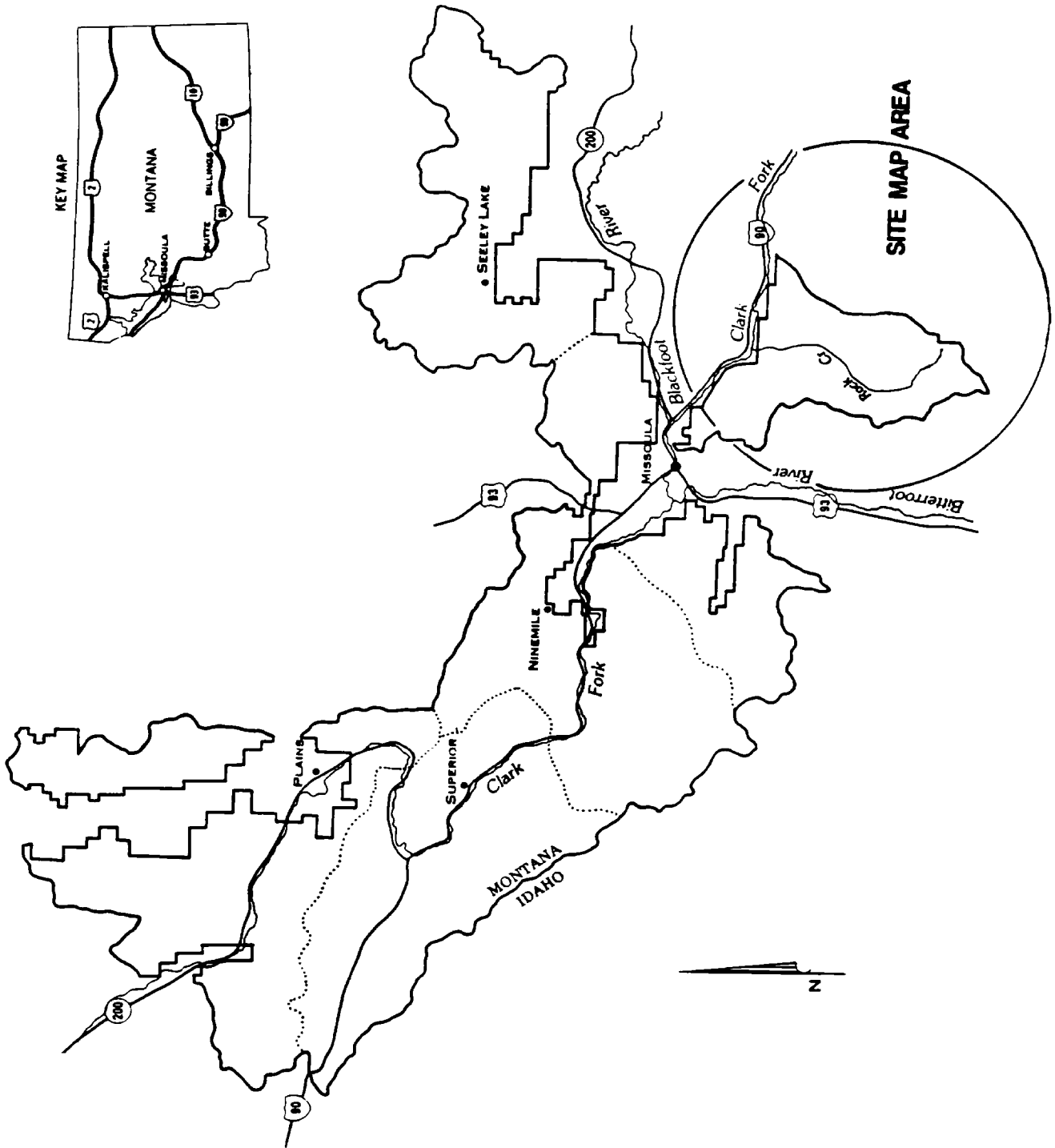
Thus, rather than classify sites, one may choose to focus on activities, intensities of occupations, population compositions, particular attributes, and other single interpretive markers rather than invoking the concept of site type.

Regarding intensity of occupation, Thoms (1987:232-233) notes that "they [site areas] can range in size from very small places used by one family, to very large places occupied by an entire band. Residential sites can be occupied for two or three days, or for many months." Thoms (p. 233) defines a "small" campsite for members of a mobile population as one about 20 m by 20 m in size. He adds (p. 251) that "little information is available about the size of Upper Kootenai encampments, but the overall impression is that the tendency was for only a few families to camp together during most of the year."

Flint (1982:127-128) states that her archaeological surface survey located 36 sites divisible into "three categories of streamside activity locations which can be rated with intensity of occupation...". One type is the "one-flake sharpening" site, which (p. 130) displayed only a single utilized or unaltered flake. The second variety is the "flake and tool aggregate" site; these sites (p. 131) possessed multiple flakes and/or a few tools. The third type is the "extensive multi-tool" site; such sites possess (see p. 135) more numerous and diverse artifacts than the

other varieties, and suggest (p. 128) semipermanent (often wintering) residence. Of course, one must take site formation processes into account in making such interpretations, as various agents may remove or bury cultural materials and thus cause the intensity of occupation to appear less than it actually was.

Figure 1: The General Vicinity of Site 24GN13
(see Figure 5a, at the back of the thesis, for the site's location)



The Natural Setting

Geology and Geography. A formal study of the site's geological history has not yet been possible, but Lolo National Forest archaeologist Milo McLeod hopes to arrange one. An issue of interest is the ages of the upper and lower terraces.

Site 24GN13 lies on primary and secondary terraces formed by permanently flowing Hogback Creek. Nearby Rock Creek, also a permanent stream, supplies an even more ample source of water. Hills and ridges adjacent to the site provide varying degrees of shelter against winds from all directions. In addition, the grassy slope north of the site reflects solar heat during much of the day, later re-radiating absorbed warmth. Milo McLeod, who has visited the locality during the winter, states that the snow cover here generally remains less deep than it is in nearby, less-sheltered areas. The site's elevation may be significant; at 4,600 feet, 24GN13 is lower than most of the other sites in its immediate vicinity. In fact, of the known pre-historic sites within a 24-mile-wide square centered approximately on 24GN13, only one of those having a listed elevation is lower. In contrast, three are above 8,000 feet. Thus, one reason that 24GN13 is a relatively large site for the area may be that people could live there during more of the year than they could occupy nearby, higher locations.

The spot has several other attractive features. For example, both the primary and the secondary terrace on the north side of the stream supply flat land suitable for habitation. Although water is readily available, the site probably (by my own observations, made at various times during the spring and summer) becomes soggy or submerged during floods less often than do nearby landforms which more immediately border Rock Creek.

Further, the land bordering Rock Creek might have functioned prehistorically, as it does today, as a passage between what is now the vicinity of Philipsburg and the Ninemile drainage system. In fact, Malouf (1952:52) considers the drainage to have been an important Native American travel route in ethnographic times; the vicinity of 24GN13 served as a temporary camping spot.

Plant Resources. Scarred ponderosa pines may demonstrate that Native Americans sought the bark's cambium layer for food. This evidence might indicate a season of site use, since May, when the edible sap begins to rise, is mentioned in various ethnographic accounts as the preferred time for such harvests (see White's 1953 discussion, pp. 1-2). The scars also suggest something about the people that visited the site, since women normally performed the debarking, at least among the Kutenai (White 1953:5). White consequently (p. 5) associates scarred trees with campsites occupied by family groups.

Malouf (1952:15) comments that local Native Americans additionally obtained from ponderosa pine the (unsavory and therefore not a preferred food?) moss which grows on its limbs, and pine nuts. Herbort adds (1987:64) that these trees also supplied medicine and raw materials for tools and shelters.

Flora that currently grow on or adjacent to the site, and which might have been present prehistorically, include cottonwood, a potential food source, and willow species useful in shelter construction; both trees supply materials for making tools and medicines (Herbort 1987:64). Douglas-fir (which supplies raw materials for medicines and tool-making), quaking aspen (used in constructing shelters), and juniper (which supplies edible berries and wood and bark useful for tools), currently grow near 24GN13; all three species provide medicine (Herbort 1987:63-64). Also present are wild rosebushes, which supply edible fruit; watercress, a source of edible greens; and Oregon grape, a producer of edible berries.

Further, bitterroot appear on the hillside in spring. Malouf notes (1952:14) that Native American women once regularly harvested this plant's edible roots at a spot near today's Florence, Montana. (Meanwhile, the men "occupied their time racing and gambling, or hunting in nearby mountains.") Various grasses, forbs, and berries likely supplied additional foods. Edible berries which Pederson

(1976:9) has noted in the upper Rock Creek drainage (which, as he defines it, lies a little south of 24GN13) include elderberry, huckleberry, gooseberry, pigeonberry, and raspberry; these shrubs may also have grown in the vicinity of the Hogback Homestead in prehistoric times.

Animal Resources. Faunal resources in prehistoric times probably included bighorn sheep, which currently graze on the site. Deer, elk, moose, and other large game animals frequent the area, and Pederson (1976:9) notes that carnivores in the drainage include black bears and coyotes. Also, beavers, ground squirrels, and other small animals dwell here; Malouf (1952:26-27) notes that Native Americans commonly ate the species I've mentioned.

Fish are also present near 24GN13. Below the site, Hogback Creek flows into Rock Creek, a nationally--at least--known trout stream. Malouf (1952:33-34) notes the importance of fishing for ethnographically known tribes in western Montana. He states that this activity was most important economically when winter hampered group mobility, and for older people when younger ones journeyed to distant regions. Both men and women fished, using tools such as traps, weirs, nets, hooks, spears, and harpoons (pp. 34-35).

Other Resources. Various chert outcrops exist within, roughly, thirty-five miles of the site; I'll discuss some exploited ones later. The presence of Tertiary-age gravels in the Rock Creek and Hogback drainages suggests that

cobbles of flakable stones, including basalt and quartzite, might be present at numerous locations (I have not conducted a survey of the vicinity of the site, but hope to do so). 24GN13 also yielded a small piece of hematite; possibly, a local source exists.

Chapter 2: The Cultural Materials: Descriptions

The Lithic Materials

Terms. Throughout this paper, I've used the terms cryptocrystalline silicate sedimentary rock, cryptocrystalline igneous rock, microcrystalline igneous rock, and macrocrystalline metamorphosed sedimentary rock (abbreviated in the tables, respectively, CSSR, MIR, CIR, and MMSR) somewhat interchangeably with (again respectively) chert or quartz (and materials that other researchers might identify as jasper and chalcedony), obsidian/rhyolite, basalt, and quartzite. I've done so because the everyday designations are those that archaeologists often apply to such materials. However, the more cumbersome terms are the more accurate ones; in many cases geological laboratory tests (not feasible for this project) are the only reliable means for distinguishing, for example, chert from chalcedony; but both fall within the class of cryptocrystalline silicate sedimentary rocks.

Sourcing results for obsidian from 24GN13, with discussion of other materials. Flintknappers must have been willing to trade for obsidian, or to transport it over long distances. Dr. Richard Hughes, of the Geochemical Research Laboratory, examined six 24GN13 "obsidian" samples. He sourced one to Bear Gulch, in the Centennial Mountains in Idaho; two derive from Wyoming's Teton Pass. The fourth

sample doesn't match any tested source, the fifth is from Timber Butte, in Idaho, and the sixth is not obsidian but non-volcanic, historic glass. The sourcing thus implies travel or trade links to the south.

Sappington (1984:24) notes that, at least in ethnographic times, flintknappers in the vicinity of Timber Butte produced obsidian projectile points as trade items. Are any of the points from the Hogback Homestead plausibly interpreted as the products of this activity, whether they date from prehistoric or ethnographic times?

To answer this question, researchers require data on the sources of the raw materials which became the projectile points; they might also wish to consider sources for particular types of debitage. For example, does any class of debitage of Timber Butte obsidian suggest that the points might have been flaked at 24GN13? If any of the completed points prove to be of Timber Butte obsidian, I can then search for explanations of their presence at the Hogback Homestead. One major question might be whether any of the points are of types which serve as regional markers for flintknappers from the Northern Rockies, the Columbia Plateau, or perhaps elsewhere.

Regarding other lithic materials which one might trace to their sources, Leslie B. Davis commented in 1972 (p. 181) that "varieties of archaeologically significant stone in this region [the Rocky Mountains and adjacent Great Plains]

include chert, chalcedony, quartzite, opalized wood, metamorphosed siltstone, basalt and obsidian. With the exception of obsidian, these lithics occur without known spatial restriction." Davis also states (p. 181) that "very few macroscopically distinguishable stone types quarried from known sources are recognized by plains archaeologists." This contention applies to the Rocky Mountains as well, and at least one of the three materials Davis names (Avon chert, Knife River flint, and a particular type of siltstone) as found in the area and often considered source-diagnostic is currently open to question. This material, "Avon chert," is one generally distinguished on the basis of its color. However, geologist Robert W. Fields states (1983:32) that "anywhere that chert is forming or being altered under similar environmental conditions, similar types and colors of chert are most likely to occur. For these reasons it is scientifically invalid to choose color as a means of identification of a site-specific chert, the so-called 'Avon chert' for example." Field's proclamation, in the case of 24GN13, probably applies most strongly to "Eyebrow chert"; yellowish to reddish chert flakes in this area are often said (as various site forms demonstrate) to resemble that quarry's raw materials in color. I will therefore note that many flakes from 24GN13 are yellowish to reddish, but that I cannot consequently infer any connection between the occupation site and the quarry.

I also consulted University of Montana mineralogist Dr. Donald W. Hyndman regarding possible methods of cryptocrystalline silicate source determination using color or other macroscopic characteristics, such as inclusions, which archaeologists have sometimes attempted; he quickly convinced me that, given the nature of "chert" formation processes, such indicators aren't reliable.

The area's geology further complicates sourcing efforts. Even if one could specify primary sources for chert, or for quartzite or basalt, the drainages of western Montana generally contain Tertiary-age gravels which may be secondary sources of chert, basalt, and quartzite cobbles (see Kuenzi and Fields 1968 or Alt and Fields 1971 for a general discussion of Tertiary deposits in the region). Thus, archaeologists require a body of data, like that which exists for obsidian, on the compositions of source materials of other types before they can even begin to state how closely one can circumscribe the areas from which particular materials were extracted.

In conducting research for this thesis, one of my tasks (suggested by Milo McLeod) was to see how many known lithic quarries/exploited secondary deposits existed within an arbitrarily chosen distance of 24GN13, this to evaluate the possibility that I could determine uses of particular sources, or at least distinguish between those sources (if any) which are different enough from the others to permit us to make

some distinctions. Given the number of actual or potential sources within a rather small area (discussed in the intersite comparisons), making the desired study could require considerable effort and expense.

Two other mineral specimens which 24GN13 provided could also have come from local sources. The first, fused shale, is represented by a single flake. No known local source for this material exists; thus, if archaeologists can find one, it could suggest something about population movements. The second, hematite, is represented by specimens which are probably not particularly useful for pigment-making; the powdery reddish material occurs in limited amounts as streaks in a relatively hard, tan matrix. Presumably, the Native Americans who visited 24GN13 would have preferred and had access to purer specimens. Thus, natural processes rather than deliberate transportation may account for the presence of hematite at 24GN13.

The 24GN13 collection. The site's diverse tool classes suggest various human activities and condition hypotheses about why people camped at 24GN13 (and perhaps suggest that both men and women camped at the site, although not necessarily at the same time).

As projectile point types are the only classes of local lithic artifacts archaeologists have demonstrated to cluster typologically on the time scale, Table 1 above provides a 24GN13 point chronology. Given that much of the site

remains unexcavated, it is likely that further evidence, such as additional point types or radiocarbon-datable materials, will indicate other times of use.

However, since tool types may cluster temporally, geographically, or functionally in currently unrecognized ways, I've presented thorough descriptions of the 24GN13 specimens. Publication of specific data may allow us to recognize non-point temporal diagnostics. Also, patterns of intersite and regional distributions might tell us which populations left the artifacts (I defend interpretive caution in this regard, as ethnohistoric/archaeological information suggests that prehistoric peoples were highly mobile and that groups didn't necessarily define themselves as rigidly as one might wish). Function implies activity, and a knowledge of spatial distributions could help us better understand, for example, seasonal rounds and site location choices.

The vast majority of identified prehistoric cultural materials from 24GN13 are flakes and flaked tools (the 1993 finds, not described in this thesis, include some ground-stone tools); excluding the scarred pine trees, researchers have not yet identified any features. This section thus describes the flaking debris and chipped stone tools from the site. I've provided line or outline drawings of several of the artifacts, especially the projectile points; these follow the written descriptions.

Tools

Schiffer (1979:20) notes that archaeologists have of late moved toward classifying the working edges of tools, and away from classifying the entire artifact. He adds that the next logical step will be that of emphasizing actual uses of tools. Since the last of these approaches wasn't feasible for this study, I have to some extent combined the first two approaches, for reasons discussed below.

My interest in producing comparable data led to an approach something like Taylor's (1973:74). He stated "I have followed that system which I feel is most useful in comparing our artifacts with those from other sites. Within an artifact class [e.g., flaked stone, ground stone, or other groups in which the artifacts share one general attribute] those tools which share other attributes, such as the same form or shape, I have segregated into artifact types. Presumably an artifact type reflects the certain style which the native craftsman had in mind when he fashioned the tool, although it is recognized that all craftsmen are not equally skilled and that individual variations do occur."

I have used the concept of artifact types much as Taylor did. My approach differs from Taylor's in that I used both artifact shape and the nature of the working edges to classify most of the 24GN13 tools. The tools which I have labeled "modified flakes" are the exception; they do not

conform to widely recognized, standardized formal categories. I have therefore classed them according to the nature of the modifications they demonstrate, and, ultimately, on the basis of the shape of the working edge(s). Thus, for example, I have differentiated "end scrapers" from those modified flakes which possess similar working edges because members of the former class are generally considered to share a certain set of formal attributes. Joukowsky (1986:312, 321), for example, defines an end scraper as a blade tool, blades being "parallel-sided flake tools struck from a prepared core." Members of the class of modified flakes are more variable, and were perhaps not struck from prepared cores. This distinction may not be meaningful in terms of tool uses, as similar working edges suggest similar functions. However, it could have other implications.

For example, regarding at least the use-modified flakes and perhaps the minimally retouched ones, one might examine Kehoe's discussion of "opportunistic" tools at a Plains bison kill site. Kehoe (1973:110) argues that the numerous irregular flake tools at the site help support his contention that makeshift working edges were created as needed. If such tools were more generally primarily intended to address a task at hand, one might ask whether they saw more than one use before discard.

Keeley (1982) adds a related point. He notes of hafted tools that people might have wished to curate such implements because they represent a greater investment of work than do unhafted ones. One might extend this idea to comparisons between modified flakes and other tools. If the flintknapper invested more effort in processing a tool (or even, as with end scrapers, in selecting the flake intended as a tool), he (or she) would perhaps be more likely to curate it. Comparisons of the amount of wear, and perhaps of the types of uses, or the variety of uses, on modified flakes as opposed to other tools should help us resolve this issue.

In classing flakes as used but otherwise unmodified, I have been strongly conservative. Young and Bamforth (1990:408) recommend caution in the macroscopic (as opposed to microscopic) identification of used edges; they present the results of a study which suggests that macroscopic determinations can be quite inaccurate. In essence, I required the presence of step fractures (resembling those on the deliberately modified tools) to identify working edges.

Regarding tools other than modified flakes, I have further subdivided the class of projectile points into a variety of subclasses. I have based the subdivisions primarily on attributes of shape, but have of course also considered size and flaking patterns. These points serve as probable chronological markers for site occupations, and

perhaps serve to indicate the region of origin of their makers. They may also have functional implications.

For example, what Anta Montet-White (1974) says of Archaic projectile points of the Plains may apply to the 24GN13 points as well. In her abstract (p. 14), she notes that "time, space, and functional specialization are estimated to contribute only part of the total variation." Socioeconomic factors may also have played a role (p. 16): "single individuals may have had specific influences [resulting in patterns which perhaps approximate tool types], and groups of closely related individuals may have shared similar preferences."

The temporal aspect, however, is the one most applicable to this study; spacial distributions, or social relationships reflected by spacial distributions, require intersite and perhaps interregional data sets, while functional investigations require identification of uses, a project outside the scope of this study.

Tool Types

In functional terms, flaked stone tools include projectile points, knives, end scrapers, side scrapers, perforator-gravers, and saws. These classes are perhaps not mutually exclusive; for example, points could have served as knives, and serrated points as saws. Tools intentionally designed for multiple uses also exist.

Of all the flaked stone tools found in the Northern Rocky Mountain region, projectile points are the only ones securely demonstrated to cluster on the time scale. These artifacts possess distal points adjacent to two bifacially flaked, sharp lateral edges; also, they are at least roughly symmetrical along the long axis. Knives may share some, or possibly all, of these characteristics; when feasible, microscopic analyses of use-wear may be useful in distinguishing the two artifact types.

Regarding other artifact types, I have used Kehoe's (1973) discussion of tools on the Northern Plains; they are sufficiently general that they should apply to Northern Rocky Mountains tools as well (given that I know of no regionally diagnostic types of such artifacts).

Of knives, Kehoe (1973:103) states that "such blades are also called slitting knives and are believed to have been used to cut with a two-way movement. Their presence at a bison drive [i.e., Gull Lake Bison Drive] indicates that they were used to butcher the meat and to cut the hide from the carcasses." Also (p. 103), "some knives are shaped into distinctive knife forms, such as the asymmetrical, scalpel-like forms much like the scalpel shape of modern knife blades. Others are distinguished only by the bifacial flaking that appears on one edge or more. Many have sharp points; the points may have served to pierce tough hides."

In other contexts, knives probably served other purposes, such as woodworking.

The tools which I have identified as knives at 24GN13 are, as a rule, distinguished from points on the bases of asymmetry and resemblance to tools from other sites which are classed as knives. The category may be underrepresented, especially if some projectile points also served as knives. A microscopic study of use-wear would help make the distinction, and should help us identify the materials (e.g., meat, hides, wood) on which individuals used the knives.

End scrapers, at least at Gull Lake (Kehoe 1973;91), are "small, unifacially worked stone tools that have a retouched scraping front shaped in an unbroken arc that meets the lateral edge; the lateral edges, in turn, converge to a butt end that is pointed, rounded, or straight." At Gull Lake, hideworkers (p. 91) used these tools to soften and scrape hides.

At 24GN13, the tools I have classed as end scrapers fit Kehoe's description; they possess rounded bits and straight lateral edges. In addition, they are made on distinctive short, thick flakes. The modified ends tend to be the distal ends of the flakes.

Of side scrapers, Kehoe states (p. 100) that "these scrapers have a single scraping edge and are similar to knife blades but are distinguished from them by not having

bifacially retouched edges." He adds (p. 100) that side scrapers were not hafted, and that they were used with a "two-way lateral movement to remove the flesh from the undersides of the skin....Some were used for working animal skins and some, perhaps, for woodworking."

At 24GN13, the artifact which I have classed as a side scraper/possible perforator-graver has a single-beveled long edge and a knife-like outline.

Perforator-gravers and drills (Kehoe 1973:110) are chipped stone tools used to make holes in hard materials or soft ones. Because the motions used to make the holes differ, these tools differ in shape and in wear marks. Drills are used with a clockwise or alternating rotary motion to bore holes in hard substances. Perforator-gravers are used to perforate holes in hard or soft substances and also to incise hard ones; they are designed for two different kinds of motion. Perforators are used with a straight downward motion to perforate the surface of hard materials or to pierce soft ones. Gravers are used with a push or pull motion to score hard substances.

These artifacts necessarily have a pointed tip. The artifact from 24GN13 which I have classed as a side scraper/possible perforator-graver possesses a suitable, if blunt, tip.

Saws (see Semenov 1964) are serrated implements used for cutting with either a one- or a two-way motion. The only artifact from 24GN13 which possesses definite serrations appears to be a Late Prehistoric projectile point. Since this tool is of obsidian (which, as I discuss below, is not a particularly durable lithic material), it seems a relatively unlikely candidate for a saw.

The Projectile Points

These finished artifacts are sufficiently complete to classify. Each is identified by its accession number, and, where first introduced, the prefix 24GN13. As indicated in the descriptions below, all except 24GN13-569 are of the size expected for atlatl points. I have included all the measurements which I could take or appropriately estimate, and used a sliding caliper for those measurements. The terms "edge" and "end" refer to the margin, unless otherwise stated.

I have divided the projectile points from 24GN13 into 10 groups, as follow:

Group 1. This class contains artifact number 24GN13-1052, a possible McKean base. This object is either the base of a relatively small lanceolate point or the stem of a relatively large point. The blade edges are straight to convex, no hafting notches exist, and the proximal edge is strongly concave. The cross-section is bi-convex, the lateral edges are alternately beveled, and the proximal edge is bifacially beveled. The maximum width is 15.15 mm, the maximum thickness is 4.10 mm, and the artifact is of CSSR.

Group 2. This group contains artifacts 24GN13- 261, 700, 1188, 1666, and 2507. These artifacts are most likely Hanna points, although 261 somewhat resembles a hafted end scraper. I find it interesting that all the 24GN13 specimens have one lateral edge placed farther than the

other from the midline, and that Hanna points elsewhere are often similarly asymmetrical. Given this attribute, which is a diagnostic trait generally associated with knives rather than projectiles, the possible relationships of Hanna points to knives deserve exploration. Most of the 24GN13 points are of basalt; thus, interpretation is complicated by the fact that the flaking pattern is difficult to discern. A further difficulty is that all five specimens lack part of the distal end (a common feature of this point type). The CSSR point, 2507, has a more definite pattern; the body tends to be horizontally flaked, while the base bears numerous vertical flake scars. The lateral margins are somewhat uneven and vary in shape from point to point. Two of these artifacts, 1188 and 1666, each possess a barb. Beveling of the blade edges is also variable; the proximal edge is most often unifacially beveled. The points tend to be planoconvex, in part because the faces are usually not entirely flaked. The hafting notches, which are set at right angles to the midline, are each shaped like either an ordinary or a flat-bottomed capital U. The notches flare towards the base to form the neck, and were often created by removal of a single flake from each face. Artifacts 261 and 1666 have retouch all around the hafting element, but only part of 700's base shows such treatment; 1188 is beveled from the body to the near edge on only one face, and 2507 lacks beveled margins. The proximal edges are concave.

1666 has a maximum width of 17.65 mm. The maximum thicknesses range from 4.00 to 5.90 mm, minimum neck widths are 14.60 to 15.35 mm, and maximum base widths vary from 14.60 to 15.35 mm. Four points are of MIR; one is of CSSR.

Group 3. This group contains artifacts 24GN13- 753, 969, 1086, and 1261.

These points somewhat resemble Hanna, and could perhaps be classed as such, but in these cases the identification is relatively tentative. I've described these points individually, arranging them in order of greatest to least similarity to the Group 2 points. Each description is a summary of the differences between the artifact in question and the definite Hanna points.

Projectile point 24GN13-753 lacks the extreme distal end and portions of the proximal edge. Deviations from the Group 2 points include material type (cryptocrystalline silicate sedimentary rock) and patterned (diagonal) flaking, both factors contributing to a general appearance more symmetrical than that of the Hanna points.

Artifact number 24GN13-969 lacks the distal tip and much of a lateral edge. It is unlike the Group 2 points in material type (cryptocrystalline silicate sedimentary rock); also, the flaking is patterned (horizontal and to the midline), the base is essentially straight, and the hafting notches and proximal edge display grinding.

Finally, 24GN13-1086 lacks the distal tip. This point is distinguished from the Group 2 points by material type (cryptocrystalline silicate sedimentary rock); also, the complete artifact must have been substantially longer than the definite Hanna points, the proximal edge shows thinning by removal of relatively small flakes and is consequently convex, the cross-section is biconvex, and the hafting notches display, possibly, grinding.

One artifact, 24GN13-1261, is a base. The proximal indentation is deeper than those seen in the Group 2 points, but the major difference is one of size: a maximum thickness at the break of 4.90 mm is within the Hanna range, but the maximum base width of 20.70 mm is substantially larger than that of any of the Group 2 points. The artifact is of MIR.

Group 4. This group contains artifacts 24GN13- 573, 954, and 1172. I have grouped them together because they share laterally constricted to very shallowly side-notched hafting elements. Number 573 is appropriately classified as a Duncan point (see Wormington and Forbis 1965:30); the other two artifacts resemble 573, but are somewhat less convincing as possible Duncan points. Because the grouping is not entirely homogenous, and because these points somewhat resemble the Group 2 examples, I have described these artifacts in terms of their variation from the Group 2 points and from each other.

Artifact number 24GN13-573 is essentially complete. It differs from the Group 2 points in the following features: the distal tip is squared off to form an edge about 4 mm wide; the flaking is relatively regular (collateral); and many small, regular flake scars produce a constriction, distal to which are small, pointed shoulders, in place of hafting notches. The maximum length of 43.90 mm, maximum width at the shoulders of 13.05 mm, maximum thickness of 5.95 mm, minimum neck width of 11.60 mm, and an unmeasurable maximum stem width which was probably greater than the body maximum imply a shape generally different from the Hanna type. Further, the constricted area demonstrates grinding, and the lateral edges of the body display abrasion (preparation for resharpening?). The artifact is of CSSR.

Artifact 24GN13-954 lacks the distal tip. It is unlike the Group 2 points, and 573 above (573 being otherwise similar), in lacking definite shoulders, though the lateral margins do expand, then contract abruptly distal to the constriction. The constricted area and the base edges display grinding. The artifact is of CSSR.

Projectile point 24GN13-1172 also lacks the distal tip, as well as part of the base and most of one lateral edge. It differs from the Group 2 points in its bi-convex cross section and in its flaking (which tends to be collateral); it also diverges from the Hanna type and the other specimens in this group in that the remaining side notch is

unifacially flaked (as was, I suspect, the straight proximal edge). The artifact is of CSSR.

Group 5. This group contains artifacts 24GN13- 304, 1105, 1524, and 2508. These points fit the criteria for the Pelican Lake type. Artifact 24GN13-2508 is a complete point; unfortunately, since it's a relatively late find, I don't have the exact measurements. However, as the outline drawing below indicates, this is a larger specimen than the others. In fact, it has a maximum length of about 60 mm.

Projectile point 304 is complete, while 1105 lacks a barb tip and 1524 lacks the distal tip, part of both faces, and a lateral edge. The distal ends of the more complete specimens are sharp tips placed to one side of the midline. The blade edges tend to be convex, and three of the points have one edge terminate proximally in a barb; 2508, the exception, has two barbs. The hafting notches are U-shaped or flat-bottomed-U-shaped, with the margins flaring equally towards the proximal margin and the tip, and are set diagonal to the midline, creating a stem. The proximal margins vary in shape. All the specimens are planoconvex, as the flaking tends to be irregular or diagonal but not to the midline. Number 2508, which is concavoconvex in longitudinal section, displays almost no flaking on its faces. Beveling of the blade edges is variable; 1524 has a bifacially beveled, nearly serrated edge. The proximal edges are unifacially or bifacially beveled, and the hafting

notches, bifacially flaked, have retouch extending to those edges. The maximum length of 304 is 24.05 mm, that of 1105, 28.95 mm. The maximum width of 304 is 19.40 mm, that of 1105, 24.60 mm. Maximum thicknesses range from 4.10 to 4.90 mm, minimum neck widths vary from 9.00 to 12.30 mm, and maximum stem widths range from 10.80 to 14.95 mm. These points are of CSSR.

Group 6. This group contains artifacts 24GN13-571 and 24GN13-1626. These points could also be placed in the Pelican Lake grouping, but these identifications are relatively tentative. Each description is a summary of the differences between the artifact and the Group 5 points.

Point number 24GN13-571 is complete but for the distal end and the tips of its barbs. Undamaged, it must have been at least 5 to 10 mm longer than the Group 5 points; also, 571 has two barbs, is bi-convex, and has a U-shaped, convex base. Its maximum thickness is 25.70 mm, the minimum neck width is 14.35 mm, and the maximum stem width is 12.90 mm. The object is of CSSR.

Artifact 24GN13-1626 lacks the distal tip. Unlike Group 5 points, it has two barbs, is bi-convex, exhibits patterned flaking (diagonal, not to the midline), and displays bifacial beveling of the proximal edge. The proximal edge and hafting notches show grinding, and the edge has a small central concavity (probably the result of a flaking accident). The maximum width is 22.75 mm, the maximum

thickness 4.75 mm, the minimum neck width 11.50 mm, and the maximum base width 14.00 mm. The material is CSSR.

Group 7. This group contains artifacts 24GN13- 220, 570, and 1872. I have not assigned these points to a named type; I've grouped them because all are side-notched and have bases that lack lateral edges (please see Figure 1 for illustrations).

These points lack the distal end, and 1872 has lost much of the flaked surface on one face. The lateral edges are straight to convex, the hafting notches are placed perpendicular to the midline and are open to greater than or equal to 90°, and the stems grade smoothly or almost smoothly into the proximal margins, forming rounded basal corners. The proximal edges are straight to slightly concave. The cross sections are bi-convex and the flaking irregular. Beveling of the lateral edges is variable, while the proximal margins display unifacial or bifacial beveling; the flintknapper created the hafting notches by removing one or more flakes from each face. Treatment of the hafting notches often extends to the proximal edge.

I obtained no maximum lengths, but maximum widths range from 16.90 to 18.60 mm, maximum thicknesses from 3.50 to 5.35 mm, minimum neck widths from 9.30 to 11.25 mm, and maximum base widths from 11.50 to 16.90 mm. These artifacts are of CSSR.

Group 8. This group contains artifacts 24GN13-238 and 24GN13-439. Both points have shapes and sizes which place them within the Besant type.

Both points have incomplete lateral edges. Number 439 also lacks the distal end and much of one face (the latter as the result of an impact). 238 has a dull tip. The lateral blade edges are convex to straight; the hafting notches are U-shaped, with the proximal sides flaring to form the neck, and are set perpendicular to the midline. The bases were almost certainly wider than the bodies and have straight or convex proximal edges. The cross section of 238 is bi-convex. Flaking and beveling are irregularly present; treatment of the hafting notches does not extend to the proximal edge, resulting in distinct, roughly parallel lateral edges on the base. On 439, the proximal edge displays grinding. The maximum thickness obtained from 238 is 5.00 mm, and the minimum neck widths are 14.55 mm (238) and 15.15 mm. A maximum base width, from 439, is 21.40 mm. Both artifacts are of CSSR.

Group 9. This group contains the artifact numbered 24GN13-569. The point fits the criteria for late corner-notched types; it resembles the Avonlea type as portrayed by Frison (1978), but differs from the type as Kehoe described it (1973:50-56). This artifact is complete. Its size is appropriate for an arrowpoint. In outline, this specimen resembles the Group 5 points, but both lateral edges end

proximally in barbs, the point is bi-convex, the flaking tends to be diagonal and to the midline, and the lateral edges are discontinuously bifacially beveled, with resulting serrations which are better-defined than those on 1524. The maximum length is 19.35 mm, the maximum width is 12.05 mm, the maximum thickness is 2.80 mm, and the minimum neck width is 5.65 mm. The maximum base width is 6.80 mm. The artifact is of CIR.

Group 10. This group contains artifacts 24GN13-437 and 24GN13-1220. These projectile points are triangular and very thin.

Artifact 437 lacks part of one lateral edge but is otherwise complete; 1220 has lost a proximal corner. Both artifacts have an elongated triangular shape and sharply pointed distal end. The lateral and proximal edges of 437 are straight, while 1220 has convex lateral margins and a concave proximal edge. The faces are flat to weakly convex; each artifact has one face completely worked and one left flat (437) or only partly worked. On 437, the flaking tends to be horizontal. The worked face has flake scars extending from the lateral edges and base well into the body. The opposite face is beveled on the proximal edge and on the lateral edges near the tip. 1220 bears horizontal flake scars. Artifact 437 has a maximum length of 28.55 mm, a maximum width of 14.30 mm, and a maximum thickness, near the break, of 1.90 mm. Both artifacts are of CSSR and resemble

Fine Triangular points as described by Flint (1977); they perhaps date to about AD 1600.

Unclassified Points, Point Fragments, and Tools Other Than Points: Descriptions and Classifications

Measurements are in the order length, width, thickness; I listed any I could obtain. For this set of artifacts, I have also supplied measurements of edge angles, which I took using a contact goniometer. I supply these measurements in part because use-wear studies may demonstrate that working edges of different slopes may have been used on different materials. A somewhat different argument is that which Smith and Creasman (1988:4.24 and B.21) mention in their discussion of a site in southwestern Wyoming: they state of probable end scrapers that "the implements with the steeper edge angles (about 80 degrees) were probably resharpened until spent and then discarded." Smith and Creasman note that the range of working edge slopes is from about 55° to 80° degrees. End scrapers at 24GN13 show a similar variation in the slopes of the working edges, and resharpening is a potential explanation.

Joukowsky offers (1986:330) offers another interpretation. She states that "because flake angles are directly related to the function the tool served, these angles must be taken on both the lateral and distal edges of the tool and recorded." She notes that angles of 46-55° on lateral and distal edges suggest numerous functions for the tool, among them skinning or cutting wood and bone. Tools

with angles of 66-75° were implements for heavier wood-working (such as hollowing out logs) and boneworking.

I have omitted some edge angles and listed some measurements as approximate; in these cases, the equipment I used with the rest of the artifacts was not available. Also, the description of faces as flat, concave, or convex refers to cross section, and the terms "edge" and "end" refer to the margin, unless otherwise indicated.

Group A. This group includes artifacts 24GN13- 968, 1261, 1486, 1522, 1744, 1813, and 1873. These objects are probably projectile point bases.

All except 968 have straight proximal edges (968's is slightly concave). The lateral edges expand distally and are concave or straight with no evidence of hafting notches, except on 1873.

Artifact number 968 has two convex, worked faces. The proximal end displays bifacial beveling to 70°; the lateral edges are bifacially beveled to 70-75°. The artifact is of glossy CSSR and has a maximum thickness of 5.50 mm.

Number 1261 lacks much of the hafting element; it was, possibly, a stemmed point. The lateral edges were likely straight to convex, one side having a rounded corner at the proximal end. The opposite corner probably had a small barb. Both faces are badly damaged. The margins are bifacially beveled. This artifact is of CIR, and it has a maximum width of approximately 23 mm.

The artifact numbered 24GN13-1486 is a partial base and midsection. It lacks approximately half of the hafting element. The artifact is of MIR.

Number 1522 has both faces entirely worked; one is slightly convex, while the other is essentially flat because it possesses a "flute" which may be the result of impact during use. Some flake scars extend nearly across the width of the artifact. The end is unifacially beveled to 74° and is about 8.50 mm wide. One margin also bears some unifacial beveling; both edges are flaked to about 65° . The object is of CSSR, and the maximum thickness, near the proximal end, is 6.45 mm.

Artifact 1744 is planoconvex, with both faces bearing large flake scars. The proximal end and edges are bifacially beveled, all rather unevenly, to 65° - 82° . The material is CSSR, and the maximum thickness, at the break, is 5.45 mm.

Both of 1813's faces are convex. Both are also worked, having flake scars extending from the edges to, often, more than half the distance across the body. The end, which bears two thinning scars on one face, has an angle of about 73° , as do the lateral edges. The artifact is of MSSR and has a maximum measured thickness, slightly proximal to the break, of 7.45 mm. This artifact may be the base of a Paleo-age point.

Artifact number 1873 is the base of a side-notched point. Portions of the (ground) notches remain. The artifact is of CSSR, and the base width is approximately 20 mm.

Group B. This group contains artifacts 24GN13- 109, 627, and 835. These objects are appropriately classed as the midsections of projectile points.

Number 109 is a tip and a partial midsection. A straight and a convex lateral edge converge to form the sharp distal point. Both faces are convex and entirely worked, having horizontal flake scars extending approximately to the midline. The lateral edges are bifacially beveled to 45°. The artifact is of CSSR, and a maximum measured thickness, near the break, of 6.65 mm probably approximates the true maximum. Based on the flaking pattern and general shape, this object may be part of a Cascade point.

Artifact 627 is a tip, midsection, and fraction of the proximal end. The convex lateral edges converge distally to form a sharp point. The object is planoconvex, with the convex face being entirely worked. The flat face is only partially reworked and has large flake scars, including one extending nearly across the tool. Both lateral edges are bifacially beveled to 46°. The artifact is of CSSR, with a measured thickness, taken on a promontory, of 4.65 mm.

The artifact numbered 835 is a midsection. The lateral edges are slightly convex. Both faces are convex and are entirely flaked; some of the diagonal scars extend over the midline. The blade edges are bifacially beveled to 46° . The object is of glossy CSSR, and, as the maximum width was probably near the midpoint, the measured width of 24.40 mm is likely to be the true one. The measured maximum thickness is 7.35 mm. Like 109, and for the same reasons, this artifact may be part of a Cascade point.

Group C. This group contains artifacts 24GN13- 2, 159, 242, 268, 270, 288, 574, 632, 1706, 1719, and 1863, and consists of miscellaneous projectile point fragments. Many of these artifacts appear unique or are rather badly damaged. I have therefore described them individually, though briefly.

Artifact number 2 lacks the distal end and part of the base. One ear remains on the indented proximal end, and a shallow hafting notch is present. The lateral edges are essentially straight and parallel. One face is strongly convex, the other weakly so; both, especially the latter, have developed a "skin" of cortex. The flaking is extremely irregular; large flake scars form the proximal indentation (unifacially) and the hafting notch (bifacially). The artifact is of CSSR, with a maximum width of approximately 24 mm, and has a maximum thickness of approximately 10 mm.

Number 159 is a possible base fragment, of CSSR.

Number 242 is the base of a little, stemmed projectile point. The stem has small flake scars on one face; a large scar on the other face results in a slight basal indentation. The flintknapper created the (remaining) hafting notch by removing a single large flake from each face to form a barbed blade edge. The notch displays, possibly, grinding. The artifact is of CSSR and has a maximum stem width of approximately 8 mm.

Artifact 268 could be the base of a thin point. Portions of three essentially straight edges remain; two converge slightly towards the proximal (?) end. The convex face is badly damaged by potlidding and impact, while the plane face is essentially intact and unaltered save for unifacial beveling of the proximal (?) edge. The artifact is of CSSR. It has a maximum width of approximately 14 mm and a maximum thickness of approximately 2 mm.

Number 270 is part of the base and of the midsection of a side-notched point. The proximal edge was probably concave, the blade edges straight. The artifact is bi-convex, with one worked face. The flintknapper created the remaining hafting notch by removing one large flake from the unworked face and multiple flakes from the opposite face. The blade edges are bifacially beveled. The material is CSSR, the maximum width was almost certainly at the bottom of the base, and the maximum thickness is approximately 2.5 mm.

Artifact 288 is most of the body of a projectile point. Possibly, the base had ears now missing; a triangular projection remains below an intact side notch. The edge outline is variable. The point is planoconvex, with large irregular flake scars tending not to reach the midline, is of CSSR, and has a maximum thickness of approximately 3 mm.

Projectile point fragment 574 is either a point base or a point missing part of the base and most of a lateral edge. If the former, one base corner has a sharp point. If the latter, one lateral edge must have had an extremely irregular shape. The alignment of the large uneven flake scars suggests the first alternative and thus a side-notched rather than a corner-notched point (as would be the case with the second possibility). The maker created the notch by removing a single large flake from each face. The artifact is of CSSR.

Number 632 is the base and part of the body of a small projectile point. The proximal edge is slightly concave; the base was probably essentially rectangular and the widest part of the point. Two notches are present, one diagonal to the midline and one essentially perpendicular to it. Above the former, the proximal edge terminates in a barb. The flaking is irregular, and the flintknapper created the hafting notches by removing a single large flake from each face. The point is of CSSR; the height of the base is approximately 7 mm, and the maximum thickness is about 3 mm.

Artifact 1706 is a projectile point lacking part of the base and portions of each lateral margin. The extremely irregular shape suggests that it may have been made from another type of artifact. It is nearly as wide as it is long, and was probably side-notched with a barb on one side. The proximal edge is slightly convex; the lateral edges are also convex and converge to form a sharp tip. Both faces are potlidded. The flaking is extremely irregular. The artifact is of CSSR and has a maximum length of approximately 36 mm. Given the resemblance of this artifact to 24GN13-1105, one might ask whether it is a large, wide Pelican Lake point.

Number 1719 is, possibly, part of the base of a side-notched point. The material is CSSR.

Artifact 1863 is, perhaps, part of the body and base of a small, crude point. The edge margins and the flaking are extremely irregular. The flintknapper removed flakes from both faces to create a notch. The artifact is of CSSR.

Group D. This group contains artifacts 24GN13- 441, 624, 801, 955, 970, 1051, 1234, 1485, 1525, 1627, and 2506, and consists of end scrapers. Of the 11 end scrapers found at the site, 3 are intact, 4 are nearly so, and 4 are badly potlidded or otherwise damaged. The proximal ends tend to be straight, slanting, and unmodified, and the lateral edges are straight to convex, expanding slightly towards the rounded distal ends. These end scrapers, which the

flintknappers made from thick, heavy flakes, usually have their working ends (bits) on the thicker ends of the flakes (that is, the ends opposite the striking platforms). The working surfaces are unifacially flaked on the convex dorsal faces; the resulting edge angles range from 56° to 90° . Some lateral edges are similarly shaped. Large flake scars are present on the dorsal faces, which are usually entirely worked. In contrast, the ventral faces generally lack deliberate modification. If they possess use-wear, it is not visible to the naked eye or under a hand-held lens.

Some variation exists between the artifacts. For example, 481 has both lateral edges regularly shaped to an angle of about 68° , and the distal end and about two-thirds of the intact proximal edge bear step fractures. Artifact number 624 is unusual in that the bit appears to be on the proximal end of the flake. Also, the dorsal face retains some possible cortex, the lateral edges show shaping, and the bit bears step fractures. Number 801 maintains the flake's striking platform on its proximal end, while 955 is distinguished by a scar on the bulb of percussion, step fractures on the bit, and retouch on about two-thirds of one lateral edge. Number 970 has a completely worked dorsal surface, and the bit has a somewhat battered appearance. Artifact 1051 demonstrates retouch on both lateral edges. Number 1234 has a pointed proximal end, retouch on a lateral edge, and step fractures on the bit, while 1485 has an

entirely worked dorsal face and has step fractures on the working edge. Artifact 1525 has step fractures not only on the bit but on one of the two regularly retouched lateral edges. Number 1627 also has both lateral edges beveled, from the dorsal face, to about 64° , but only the bit has step fractures.

Of the intact artifacts, 624 has a maximum length of 27.20 mm, a maximum width of 21.40 mm, and a maximum thickness of 11.45 mm. Number 955 has maximum measurements of 47.20, 25.45, and 7.60 mm; 1051 has maximums of 23.50, 18.65, and 5.00 mm; and 1206 has approximate measurements of 50, 24, and 8 mm. All of the end scrapers are of CSSR.

In addition, artifact number 24GN13-1110 is a possible fragment of an end scraper. It is of CSSR.

Group E. This group contains the artifact numbered 24GN13-14; the object is a multiple-use tool. This intact artifact has a lunate outline; the distal end is a blunt point, perhaps used as a graver, while the proximal end, which appears unmodified, retains apparent cortex. One lateral edge is straight to concave, while the other is roughly convex and might have functioned as a side-scraper. The flat ventral face is unaltered except for some possible thinning of the bulb of percussion; in contrast, the slightly convex dorsal surface bears large flake scars. On the concave edge, an area of single-bevel retouch forms a working surface with a slope of about 56° . The opposite

edge displays use-fractures and some deliberate retouch. However, the dorsal and ventral surfaces just above the point lack evidence of use-wear. This artifact is of CSSR. The maximum measurements are 57.85, 21.80, and 6.60 mm.

Group F. This group contains artifacts 24GN13-752, 772, and 990; these bifaces are shaped like flat-bottomed rain-drops. All are intact and have generally regular margins and smoothed faces. Number 772 is substantially larger than 752 or 990, but is otherwise similar. The distal ends and lateral edges of all three specimens are flat to convex. Two of these artifacts, 752 and 772, have flaked, pointed proximal ends; 990's is an unworked point. The objects are planoconvex, with the flaking irregular or to the midline. The lateral edges of 752 are bifacially beveled to about 70° - 73° , and its distal end shows possible use-fractures. All margins of 772 display bifacial removal of percussion flakes, with resulting edge angles of 55° - 70° . Number 990 has a lateral edge and about half the worked end unifacially beveled to 65° - 69° .

All three artifacts are of CSSR. Maximum lengths range from 42.25 to 58.30 mm, maximum widths from 26.70 to 38.30 mm, and maximum thicknesses from 5.80 to 7.90 mm.

Group G. The single artifact in this group is 24GN13-629, a large, heavy biface blank or knife. This tool is broken; the remaining part is roughly triangular. A convex and a concave edge converge to form a dull point. Both

faces are convex and display irregular flaking. The edges are percussion-flaked but not retouched; the end bears smaller flake scars. The artifact is of CSSR (which includes a crystal cavity). The maximum width (at the break) is 44.00 mm and the maximum thickness is 10.75 mm, or 12.00 mm on a promontory.

Group H. In this group, I've placed artifacts 24GN13-516, 773, and 1523. These objects are partial preforms or knives having one straight lateral edge and one convex one. Number 516 has a rounded distal margin, 773 displays an unaltered proximal end, and 1523 retains a sharp point. All of these artifacts have a convex lateral edge and faces which tend to be convex and unaltered or irregularly flaked. Artifact 516 has its margins shaped to about 68°. Number 773 has lateral edges (unifacially?) beveled to 55°-80°; 1523's are bifacially beveled to 63+ degrees. All of these artifacts are of MMSR. Artifact 516 has a maximum width of 32.20 mm (just above the break) and a maximum thickness (near the middle of the piece) of 6.90 mm. Number 773 has a maximum width, at the break, of 25.20 mm, and a maximum thickness of 5.45 mm. Number 1523 has a measurable maximum width (which may approximate the true maximum) of 26.30 mm at the midpoint and a maximum thickness of 6.75 mm.

Group I. Two artifacts, 24GN13-124 and 24GN13-774, fall within this grouping; they're most probably pieces de esquilles. These two objects are essentially large,

irregular pieces of rock having a thick end which bears apparent use-flaking on one face. The proximal ends may have been broken off during or after use of the artifacts; 124 especially looks badly damaged. Both are of CSSR, and 774 has a maximum width of approximately 35 mm and a maximum thickness of about 9 mm.

Group J. This group contains 24GN13-568, a possible knife. The remaining portion of this artifact has a right-triangular outline. The lateral edge margins are uneven and the edges converge to a dull point. Both faces are slightly convex and somewhat smoothed. The lateral edges and point are shaped, sometimes unifacially beveled, to about 55° . The artifact is of CSSR, and its maximum thickness is 6.40 mm.

Group K. This class contains artifacts 24GN13- 377, 468, 1106, and 1268, and consists of unidentified bifaces having straight to slightly convex proximal edges and straight to convex, essentially parallel lateral edges. Members of this group vary: 468 and 1106 are much thinner than the other two objects in the group, and 468 is considerably smaller than the rest.

Number 377 possesses essentially straight lateral edges, with angles of about 61° , which expand towards the convex proximal end. Both faces are convex and have large, unpatterned flake scars as well as unaltered areas. The remaining end is bifacially beveled on over half its length,

unifacially beveled on the rest, to about 65° . The artifact is of CSSR, has a maximum width (near the proximal edge) of 28.75 mm, and has a maximum thickness (near the break) of 5.90 mm.

Number 468 has a convex and a straight lateral edge; the proximal end is also straight. Both faces are slightly convex and are entirely worked. They have horizontal flaking from the edges as well as scars running inward from the end. On one face, most of one lateral edge displays retouch, and thus is thinned to 50° . The other edge's angle is 26° ; the end's angle is 30° . The artifact is of CSSR and its maximum width is 16.75 mm, its maximum thickness 2.30 mm.

The artifact numbered 1106 has one straight and one convex lateral (?) edge; the latter has a deliberately shaped triangular extension which might have served as a perforating/graving device. Both faces are convex and are entirely worked; they bear large flake scars. The edges are bifacially beveled to about 45° . The artifact is of CSSR, and only the maximum thickness, 3.75 mm, could be recorded.

Number 1268 has slightly convex lateral edges that expand from the straight proximal end, then contract again near the break. Both faces are convex and worked. The lateral edges display bifacial percussion flaking to about 64° ; the end is similarly worked to 58° . The material is

CSSR. The maximum width (near the center) is 26.25 mm, and the maximum thickness is 6.40 mm.

Group L. This artifact, numbered 24GN13-50, is an unidentified biface. Its proximal end has apparently broken off. Also missing is a part of one lateral edge and the adjacent portion of the distal end. The straight lateral margins expand toward what was probably a slightly convex working edge. In all, the general outline is something like that of an end scraper, but there the resemblance ends. Both faces are, for example, worked and slightly convex. The lateral edges are bifacially thinned, but deliberate beveling is limited to the distal end of a lateral edge. The artifact is bi-convex in longitudinal section, with the distal end being unifacially beveled to a sharp edge. The object is of MMSR and has a maximum thickness of approximately 8 mm.

Group M. This group consists of the unidentified biface numbered 24GN13-20. This object lacks a tip; probably, it originally had four sides of unequal length. The general outline resembles that of a Cody knife; however, this artifact is about the size of a postage stamp. The proximal (?) margin is straight and slanting, and both faces are proximally thinned, suggesting that the flintknapper designed the object for hafting. Both lateral edges are straight; they expand towards the distal end until one turns in at approximately 90° angle, slanting to the distal tip.

The object is bi-convex in both cross and longitudinal section, despite an absence of beveling. The flake scars are large and irregular. The artifact is of MIR; the maximum width is approximately 21 mm, the maximum thickness approximately 5 mm. If this object is a Cody knife, it may be evidence of a Paleo-age occupation of the site; Frison's (1978) date for these artifacts is 9,500 BP to 7,500 BP.

Group N. The artifact numbered 24GN13-1630 is a biface fragment. It has a potlidded ventral face and lacks the distal end. The proximal end is present and is straight. The irregularly shaped lateral margins expand from the (unifacially worked) proximal end. The remaining portion of the ventral face is unworked, while the convex dorsal face is somewhat flattened. One lateral edge bears single-bevel retouch or use-wear and has a slope of about 56° - 60° . The proximal faces are thinned. The object is of CSSR and has a maximum remaining width of 32.65 mm and a maximum thickness of 5.75 mm.

Group O. This group contains the artifacts numbered 24GN13- 376, 443, and 1499, a set of miscellaneous biface fragments.

The artifact numbered 376 is a bifacially worked fragment, most likely the neck of a projectile point. The lateral edges demonstrate bifacial beveling; the faces are otherwise essentially flat. The material is either clear glass or a crystal of CSSR.

Number 443 is essentially rectangular, with one edge broken. The margins are straight to slightly convex and tend to be sharp. The artifact is thin, and one face is badly pitted; this surface is flat and probably unaltered. The other face is convex in both longitudinal and cross section, and is entirely worked. The artifact is of CSSR and has a maximum width (?) of approximately 17 mm and a maximum thickness of about 3 mm.

Artifact number 1499 is a small fragment, lacking a distal end, of what may have been a projectile point. The proximal end is straight, and straight lateral edges expand to form knob-like "ears," then contract towards the break. The convex face is mostly worked and bears small irregular flake scars. The other face is essentially unaltered and therefore flat. The lateral edges demonstrate bifacial beveling. The object is of CSSR and has a maximum width, at the ears, of approximately 9 mm, and a maximum thickness of approximately 2 mm.

Group P. These artifacts, numbered 24GN13-633 and 24GN13-957, are thick, irregular biface fragments which differ from each other but which don't fit within any other class. Number 633 has portions of a slightly concave lateral edge remaining. The proximal end retains possible cortex. One of the edges was probably unifacially beveled; the other is definitely unifacially beveled, to about 78°, and bears apparent step fractures. Both faces are essen-

tially flat, probably as a result of deliberate modification, and the cross section is irregular. The artifact is of CSSR and the proximal end has a maximum thickness, taken on a promontory, of 9.80 mm.

The artifact numbered 957 is badly cracked and may have been burned. The intact end is strongly rounded, and the lateral edges (whose remaining portions are straight) converge towards it. The artifact is planoconvex, the flat face being unworked; the convex face bears large flake scars. The end has unifacial beveling (on the flat face) to 78° - 80° . The artifact is of CSSR; its maximum width and thickness were probably on the missing part of the artifact.

Group Q. The single artifact in this group is 24GN13-956, a broad, thin artifact tip. The remaining portion of this object is shaped somewhat like the top half of an aspen leaf. The convex lateral edges converge to a sharp point. This artifact is planoconvex, with an unmodified flat face; the convex face bears large flake scars. The sharp point displays bifacial beveling, and both faces have discontinuous beveling of the lateral edges to about 45° - 50° . The material is CSSR. The maximum width at the break is 22.05 mm, and the maximum thickness is 4.40 mm.

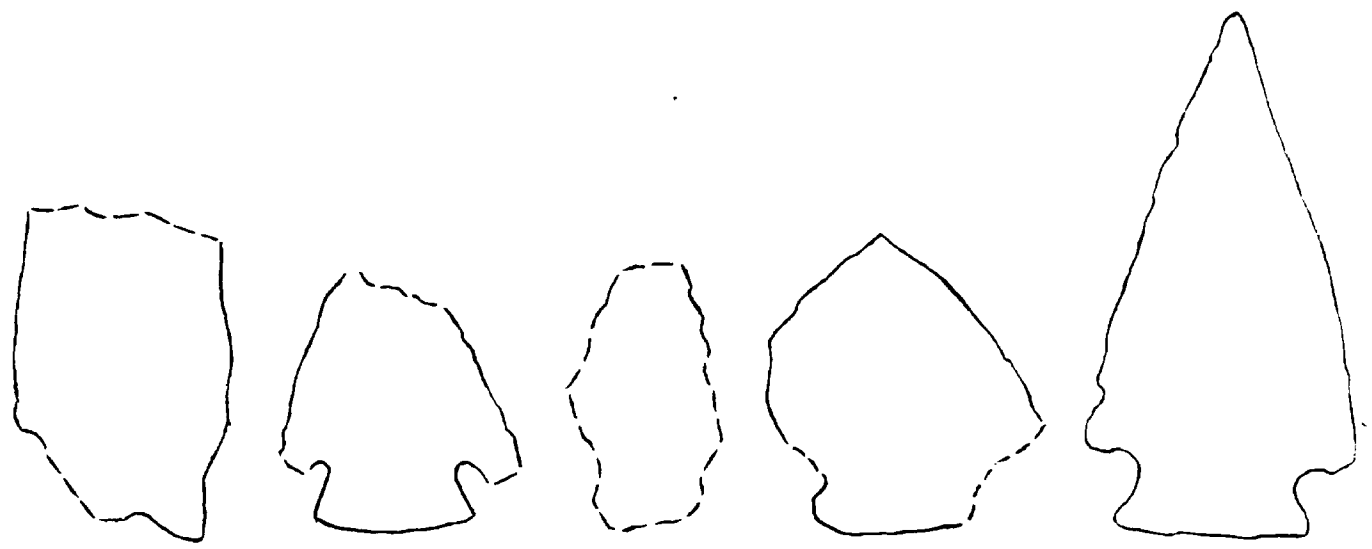
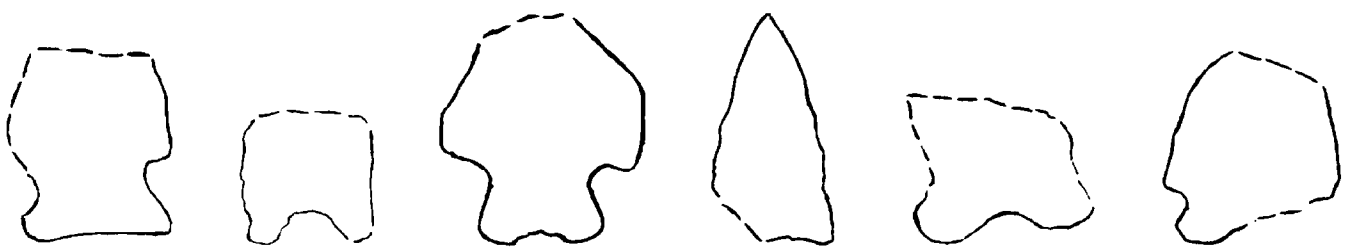
Group R. These are miscellaneous artifact tips, and are numbered 24GN13- 165, 239, 269, 1050, 1219, and 1334. All six artifacts are broken at their maximum widths; straight or convex lateral edges meet in sharp points. The tips are

bi-convex or planoconvex, the former where both faces are worked, the latter where the plane face is unworked. The edges are unifacially or bifacially beveled to about 40° (165, 1219, 1334) or to about 55° (239 and 269) or 57° - 70° (1050). Of the tips, only 1219 has a discernable (diagonal) flaking pattern. 269 is of MMSR; the other tips are of CSSR. The maximum measurable thicknesses are normally at the break; they range from 2.00 mm to 5.50 mm.

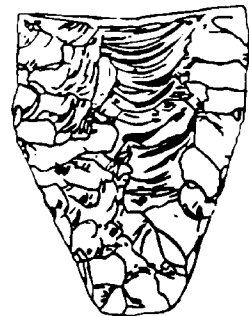
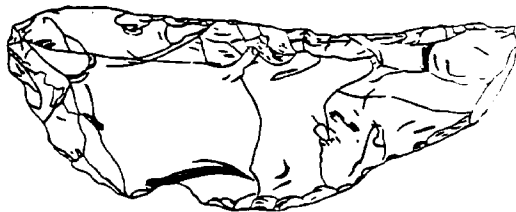
Group S. These artifacts, 24GN13- 498, 701, and 958, are fragments of thick bifaces (perhaps biface blanks). Each possesses at least a portion of one or more convex margin(s), and number 958 has a sharp tip. The faces tend to be convex and either unaltered or irregularly flaked. The edges of 498 and 958 lack deliberate retouch, while 701 displays a small area of possibly deliberate unifacial beveling. Artifact 958 has a maximum thickness of 7.20 mm. All three artifacts are of CSSR.

(Please see the following pages for illustrations.)

Following Page, Figure 2. Outline drawings, all actual size, of the relatively complete projectile points (except those shown in Figure 3) from 24GN13. Broken lines indicate broken edges; "c" marks small areas of intact margins in the midst of damaged areas. From left to right and top to bottom, the points are 24GN13- 220, 261, 270, 574, and 437; 304, 439, 569, 570, and 700; 969, 1052, 1188, 1220, 1261, and 1486; 1524, 1626, 1666, 1872, and 2507; and 2, 571, 1172, 1706, and 2508. Artifact 1052 is from Group 1; 261, 700, 1188, 1666, and 2507 are from Group 2; 969 and 1261 are from Group 3; 1172 is from Group 4; 304, 1524, 2508 are from Group 5; 571 and 1626 are from Group 6; 220, 570, and 1872 are from Group 7; 439 is from Group 8; 569 is from Group 9; 437 and 1220 are from Group 10; 1486 is from Group A; and 2, 270, 574, and 1706 are from Group C.



Following Page, Figure 3: Line drawings of a selected sample of artifacts from 24GN13, at approximately actual size. From left to right and top to bottom, they are 24GN13- 1268, 772, 238, 573, 753, 954, 1086, 1105, 14, and 1522. Artifacts 753 and 1086 are from Group 3; 573 and 954 are from Group 4; 1105 is from Group 5; 238 is from Group 8; 1522 is from Group A; 14 is from Group E; 772 is from Group F; and 1268 is from Group K.



Also present were a variety of modified flakes. Table 2 below, and tables in the section on intrasite spatial analyses, describe these artifacts. Note that this class is probably overrepresented; many of the specimens were small fragments, and I listed as modified flakes those artifacts which I could not identify as recognizable portions of other tools.

Group T. This grouping includes a variety of modified flakes. For convenience, since they are plentiful and varied, I've grouped them morphologically (on the assumption that form reflects function) and presented the data in tabular form.

Table 2: Classification of the Modified Flakes from 24GN13

<u>Modifications:</u>	<u>Working Edges:</u>	<u>Material Types:</u>
Faces Modified, No Bevel.	unifacially altered: bifacially altered:	4 CSSR 2 CSSR
*Single Bevel, Faces Unmodified:	use-beveled on one end only: alternately use- beveled: otherwise use-beveled: deliberately beveled: deliberately, alternately beveled: deliberately beveled, one margin single- beveled, one double- beveled:	2 CSSR 1 CSSR 5 CSSR, 2 CIR 18 CSSR 1 CSSR 1 MIR
Single Bevel, One Face Modified:	use-beveled: deliberately beveled: unworked face is beveled:	1 CSSR 1 CSSR, 1 MMSR 1 CSSR
Single Bevel, Both Faces Modified:	deliberately beveled:	2 CSSR
*Double Bevel, Faces Unmodified:	unifacially, deliberately beveled, with the other face apparently use- beveled: deliberately beveled:	1 CSSR 1 CSSR
Double Bevel, Faces Possibly Unworked (the flakes are damaged):	deliberately beveled:	3 CSSR

* Two of the "modified flakes," one in each of the classes indicated, are portions of the same artifact. As the working edges differ from each other, and therefore the flake might have served multiple purposes, I have listed the pieces separately.

Based on the discussions of tool types presented above, I can tentatively suggest functions for these modified flakes. For example, one would expect that scraping tools would possess single-beveled edges; cutting tools should have double-beveled ones. The deliberately beveled flakes having single bevels and unmodified faces are especially interesting. Some have a bit with a shape and angle which suggest use as end scrapers. Others have a long edge beveled, and perhaps functioned as side scrapers. Several have step fractures, implying use.

Chapter 3: Analyses

In describing the artifacts from 24GN13, conducting analyses of the collection, and presenting my results, I have had three objectives. The first is to identify those artifact attributes (including provenience) which predict other artifact attributes, and to suggest possible explanations for observed associations.

My second objective is to provide a body of data useful in comparisons with those from other local or regional sites (I hope that other investigators will find my work helpful, but, in any case, I am preparing for further investigations of my own). In consideration of this objective, I have sometimes used functional tool classes where I might otherwise have preferred morphological ones. Thus, for example, I have used the term "end scraper" for a class of retouched flakes in which the members share certain morphological attributes, even though these tools might have had a function or functions other than or in addition to scraping (see, for example, Semenov 1964).

My third objective was to identify and suggest some directions for future studies, as 24GN13 has much information yet to offer. Therefore, I have sometimes presented data I gathered to help me evaluate the potential of available comparative data, and suggested means to fill

gaps in existing knowledge of area sites. Regarding 24GN13 in particular, two general considerations for future studies deserve mention here; the reader may wish to keep them in mind when examining the remainder of this thesis.

One issue is the desirability of investigating the various natural processes that influenced site formation. How did sediments get where they are, and how have the processes which put them there influenced the distribution of cultural materials? If one considers this question together with the cultural influences on site formation, it could help us better evaluate the issue of the site's horizontal integrity. It might also help archaeologists identify relatively intact portions of 24GN13, explore (together with continued monitoring) and explain the site's spacial boundaries, or determine which areas of the site might most appropriately be compared in additional analyses.

Also, the degree and nature of the cultural affiliations and/or contacts of groups at the site with peoples in other places perhaps changed through time. Viewing potential movements, migrations, and interactions from a broad perspective on the causes and timing of such events might (when taken with physical evidence such as point morphology, flintknapping technology, and sources of raw materials) help us develop a model to further explore the degree and nature of the potentially various cultural influences acting upon 24GN13's visitors at particular times.

Tools and Debitage from 24GN13

In pursuing the objectives discussed above, I examined a variety of attributes common to the tools and the debitage at the site. Discussions of the effects of fire, the nature of the exploited lithic materials, and the selection of an approach to applying Chi-squared analyses appropriately concern all the flaked lithic materials from the site.

The effects of fire. Numerous artifacts from 24GN13 display characteristics which one can attribute to exposure to fire. Such exposure could be the result of natural fires, exposure to fire in hearths, or deliberate heat-treatment of the materials. I have not yet formally analyzed the collection to identify any heat-treated materials, but current evidence suggests that other agents were responsible for the majority of the observable effects of fire on 24GN13 lithic materials.

Mandeville (1973:177) notes that "ethnographic literature of the late 19th and early 20th centuries contains a number of accounts of the use of heat in the manufacture of chipped stone artifacts." Also (p. 177), "archaeological evidence now indicates that use of this technique was widespread both geographically and temporally." Gregg and Grybush (1976:189) add that "recent studies show that desirable changes, in terms of knappability, take place in chert and many other siliceous

stones if they are heated slowly. at relatively low temperatures, and out of direct contact with intense heat."

Mandeville (1973:191) lists a variety of alterations in cherts as a result of their exposure to fire. Various color changes may occur, either as a result of the loss of water or as a product of the presence of mineral impurities. Collins and Fenwick (1974:191) caution that one must know what the original material looked like before concluding that a particular piece has been heated. Other changes (Mandeville 1973:191) include weight loss (as a result of water loss), decreases in density and refractive index, alterations in surface area, and changes in the results of thermal analyses.

As Gregg and Grybush note (1976:190), however, "the usual subjective indicators of the field archaeologist or laboratory analyst for identifying thermally altered siliceous stone is the presence of lustrous surfaces and color changes in the materials...". Mandeville (1973:183) notes that "the hallmark of heat-treated chert seems to be a flake scar variously described as having a greasy, glossy, or vitreous luster." Only the flake scars made after the heat-treatment show the change, so one can distinguish "before" from "after" flaking. Collins and Fenwick add (1974:140), however, that heat-treatment doesn't make all cherts more lustrous; some instead show a "sugary" texture, perhaps as a result of improper heating. These researchers

state (p. 138) that the size and nature of flake scars and ripple marks in cherts may change with heat treatment.

Mandeville (1973:191) also notes that the effects of heat can include deleterious ones, such as crazing and calcination. Pavlish and Sheppard (1983:793) state that certain deleterious effects of fire suggest exposure in contexts other than heat-treating. Forms of fire damage (p. 793) which presumably are not deliberate include heat crazing, cubical spalling, and potlid fractures. These effects indicate temperatures of about 700°-800° Celsius, and (p. 793) decrease the stone's flaking quality.

Given this discussion, I have two reasons to conclude that much of the heating of stone artifacts at 24GN13 was not deliberate. The first reason is that many artifacts do display potlid fractures; some also demonstrate cubical spalling and/or heat crazing. Cherts seem to be the materials most affected, but that could be because they are most susceptible to the effects of fire or simply because these effects are much more obvious (and much more thoroughly discussed in the literature) on chert than on other materials. If I can identify other evidence that heat-treating went on at the site, this issue of material types deserves further investigation. Unfortunately, it would require data on the effects of fire on materials other than chert, a difficulty since few authors address this matter.

The second reason is that many finished tools display potlud fractures. Logic suggests that flintknappers would not have subjected completed tools to heat-treatment. Not only would they have already concluded the process that the treatment might have aided, but they would risk damage to the implement.

If the fires which altered the artifacts were contained in hearths, one might see patterns in the distributions of affected and unaffected lithics, the former being more closely associated with charcoal or other evidence of the presence of a hearth. However, excavators have not yet identified any features at 24GN13, and artifacts which display the effects of fire appear in units/levels with those which do not. Of course, mixing of the deposits at the site could have disrupted any patterns which might otherwise exist.

Pavlish and Sheppard (1983), who examined small bifacial retouch flakes from the Parkhill Paleoindian site in Ontario, offer another means to distinguish between technological and accidental exposures of lithic materials to fire. They state (p. 794) that "one would assume that, if the heating of flakes was fortuitous, the TL [thermoluminescence] results from the three sampled squares [at the site] ought to reflect this fact with a mixture of both heated and unheated flakes, the former possibly having predominance in the hearth area. If, however, heating was

practiced as part of a technology, one would expect that most or all of the sample flakes would show evidence in their TL output of heating within the relatively recent past, regardless of proximity to the hearth."

Wildfires could also cause all the flakes to show evidence of heating. Given that many of the artifacts at 24GN13 were damaged by exposure to heat, that finished tools are among the damaged materials, and the fact that archaeologists have not identified either heat-treating pits or hearths within the excavated areas, such fires are the most parsimonious explanation for most or all of the heat-related alterations to 24GN13 lithics. However, examination of the finished tools for flake scars which show textures different from those of the rest of the artifacts could be worthwhile. I suggest use of these indicators because they do not require that one know what the raw material looked like, and do not demand special equipment. If any such scars do exist, the hypothesis that they reflect heat-treating should receive testing by more objective means.

Material types. The material types of artifacts from a site potentially reflect many factors; embeddedness (sensu Binford) is may well be one. In that case, logic suggests that the most extensively exploited lithic resources would be those closest to, or most conveniently accessed from, other exploited resources.

Greiser and Sheets (1979) emphasize the functional qualities of raw materials. They studied (p. 289) obsidian, silicified sandstone, quartzite, chert, and chalcedony, using each material to cut into a seasoned oak board. After observing the results, they suggest (p. 295) that materials which flake nicely may not wear well (at least, one might add, if one is cutting into seasoned oak boards). For instance, they note that "most modern flintknappers prefer obsidian for its flaking properties, yet the obsidian specimens tested here were the first to lose their working edges through rapid attrition."

Such factors may cause particular materials to be better choices than others for particular tool types. Gould and Saggars (1985:123) underline this point with a paraphrase (concerning a Maya lowlands site) from the Greiser and Sheets article (1979:296). As Gould and Saggars put it, "the null hypothesis would predict that, if functional criteria in materials were of no significance, the 31 scrapers recovered at the site would subdivide into 19 of chert and 12 of obsidian. In fact the distribution of scrapers by raw material was 31 chert, 0 obsidian." Chert is presumably more suitable for end scrapers because it is more durable than obsidian.

Both sets of authors thus emphasize functional attributes of raw materials. In fact, Greiser and Sheets conclude (1979:295) that "raw material selection occurred

primarily for functional reasons." They add (p. 295) that "archaeologically this translates as statistically significant correlations between classes of raw materials and functional implement categories." Regarding this contention, 1993 materials from 24GN13 should, when added to those I have discussed in this thesis, provide a sufficient sample of artifacts to permit statistical testing for correlations between material and artifact types.

Other reasons for uses of particular materials might include social ones, such as trade connections, aesthetic considerations, difference in the flakability or ease of transport (for example, relatively small cobbles might prove convenient to carry even without any reduction) of particular raw materials, or traditional focus on particular materials or sources.

In any case, an examination of the exploited material types is a prerequisite to searching for explanations for observed patterns, and I have provided one in this thesis.

Statistical analyses. Cannon (1983:785) states that American archaeologists measure quantities in artifact assemblages in three basic ways. These are absolute frequency, diversity, and proportional frequency. We often favor proportional frequency (p. 787), he adds, because we generally assume that it is less influenced than are the other approaches by irrelevant factors such as occupation span. Thus, we believe that it reflects behavior more

accurately than the other methods. Also, he adds (p. 787), we can employ the approach with assemblages of any size.

I have emphasized proportional frequency in my statistical tests for the reasons Cannon sets forth. The approach is especially useful in this case because it provides for intrasite comparisons of areas of the site which have not received equal amounts of excavation and which, perhaps in consequence, have not yielded equal numbers of artifacts.

I present my results in tables. Lewis (1986:282) states that tables are more effective than graphs or figures for displaying quantitative patterns; in this case at least, I find them so. Additionally, I have concurred with his opinion (p. 282) that rounding the expected values to two effective digits is a good practice in the absence of a compelling reason not to do so. As Lewis states, the clarity gained seems to more than compensate for the potential loss of small quantities of information.

I have required a .01 level of confidence to consider correlations meaningful.

Debitage Analyses

Stanley A. Ahler (1989) distinguishes between two types ofdebitage studies; those which emphasize individual flake attributes, and mass analyses. Of the latter (p. 85), he states that "mass or aggregate analysis of flaking debris focuses on size distribution and flake shape information

derived from size-graded debitage samples which are studied en masse."

Ahler prefers such studies, since, in his view, they offer "clear advantages in objectivity and the ability to handle numerically large samples, including data from broken as well as whole flakes" when compared to studies of individual flake attributes. Also (p. 88), because the associated analyses "involve steps such as size-grading, weighing, and perhaps recording only very low-level attribute data, virtually anyone trained in elementary lab procedures can record data in a replicable manner."

Since providing reliable, replicable data suitable for intrasite and intersite comparative studies was one of my major goals in producing this thesis, mass analysis procedures such as those Ahler describes seemed suitable for my study. The size of the collection, and the presence of numerous broken flakes, also argued in favor of this approach.

Given my interest in producing reliable data, I elected to classify debitage on the bases of attributes which I believed that I could confidently identify and which could lead to some potentially meaningful conclusions about the range of flintknapping activities which the debitage presumably reflects. I have therefore used only a few debitage classes, these selected and defined to promote objectivity.

I have thus identified and distinguished between cores, shatter, primary flakes, secondary flakes, and resharpening flakes. The cores from 24GN13 are pieces of flakable stone which bear multiple flake scars demonstrating the removal of flakes large enough to have been made into tools. Two of the cores, one of CSSR, one of MIR, are tabular; the rest are essentially irregular.

I define shatter as any piece of lithic material flaked from another piece in such a manner that one cannot identify the direction of flaking; no bulb of percussion or striking platform is evident.

Primary flakes bear some cortex, here defined on the basis of a rind-like appearance and the presence of visible weathering. Secondary flakes lack cortex. Since many of the 24GN13 flakes are broken, and since some such flakes may have consequently lost the cortex that proclaimed them as primary flakes, such flakes may be somewhat underrepresented. However, this approach is a traditional one, and thus provides well for comparison of 24GN13 data with that from other sites.

Resharpening flakes are a subset of secondary flakes, but I have analyzed them separately since they identify a particular stage in the flintknapping process. These are relatively small, thin flakes bearing three or more patterned flake scars on their dorsal surfaces. Characteristics such as an essentially concavoconvex long section,

the presence of a remnant of the edge of a tool, and a striking platform at an angle suggesting its removal from the opposite face of the tool help identify these flakes.

Regarding material types, I have, in seeking replicability, eliminated 10 relatively uncertain examples of CSSR, MIR, or MMSR from tabulations of material types. These are lithics which grade between materials, or which present other interpretive difficulties. Flakes classed as "other" are those which a geologist has identified as such, or which I have classed based on the criteria he supplied.

I have also recorded the size classes of flakes. As Ahler (1989:89) notes, "size-grading provides a potentially more efficient method [than measuring individual flakes] for rapidly measuring both the upper size limit in a flake sample and something about the overall or average size distribution in that sample." He adds (p. 90) "because flake size can be expected to vary with technology and stage of manufacture, it should be important to record the presence or absence of cortex on flakes according to size grade." Given that the relatively small flakes at 24GN13 are probably underrepresented in the sample, this latter type of analysis may not be appropriate at this time. However, once a larger sample of flakes from 24GN13 undergoes analysis, one could appropriately look for differences in the distribution of primary and of secondary flakes of particular material types in size classes. Also,

given that many excavators still use 1/4" (6.35 mm) mesh, the collection does provide data potentially useful in intersite comparisons. One might ask, for example, whether size class distributions at all the sites suggest the same range of flintknapping activities. Further, one can analyze, as I have done, the relative percentages of flakes of particular material types which fall into each size class and the intrasite distribution of flakes of particular sizes.

Finally, as with the tools, I identified the flakes which show the effects of fire.

A Chi-squared test for independence (without correction for the zero value) of the primary and secondary flakes from 24GN13 arranged by material type (see Table 4, p. 91) yields a rounded value of 6.724. With four degrees of freedom, values lower than 7.779 occur by chance at an average rate of between once and twice in 10 trials. Since I have required a .01 level of confidence to consider correlations meaningful, I cannot state that material type predicts whether flakes are primary (here, defined as bearing any cortex) or secondary. The major differences in observed and expected values are in the CSSR and MIR classes; there are more primary flakes than one would expect in the first group, fewer in the second.

Another potential topic for investigation is that of flake sizes. I measured the flakes using a testing sieve

Table 3: Cores and Debitage Other than Primary and Secondary Flakes, by Material Type

Cores:	3 CSSR 1 MIR 1 MMSR
Shatter/Chunks:	1 CSSR 1 OTHER 1 UNCERTAIN
Resharpener Flakes (defined here as relatively small flakes bearing multiple, patterned flake scars on their dorsal surfaces):	16 CSSR 19 CIR

Note: Table 4, on the following page, presents the quantities of primary and secondary flakes at 24GN13 arranged by material type. Together, Tables 3 and 4 suggest that a far higher relative percentage of all the CIR, as opposed to CSSR, flakes at the site are resharpener flakes.

Table 4:
Primary and Secondary Flakes from 24GN13, by Material Type

<u>Material</u>	<u>Primary</u>	<u>Secondary</u>	<u>Totals</u>
CSSR	68 (60.58)	1,182 (1189.42)	1,250
CIR	3 (4.02)	80 (78.98)	83
MIR	1 (6.83)	140 (134.17)	141
MSSR	7 (7.32)	144 (143.68)	151
Other	0 (.24)	5 (4.76)	5
	79	1,551	n = 1630

Notes: The artifact inventory also included six "obsidian" flakes not listed above. We sent these off for source analysis; one proved to be historic glass. The others were probably secondary flakes. Also, in Table 4 above, and in all the tables which present statistical analyses, the observed values are the unenclosed ones; the expected values appear in parentheses.

having mesh in descending sizes. Flakes in size class 1 are the largest; these did not pass through 25.00 mm mesh. The other mesh sizes are, respectively, 12.50 mm, 5.60 mm, 2.80 mm, and 1.18 mm. Since the smallest screen the excavators used to sift the deposits in the field was 1/4" (about 6.35 mm), flakes in the smaller size classes are presumably under-represented.

The largest number of flakes fall within size class 3, which one might visualize as containing the peak of a distributional curve which descends through classes 2 and 4 to a small value in size class 1 and to nearly zero in size class 5. Again, however, given that the excavators used 1/4" screen, one must anticipate that flakes in the smaller size classes are underrepresented. Thus, the fact that only a single secondary flake fell into size class 5 is unsurprising, and need not reflect on flintknapping activities at the site.

A test (see Table 5, p. 93) of size classes of primary and secondary flakes by material type yields (without correction for the zero values) a Chi-squared value of 61.359. With nine degrees of freedom, one would expect a value higher than 27.877 less than once in one thousand trials, so the result is significant. All the material types show some deviation from the expected results. CSSR tends to be less well-represented in size classes one and three, and better

Table 5: Size Classes of Primary and Secondary Flakes, by Material Type

<u>Material Type</u>	<u>Size Class 1</u>	<u>Size Class 2</u>	<u>Size Class 3</u>	<u>Size Class 4</u>	Totals:
CSSR	18 (22.19)	230 (219.65)	877 (890.85)	85 (77.30)	1210
CIR	0 (1.49)	4 (14.70)	71 (59.64)	6 (5.17)	81
MIR	0 (2.57)	14 (25.41)	122 (103.07)	4 (8.94)	140
MMSR	11 (2.75)	39 (27.23)	94 (110.44)	6 (9.58)	150
Totals:	29	287	1164	101	n = 1581

represented in classes two and four, than is expected. MIR flakes, in contrast, tend to fall into size class three. There are more large flakes of MMSR than expected, and fewer small ones; the reverse is true of CIR.

Regarding stone tools, the sections on intersite and intrasite data, below, summarize my findings. They are included in that section, rather than this one, for ease of comparison.

Intrasite Comparisons: Spatial Analyses

The site's upper and lower terraces invited comparison, since they provide a clear-cut division of the area. The division might also be archaeologically meaningful, since particular groups might have chosen to camp on different terraces for reasons perhaps related to conditions which changed through time or to varied emphasis on the exploitation of particular resources (e.g., water, bitterroot) which differ in distribution.

Investigators have conducted a number of surface examinations on both terraces, and the survey conditions, in terms of the ground visibility afforded by the vegetation, on each are somewhat similar. On the lower terrace, a dirt road provides an area of unusually good ground visibility. On the upper terrace, dirt piles left by rodents are relatively numerous and provide opportunities to examine bare dirt (both from the surface and below it). Regarding the excavated deposits, the units on the upper terrace reflect selection

(based, probably, on the distribution of surface materials). The placement of the units on the lower terrace reflects the cabin's location. Thus, differences in the two samples could reflect differences in approaches to recovery.

Sufficient data exists for several statistical comparisons. In all the tables below, expected values follow observed ones and appear in parentheses.

These tables do not include flakes which came from the immediate vicinity of the creek, so the areas under discussion are the upper and lower terraces proper.

A test (see Table 6, p. 96) for independence of secondary and of primary flakes sorted according to location on the upper or lower terrace yields a Chi-squared value which rounds off to .079; with one degree of freedom, chance alone should produce values lower than .148 more than 70% of the time. Thus, I cannot say that the slight observed differences in observed and expected values are meaningful. In a test (see Table 7, p. 98) for independence of both primary and secondary flakes sorted by material types and location on the upper or lower terrace yields, with three degrees of freedom, a Chi-squared value which rounds to 22.077. Since chance alone would produce a value higher than 16.268 less than once in one thousand trials, the discrepancies between observed and expected values are probably archaeologically meaningful. The major differences

Table 6: Distributions of Secondary and Primary Flakes

<u>Flakes</u>	<u>Upper Terrace</u>	<u>Lower Terrace</u>	Totals:
Secondary	235 (234.13)	1284 (1284.87)	1519
Primary	11 (11.87)	66 (65.13)	77
Totals:	246	1350	n = 1596

appear in the CSSR and MMSR classes. For the former, the upper terrace has less than the expected amount and the lower terrace more; the reverse is true of MMSR.

In a test (see Table 8, p. 99) for independence of secondary flakes sorted according to size class and provenience on the upper or lower terrace, the Chi-squared value rounds off to 28.107. With three degrees of freedom, chance alone would produce a value higher than 16.268 less than once in one thousand trials, so the differences in observed and expected values are probably meaningful. The upper terrace tends to have relatively fewer large flakes and more small ones than one would expect, while the reverse is true of the lower terrace.

The Chi-squared test (see Table 9, p. 100) for independence for primary and secondary flakes arranged by size class and provenience on the upper or lower terrace rounds to 29.059. With three degrees of freedom, chance alone should result in a value higher than 16.268 less than once in one thousand trials, so the differences in observed and expected values are probably meaningful. The effect of sorting according to size classes and terraces is even more marked for both primary and secondary flakes than it is for secondary flakes alone (I have not treated primary flakes separately because the sample is so small).

Table 7: Distribution of Primary and Secondary Flakes by Material Type

<u>Material</u>	<u>Upper Terrace</u>	<u>Lower Terrace</u>	Totals:
CSSR	164 (186.74)	1046 (1023.26)	1210
MIR	25 (21.61)	115 (118.39)	140
CIR	13 (12.50)	68 (68.50)	81
MMSR	42 (23.15)	108 (126.85)	150
Totals:	244	1337	n = 1581

Note: This table does not include flakes of other materials, given their scarcity.

Table 8: Spatial Distribution of Secondary Flakes by Size Class

<u>Locations</u>	<u>Size Class 1</u>	<u>Size Class 2</u>	<u>Size Class 3</u>	<u>Size Class 4</u>	Totals:
Upper Terrace	0 (3.53)	23 (41.96)	184 (173.83)	26 (13.68)	233
Lower Terrace	23 (19.47)	250 (231.04)	947 (957.17)	63 (75.32)	1283
Totals:	23	273	1131	89	n = 1516

Table 9: Spatial Distribution of Secondary and Primary
Flakes by Size Class

<u>Locations</u>	<u>Size Class 1</u>	<u>Size Class 2</u>	<u>Size Class 3</u>	<u>Size Class 4</u>	Totals:
Upper Terrace	0 (4.60)	25 (45.19)	193 (180.13)	26 (14.09)	244
Lower Terrace	30 (25.40)	270 (249.81)	983 (995.87)	66 (77.91)	1349
Totals:	30	295	1176	92	n = 1593

Regarding tools, those numerous enough to test included modified flakes, projectile points, and end scrapers.

The Chi-squared test (see Table 10, p. 102) for independence of tool types arranged according to provenience on the upper or lower terrace yields a rounded-off value of 2.550. With three degrees of freedom, a value less than 3.665 should occur by chance alone between 30% and 50% of the time. Thus, I cannot say that the discrepancies between the observed and expected values are necessarily due to anything but chance.

In a comparison (see Table 11, p. 103) of the spatial distribution of formal tools as opposed to modified flakes, the Chi-squared test for independence yields a rounded-off value of 1.067. At one degree of freedom, one would expect a value lower than 1.074 to occur due to chance alone slightly less than 30% of the time. Tables 10 and 11 therefore suggest that any differences in the distributions of tools of particular classes may be due to chance.

One possibly relevant limitation of the study is that the testing tends to require rather general classes (e.g., that of projectile points as opposed to those of particular point types) as a consequence of the small size of the samples. One exception appears in Table 12 below; I've considered Duncan and Hanna points together because they

Table 10: The Spatial Distribution of Tool Types

<u>Tool Types</u>	<u>Upper Terrace</u>	<u>Lower Terrace</u>	Totals:
Projectile Points	4 (4.16)	18 (17.84)	22
Point Fragments	2 (3.59)	17 (15.41)	19
End Scrapers	1 (1.89)	9 (8.11)	10
Modified Flakes	10 (7.37)	29 (31.63)	39
Totals:	17	73	n = 90

Table 11: Distributions of Formal Tools and Modified Flakes

<u>Artifact Class</u>	<u>Upper Terrace</u>	<u>Lower Terrace</u>	Totals:
All Formal Tools and Fragments	14 (16.13)	66 (63.87)	80
Modified Flakes	10 (7.87)	29 (31.13)	39
Totals:	24	95	n = 119

often co-occur in the levels of Plains sites and thus may be temporal if not cultural contemporaries.

The Chi-squared test (see Table 12, p. 105) for independence of point types arranged by provenience on the upper or lower terrace yields a value of 4.889. At one degree of freedom (but without correction for the zero value), one would expect a value higher than 3.841 in less than 5 of 100 trials. If the Yates' correction for continuity for expected values less than five is employed, Chi-squared drops to 2.75. Values greater than 2.706 occur by chance in less than 10 of 100 trials, so this result might flag an archaeologically meaningful distribution which will become more obvious when the site yields more points of these types. Since the sample size is so small, I prefer not to draw definite conclusions about the distribution until Forest Service personnel recover additional points from the site. However, the result is at least suggestive. The question is of course of special interest because spatial patterns of site use might have differed through time (assuming, of course, that the morphology of these points is time-diagnostic).

Table 12: The Distribution of Projectile Points by Point Type

<u>Point Types</u>	<u>Upper Terrace</u>	<u>Lower Terrace</u>	Totals:
Hanna, Hanna-like, and Duncan (?) Points	0 (2)	11 (9)	11
All Other Point Types	4 (2)	7 (9)	11
Totals:	4	18	n = 22

Chapter 4: Interpretations and Comparisons

Intrasite Data: Primary and Secondary Flakes and Material Types

The lithic materials show few differences in the percentages of primary as opposed to secondary flakes. One possible explanation is that materials entered the site at about the same stage of reduction. Another is that differences in processing produced the percentages. For example, the number of primary flakes of CIR might reflect the possibility that these flakes are relatively small because the flintknappers carefully reduced this material so as to conserve it. In contrast, local materials might have received more summary treatment, and thus be larger but not relatively more numerous.

Regarding tools and material types, Table 14 below demonstrates at least one probable correlation: all of the site's 11 end scrapers are of CSSR.

Primary and secondary flakes arranged by size class and material type suggest differences in either the nature of the raw materials or the ways in which flintknappers processed them. There are more large MMSR flakes, and fewer small ones, than one would expect; the reverse is true of CIR. One factor (at least according to my own experience) might be that CIR flakes tend to be more easily spotted in excavating than are MMSR flakes, and therefore smaller

specimens would be less likely to pass through the screens and be lost. However, this explanation does not account for the unexpectedly low number of obsidian flakes in the larger size classes. When considered in conjunction with the relative proportion of obsidian flakes, as opposed to chert flakes, which demonstrate resharpening rather than some other stage of reduction, these results make a good case for conservation of obsidian at 24GN13.

Intrasite Data: Differences in the Inventories of the Upper
and Lower Terraces

Regarding the differences in observed amounts of CSSR and MMSR on the upper and lower terraces, possible factors are the nature of the groups which camped on each terrace, their routes to the site or other factors affecting the type of material procured (e.g., the tools they planned to make), and the camping locations preferred for particular activities or seasons. Thus, the materials distribution could reflect temporal (or even cultural) preferences for particular materials, coupled with a tendency for some groups to camp on the upper terrace and some on the lower, for whatever reasons.

Among the possible motives for such choices are climatic or seasonal factors; for example, the upper terrace presumably tends to be drier than the lower at all times, and so might make for more comfortable camping during wet periods.

Procurement strategies might also reflect seasonality or other factors influencing the routes people took to the site. They could have designed their rounds to include particular types of lithic sources, or might have exploited nearby sources opportunistically. In either case, the direction from which the flintknappers approached the site might have determined the types of materials that they exploited, then brought to the site.

Regarding the question of size classes, it's worth noting that many of the flakes have broken margins; one might ask whether differences in the percentages of broken flakes might play a role. One potential issue is that the homesteader plowed the upper terrace (Bolton and Hubber 1990), but performed other activities on the lower (such as constructing a cabin and various outbuildings). Even if the homesteader did plow portions of the lower terrace (and perhaps one should not assume otherwise, since the available documentation may simply fail to mention it), most of the artifacts from this terrace come from under the cabin or within its immediate vicinity, areas unlikely to receive regular plowing. Did plowing break flakes on the upper terrace?

It's worth noting that primary and secondary flakes together demonstrate a greater amount of difference in their distribution by size class than do secondary flakes alone. A possible factor is that of material type, since the

samples from the upper and lower terraces do show some differences. For example, the upper terrace does have proportionally more MMSR flakes than does the lower, and these flakes tend to be larger than expected. Other possibilities are that different reduction activities took place on the two terraces, or that the distribution is the result of natural processes which tended to move the heavier materials downslope.

Intersite Artifact Distributions: The Local Cultural Setting

I compared 24GN13 with other area sites using three strategies. First, following Milo McLeod's advice, I considered all the recorded prehistoric sites within an (arbitrarily chosen, and approximated to suit the state's data base of site records) radius of Hogback. Second, again on Milo's advice, I examined area lithic sources. Regarding these cultural resources, note that, since surveyors located some of them during project-related examinations confined to specific areas, the known sites likely represent a limited, potentially biased sample of those which actually exist in the area. The University of Montana's Archaeological Records Office supplied the needed forms, and I have discussed these data in the second and third sections below.

Also, I compared 24GN13 with other area sites similar in that each relevant artifact collection suggests numerous, varied activities. Such sites are, for the area, relatively large; they generally include features (hearths, tipi rings)

that imply occupation. Unfortunately, a lack of specific recorded data limited the effectiveness of this approach.

A major obstacle is that existing reports often don't describe artifact collections completely enough to permit analysis. Patricia Flint (1977, 1982), however, offers useful discussions of three local sites; I have first discussed 24GN61, the Graybeal Site.

Relatively extensive area sites. Site 24GN61 is located about 30 miles north and east of 24GN13. Flint describes (1982:245) the collection of excavated archaeological materials from Graybeal as "that which would be expected from a typical [wintering?; see page 96 and pages 128-130] semipermanent campsite in the Northern Rocky Mountain Region." She argues (p. 254) that apparent exploitation of local lithic raw materials suggests year-round use of the mountain regions, given the times of the year (see page 98) which stone procurement occupies in her proposed annual round of activities. Additionally, Flint adduces the development of projectile point traditions she considers local.

The projectile point types at 24GN61 suggest human use of the locality by 5000 B.C. (p. 224), and that Native Americans continued to camp at Graybeal until at least A.D. 1450 (p. 227). The site's inducements to occupation resemble 24GN13's (p. 224): hills shelter the area from north and east winds; it lies near water sources (here, a

spring and a creek); and the ground is nearly level (p. 241). 24GN61's elevation of about 4,240 feet is somewhat lower than 24GN13's.

Point types. 24GN61 artifacts include projectile points in the Wayne Graybeal Collection; I've contrasted the types with those from 24GN13 in Table 13.

Table 13: Chronologically Arranged Comparison of Projectile
Point Types/Materials at 24GN13 and 24GN61

Notes: I've borrowed Flint's abbreviations for the table below. CN means corner-notched, SN indicates side-notched, and NRM stands for "Northern Rocky Mountain." I've also borrowed her chronologies for the Northern Rocky Mountain physiographic province and adjacent areas. She assigns (1982:218) point types in the Great Basin, Great Plains, Columbia Plateau, and Northern Rocky Mountains physiographic province to five temporal periods, which I have labeled P1, P2, P3, P4, and P5. The assignments are appropriately regarded as being based on the first known manufacture of the point types; some types, most notably Cascade, may date to more than one time period. P1 began about 12,500 BC and lasted until P2, which began about 8000 BC. Starting dates for P3, P4, and P5 are, respectively, 5000 BC, 2000 BC, and the year 0. Where point type dates exist for the NRM province, Flint (1982:217) lists them specifically; in the table above, they follow the words "NRM date." Generally, points listed with only an NRM date are of varieties which Flint believes to be regional (that is, Northern Rocky Mountains) types.

<u>24GN13</u>	<u>24GN61</u> <u>Graybeal Collection</u> (after Flint, 1982, pp. 238-239)
Cascade (?) 2 CIR (P2 if Cascade; 1 MMSR NRM date 5400 BC for similar points)	Salmon River Side-Notched 6 CSSR (NRM date 4890 BC) Mummy Cave c. 3290 BC 1 CSSR (NRM date 3290 BC) Eared Indented Base 1 CSSR (P3; NRM date 3200 BC)
McKean (?) 1 CSSR (P3 if McKean; NRM date 2500 BC for similar points)	Lanceolate Indented Base 1 CSSR (P3; NRM date 2500 BC) Beaverhead 1 CSSR (no specific dates listed)
*753 (?) 1 CSSR (P3 if Pinto)	Pinto 1 MIR (P3) 1 MMSR
*1261 1 MIR (P3 if Oxbow)	
Possible Duncan 2 CSSR (P4) 1 CIR	Duncan 1 MIR (P4)
Hanna 1 CSSR (P4) 4 MIR	
Possible Hanna 2 CSSR (P4 if Hanna) (and perhaps 753 and 1261 above)	NRM Fishtail 1 CSSR (NRM date 1500 1 MIR BC) Hanna Stemmed 5 CSSR (NRM date 1500 2 MIR BC)

(continued on following page)

Table 13, continued

Pelican Lake (P4; NRM date 1000 BC)	3 CSSR		
Possible Pelican Lake (P4 if Pelican Lake)	2 CSSR 1 CIR		
		NRM Convex Base CN (NRM date 856 BC)	21 CSSR 3 MIR
		Small NRM Convex Base CN (NRM date 87 BC)	1 CSSR 1 MIR
Besant (P4; NRM date AD 400 for a Besant variant)	2 CSSR	Besant (P4; NRM date AD 400 for a Besant variant)	1 CSSR
		Blue Dome (NRM date AD 350)	1 CSSR 1 CIR
		Columbia Valley CN (P5)	2 CSSR
		Mummy Cave CN (NRM date AD 734)	1 CSSR 1 CIR 1 MIR
Fine Triangular (?) (NRM date 1594)	2 CSSR	Plains SN (P5)	1 CIR
		Desert SN (P5)	1 CIR

* In the point classification given earlier, I included the examples marked with an asterisk in the group of possible Hanna points. However, 753 somewhat resembles a Pinto Series point, and 1261 looks rather like a "Fishtail," or possibly an Oxbow, base.

Table 13 demonstrates one problem with comparative studies of this type. No universally accepted, standardized terminology exists to help the archaeologist determine which types are truly comparable. Table 13 is thus presented as a descriptive table, not an analytical one. It is useful for comparing time periods of occupation, but not for comparisons of point types per se; a morphological classification system, or some other consistent form of classification, would be required for that. Originally, I had intended the table to suggest the relative strengths of various regional influences on the collections from the two sites; I have now concluded that to do so is inappropriate, given that named types may properly be associated with multiple regions. The McKean type is one example--see Heizer and Hester 1978 for a discussion of its distribution in the Great Basin, Frison 1978 for a discussion of its distribution on the Plains. Also, morphologically similar types may appear in different regions under different names (see, for example, Smith 1988:B.72-B.99). For instance (p. B. 90), large, corner-notched points are usually called Pelican Lake in the Northwestern Plains, but assigned to the Elko series in the Great Basin.

Malouf (1956:294) noted that point types among regions tended to especially resemble each other during his Forager period (which he described as a type of Archaic between periods of emphasis on hunting). He writes that "east and

west contacts during Forager times are strongly implied in the widespread similarities of points and tools in the Plains, and in the Great Basin and Columbia Basin....All of these areas may actually have obtained these traits from a common source." In any case, further studies are probably necessary before archaeologists can use projectile point types as definitive regional markers. However, Young and Bonnicksen (1984) offer a possible alternative.

They state (p. 136) that technological considerations are of interest regarding personal or population affiliations of the makers of stone tools, as these are less easily communicated, and thus reflect learned (more accurately, deliberately taught, as opposed to merely imitative) behaviors more strongly than do shape or use-technology. Peoples may copy the shapes formed by other groups, but they'll do so according to their own technology (of course, Young and Bonnicksen add, one can perform some tasks in only a very few ways, so not all technological considerations are meaningful in this context). Perhaps this approach will be useful in future studies of projectile points as regional markers. Regarding temporal questions, two issues are worth noting: first, the sequences from both sites suggest several thousand years of occupational episodes; second, the majority of points from both sites seem to date to the period from about 5,000 to 1,500 years ago.

Other comparative materials. At Graybeal, Flint and others (p. 241), excavating within a three-by-five-meter grid, recovered additional finds from a T-shaped, sixty-five-centimeter-deep test trench of otherwise unspecified dimensions. Within the trench, they excavated a one-meter square to a depth of 100 cm. This excavation (p. 245) yielded 1,260 pieces of lithic debitage and tools, including 13 partial points and 6 other stone tools. Also present were 2 pieces of shell and 554 bone fragments. At least 327 members of this last class (p. 246), states Flint, resemble the by-products of bone-grease extraction.

Some of the bones which the excavation recovered permitted identification. Graybeal's distinct upper and lower components each (p. 246) contained deer, bison, elk, cottontail, fox, grouse (or a similar bird's), and rodent bones. Given that 24GN61 and 24GN13 are within geographically and environmentally similar areas, one suspects that such animals were available, if not exploited, at the latter site.

Further information about potentially available game species comes from 24GN4, which Flint described in 1977. This site lies about 23 miles to the north, and a little to the east, of 24GN13. Here, bison and mountain sheep bones indicated exploited (preferred?) animals. The site lies at the mouth of a gulch; thus, this location, like those of 24GN13 and 24GN61, offers flat ground suitable for

campsites. Too, it is sheltered from winds by adjacent landforms, and is near water.

In examining 24GN4, Flint (1977) studied Griswold and Larom's (1954) report, and artifacts in Mrs. Fred Decker's collection, as well as archaeologists' surface finds from the 1975 and 1976 field seasons. Her discussion (pp. 34-37) of material and artifact types for this site and for 24GN62 provides the comparative information found in Table 14.

24GN62 is the Mount Baldy Quarry, a chert source approximately 26 miles from 24GN13, and lying to the north and a little to the east. I have included it here because it is the only area site other than 24GN4 for which I have sufficiently detailed data and because it enables me to compare a potential camping area which includes a quarry with two that do not. Note that the CSSR listing for 24GN4 may include some microcrystalline materials, depending on what the investigators described as "flint." See Tables 15 and 16 for some statistical analyses.

Table 14: A Comparison of Artifact Types at 24GN4, 24GN13,
and 24GN62

Notes: I've excluded shatter/chunks and modified flakes, as Flint doesn't mention these items. Also, I didn't list artifacts from 24GN13, such as pieces esquillees, not comparable to Flint's categories. She treated "blade" flakes separately and distinguished between "flakes" and "chips"; I counted all such items as primary or secondary flakes. Note also that Griswold and Larom lumped quartzite and argillite, so MMSR may be slightly overrepresented for 24GN4. Finally, the 24GN13 projectile point count does not include potential examples of the artifact type too fragmentary for confident classification (the numbers in parentheses indicate the number of tool fragments which appear to be portions of points but which aren't sufficiently complete to be assigned to a type; the preceding numbers represent points complete enough to be grouped according to type).

Artifact Type:	24GN4	24GN13	24GN62
<u>projectile points:</u>	9 CSSR 1 MIR 1 CIR 1 MMSR	24 (+16) CSSR 5 (+1) MIR 1 (+1) CIR	N/A
<u>end or unspecified scrapers:</u>	1 CSSR 3 MIR	11 CSSR	12 CSSR 1 MIR
<u>side scrapers:</u>	1 MMSR	N/A	N/A
<u>"spurs":</u>	N/A	N/A	1 CSSR
<u>knives:</u>	4 MIR	<u>possible knives:</u> 5 CSSR 3 MMSR	3 CSSR
<u>choppers:</u>	N/A	N/A	2 CSSR
<u>flakes or cores</u> (Griswold and Larom grouped these artifacts):	156 CSSR 91 MIR	N/A	N/A
<u>flakes:</u>	36 CSSR 7 MIR 2 MMSR	1,250 CSSR (plus 16 resharpening flakes) 141 MIR 83 CIR (plus 19 resharpening flakes) 151 MMSR 5 Other	68 CSSR (plus 8 "blade" flakes) 2 CIR
<u>cores:</u>	1 MIR	3 CSSR 1 MIR 1 MMSR	3 CSSR

Table 14 supplies material for at least two statistical analyses; see Tables 15 and 16.

Table 15: Material Types for Flakes and Cores at Sites
24GN4, 24GN13, and 24GN62

<u>Material Type</u>	<u>24GN4</u>	<u>24GN13</u>	<u>24GN62</u>	Totals:
CSSR	192 (221.29)	1269 (1257.53)	79 (61.18)	1540
MIR	99 (34.63)	142 (196.79)	0 (9.57)	241
CIR	0 (14.94)	102 (84.92)	2 (4.13)	104
MMSR	2 (22.13)	152 (125.75)	0 (6.12)	154
Totals:	293	1665	81	n = 2039

The Chi-squared (see Table 15, p. 121) test for independence of flakes and cores arranged by material type for each site results in a Chi-squared value of 203.031 (without correction for the zero values). With six degrees of freedom, one would expect chance alone to produce a value higher than 22.457 less than once in one thousand trials.

For all the listed artifacts (see Table 16, p. 123) at sites 24GN4, 24GN13, and 24GN62, the rounded-off Chi-squared value is even higher: 214.417. If the probable point fragments from 24GN13 are added, the value increases yet more to 215.254. Given that this table also requires six degrees of freedom, the differences in the distributions of particular flaked lithic materials certainly seem meaningful.

A point worth noting of Table 14 above is that it demonstrates a major problem inherent in this examination: the artifact classes used at the three sites aren't always comparable. Also, the artifact samples differ in that materials from 24GN4 and 24GN62 include a far higher relative percentage of surface finds than do those from 24GN13. Thus, although modern collectors have undoubtedly affected the composition of all three artifact collections (some finds make more interesting display items and/or are easier to spot than others), their influence on the 24GN13 sample may be relatively slight. Also, as opposed to survey, screening is a more effective means of locating

Table 16: Material Types (for All the Artifacts Listed in Table 12) at Sites 24GN4, 24GN13, and 24GN62

<u>Material Type</u>	<u>24GN4</u>	<u>24GN13</u>	<u>24GN62</u>	Totals:
CSSR	202 (237.27)	1309 (1295.17)	97 (75.56)	1608
MIR	107 (37.63)	147 (205.39)	1 (11.98)	255
CIR	1 (15.64)	103 (85.38)	2 (4.98)	106
MMSR	4 (23.46)	155 (128.07)	0 (7.47)	159
Totals:	314	1714	100	n = 2128

relatively small artifacts. When Forest Service personnel have recovered a sufficiently large sample of surface finds from 24GN13, a study involving only the surface collection from that site might make for more comparable data (the outcomes described for Tables 15 and 16 should be compared with results derived from systematic sampling, if and when that becomes possible, before being accepted as definitive).

Intersite comparisons: distributions of material types. Table 14 above is suggestive. For example, (local?) chert is by far the best-represented lithic material at all three sites; since basalt and quartzite are also locally available, the percentage could reflect preference. Quartzite cobbles definitely occur within about thirty miles of 24GN13, at a site discussed in the following section; given the area's geology, which I've discussed briefly below, basalt may also appear within the given radius. Flint (1982:240) names two basalt sources, the Davis Island quarry and an area on Brock Creek, which she believes might have been exploited by the inhabitants of the Graybeal site. Depending on their travels, 24GN13 inhabitants might or might not have found such sources convenient relative to those yielding chert. Regarding obsidian, its presence implies either long-distance movements or trade contacts, or both.

Also interesting is that microcrystalline igneous rock (basalt) appears unexpectedly well-represented at 24GN4.

Possible explanations include temporal considerations, the travels of a particular group, or, perhaps most likely, the spatial patterning of basalt quarries with regard to the sites. Of the first (and perhaps second) possibilities, it's interesting to note that, in the 24GN13 collection at least, Hanna points, which are usually considered temporally diagnostic, are often made of basalt.

Certainly, some researchers have argued that a preference (if we can demonstrate one) for coarse-grained materials reflects the time during which the flintknapper(s) lived. Griswold (1953:22), in one such discussion, mentions Malouf's (e.g., Malouf 1952, or see Malouf 1956 for a discussion of the use of certain material types as a movable trait) studies of intermountain populations in western Montana. The results of these studies (p. 22) suggested that, before A.D. 1700, a fine-grained black quartzite was the most commonly flaked material, with other quartzites and slate being other favored materials for projectile points, knives, and drills. (Griswold adds that, at least in some cases, Malouf mistakenly believed the black material to be basalt.) After that time (p. 22), the preference in materials became "flint, chalcedony, jasper, and chert."

Regarding cryptocrystalline igneous rock and cryptocrystalline silicate sedimentary rock, investigators report tertiary and/or resharpening (regarding the 24GN13 materials, I've used the latter term for relatively small

flakes bearing numerous flake scars on the dorsal faces) flakes at both 24GN13 and 24GN62. Since the latter site is a chert quarry, one might hypothesize that knappers sometimes completely processed new tools, and finished or resharpened old ones (the cryptocrystalline igneous examples, as the material is exotic to the area), at lithic sources. However, the possible blanks or preforms at 24GN13 suggest that flintknappers often didn't finish their work at the quarry. Resharpening flakes at Hogback perhaps indicate that, when they could, the knappers reworked tools rather than return to the raw material source to make new ones, a logical reduction of effort.

Since Flint didn't distinguish between primary and secondary flakes, I couldn't compare the relative percentages of each type. Also, neither Flint nor I have attempted to relate such data to particular production strategies. Thus, the data raise but didn't answer several questions. For example, did local Native American groups most often camp at quarries when they processed lithic resources? If so, do the flakes and possible preforms at sites such as 24GN13 indicate that circumstances (perhaps another group already in residence?) sometimes compelled people to camp away from the source? Or did people chose to camp at sites such as 24GN13 because they offered a resource or resources more compelling or less portable than stone, such as relatively comfortable camping locations or a source

of water? Of course, the preforms and flakes at 24GN13 could also represent reserve materials carried over long distances as a hedge against tool loss or destruction. Alternately, knappers perhaps opportunistically exploited non-quarry sources.

To clarify this issue, I'd hoped to compare artifacts from the Eyebrow chert quarry (24GN501) with those from Hogback. Unfortunately, collectors have removed many artifacts from the former site, and the available data are limited. I will mention only that the site form (Taylor 1967) indicates the presence of rock rings, that investigators found numerous blanks and pieces of large "knives" (one of the latter resembles 24GN13-629, an artifact that I classed as a possible knife), and that the majority of flakes displayed percussion or striking platforms. Did prehistoric peoples usually camp at this particular quarry only long enough to complete the earlier stages of tool manufacture? I dare draw no inferences from such sketchy data. Perhaps future investigators will provide the information we need to better interpret local patterns of cryptocrystalline silicate sedimentary rock procurement and processing.

Intersite comparisons: distributions of artifact types.

The lithic types at the three sites call to mind several questions about the groups who camped there; the typological distributions of finished tools are also suggestive. Lahren

(1976) states that scrapers imply the activities of (female) hide-workers, while projectile points and bones suggest the presence and practices of (male) hunters. Flint (1982:133) adds that (female) bitterroot processors might also have employed scrapers. Perhaps 24GN4, 24GN13, 24GN61 (Graybeal), and 24GN62 (the Mount Baldy chert quarry) inhabitants sometimes camped in family groups, a possibility in keeping with Flint's belief that 24GN61 artifacts reflect semipermanent occupations. As the collection from 24GN13 grows, I might be able to usefully compare (taking into account, as far as possible, whether the on-site presence of particular tool reflects actual use or, say, replacement or resharpening), and considering the use-life of particular tools, the relative percentages of "men's" as opposed to "women's" tools. All-male groups may have occupied the sites more frequently than did families, or vice versa. Of course, it is also possible that all-male and all-female groups used the site at different times.

Seasonality could also be a factor, since one may hunt (using projectile points), but is unlikely to process bitterroot (perhaps using a scraper), during the winter. Unfortunately, I lack data to argue the season(s) of use for 24GN13; perhaps future excavations will supply the necessary information.

Lithic source sites near 24GN13. The Archaeological Records indicate that several quarry sites exist within

about thirty-five miles of 24GN13. Figure 5a (at the back of this thesis) shows the distribution of several of these lithic sources, along with sites which the recorders or Archaeological Records personnel considered potentially associated with the quarries.

I have provided some information about this site sample in Table 17a (also at the back of the thesis). Note that, in providing descriptions of the natural settings, I have used only information from the narrative portion of the site forms, for two reasons. First, not all the investigators provided a mapped site location (various other difficulties aside, appropriate maps might not have been available). Thus, I couldn't always place the site precisely on a topographic map. Second, to provide consistent setting descriptions, I'd need to develop or borrow a set of landform definitions. I consider this unnecessary, and hope that I've instead provided some characterization of the setting in terms of what's most striking to an observer in the field. Also, in discussing the known deposition, please note that "surface" designations apply to all sites, regardless of estimated deposition, for which we as yet have no concrete evidence (e.g., flakes appearing in gopher holes, eroded areas, or excavations) of buried cultural materials.

As the table suggests, these sites possess a variety of known attributes. These samples of the evidence of

prehistoric activities reflect many influences, among them whether or not the reporter had the chance to see the site, the activities of collectors, and the deposition of cultural materials. In at least one case, an investigator crossing private land confined his examination to an access road to avoid trespassing. Under such circumstances, one may, for example, have to restrict oneself to noting that flakes are present, without giving further details. These difficulties limit the inferences one can make based on the recorded data.

Still, we can begin examining the activities that took place at particular locations. One question is whether people normally camped at lithic extraction sites or chose to camp nearby, perhaps in a spot rich in numerous resources, or perhaps near a resource, such as water, which is less portable than stone. We first need to decide how to identify campsites.

Camping activities may produce fire-cracked rock and charcoal, but so can forest fires; we must find definite concentrations, and try to distinguish modern examples from older ones. Bones suggest human activities when they demonstrate evidence of processing (e.g., cut marks), but sometimes mark kill or processing sites rather than camps. Bones broken for marrow extraction, however, logically suggest camps; so do tipi rings and hearths.

Having come so far, we now run into the problem of sample size; only one site, 24GN501, boasts apparent tipi rings, and only 24GN304 has a known hearth. Both are chert sources, but the locations also offer other attractions; 24GN304 is, for example, near a spring, and 24GN501 covers a variety of landforms including high points which offer a good view of the surrounding country and the game (or enemies?) therein. Based on the descriptions in the tables, some but not all of the other exploited sources do offer water; this is also true of nearby, non-source sites. The landforms in question also vary.

Thus, not surprisingly, I can suggest only that sites are where they are for varied reasons. For example, saddles (and ridges?) likely invited travelers. Here, lithic debris may reflect a temporary rest or an overnight stop rather than long-term occupation. Lithic outcrops, sheltered areas, and flat spots all invited use.

A second point is that almost all the sites yielded chert flakes. Of the two exceptions, one contained only basalt and the other only quartzite artifacts. Three or four additional sites produced both basalt and chert flakes, and another displayed artifacts of all three material types.

These data surely reflect the presence or proximity of chert sources, since this is the material all the quarries under discussion provided. Thus, it isn't surprising that chert is the best-represented variety of stone. Its absence

in two sites might be analytically interesting; did the people who camped there prefer coarser-grained materials for whatever tools they processed at the site? In contrast, one site (24GN304) which yielded chert flakes also contained naturally occurring but apparently unexploited quartzite cobbles; one of many possible explanations is that the people who camped there preferred fine-grained materials. The lack of obsidian, however, seems especially curious in that light. Since it does appear in many sites near 24GN13, one suspects that the groups exploiting the quarries had access to the material. The simple, obvious explanation is that people generally visited the quarries to exploit them, and that their flintknapping activities emphasized the resource they'd come to process. The obsidian flakes at Mt. Baldy might therefore represent a fairly unusual occurrence.

Finally, the table suggests some points about attribute distribution and known depositions; since they also apply to the sites described below, I've discussed them in the next section.

Sites of all types in the vicinity of 24GN13. One major difference between the sites listed in Table 17a and those in 17b is that, although chert is everywhere well-represented, other materials appear more frequently in the table in this section. This is true even though 24GN346 is a chert source, and that six of the other (associated?) sites form a cluster in its vicinity; these sites did not

appear on the original quarry list, which I requested several months before I sought the set of records of all sites within twelve miles of 24GN13, and so I've included them with the non-source sites. Of course, they belong in both tables, but this approach saves listing them twice.

Materials other than chert appear fairly frequently at the sites near 24GN346. One possible explanation is that these campsite choices reflect factors other than flintknappers' desire to exploit the lithic source.

A similarity is that site locations probably reflect many considerations, some perhaps specific to the site's purpose (the possibly prehistoric cairns, for example, appear in areas where they're likely to be relatively visible). Water sources and/or flat areas were, evidently and logically, other attractions.

Other worthwhile comparisons could involve the distributions of finished or partly completed artifacts and of debitage at lithic source sites, nearby and potentially associated sites, and other sites. Regarding most of the debitage classes which I've listed in the tables, I should probably conclude that I need more specific information (regarding the distribution of primary as opposed to secondary flakes, for example), and/or larger sample sizes (for example, investigators reported shatter at only one or two of the sites). However, one suggestive association is that investigators recorded cores at 50% (7 of 14) of the

lithic sources, about 17% (4 of 23) of the sites either relatively near the quarries or interpreted as related to them (an assessment perhaps related to the presence of the cores), and at less than 1% (1 of 15) of the other sites. These data suggest two obvious conclusions; the first is that flintknappers, at least sometimes, reduced raw materials to the flake stage at or near the quarries. The second is that (assuming a core to be a piece of material from which the knapper has removed multiple flakes but which does not appear modified for use as a tool) the reduction sequence involved repeated exploitation of a particular piece of material (in a fashion systematic enough to produce recognizable cores).

Regarding blanks or preforms, investigators noted them at only at two or three quarry sites. The distribution of these artifacts might well deserve further investigation (involving a larger sample of sites). Did flintknappers normally reduce materials to (at least) this stage at the quarries, to make them relatively easy to transport? Did they finish tools at the quarries? To answer the second question, we need to identify, as accurately as we can, tools apparently broken during manufacture as opposed to those which broke or wore out during use or which the owner simply lost. We can then examine the distributions of tool types interpreted in terms of the activities which introduced them into the archaeological record.

This question of manufacture versus tool use is one that we should probably address before coming to any conclusions about artifact class distributions at the various sites. The fact that collectors have probably removed most of the patterned artifacts from many of the sites (for example, highly visible sites such as 24GN501, or locations which see modern use as fishing or camping areas) is also relevant. Buried deposits could help, at least in some cases, by adding to the existing artifact and feature samples.

This issue of buried materials helps us pinpoint which of the sites in this and the preceding section should provide the most plentiful additional information about the activities of the sites' inhabitants. These sites, and perhaps those demonstrating several concentrations of artifacts, also often suggest occupations at more than one point in time. Where we can find temporal indicators, then, we can use these sites to examine patterns of site use and distribution at particular times, and perhaps even identify changes through time.

Chapter 5: Conclusions and Future Research

Site 24GN13: The Nature of the Site and its Inhabitants

If one accepts Flint's (1982) conclusions, 24GN13 appears to be a semipermanent, possibly wintering, campsite. Malouf's (1952) ethnographic evidence suggests, in contrast, that it was a temporary campsite. The artifacts themselves, given the varied types, demonstrate only that 24GN13 is better interpreted (at least for some episodes of occupation) as a campsite than as a special-purpose site. The site's location seems an appropriate one for a wintering camp, but we must keep in mind that the nature of use of the site might well have changed through time. Use of ethnographic analogies of course requires some caution, as horses, guns, and disease epidemics presumably affected Native American mobility and hunting strategies as well as the numbers of individuals and numbers and distributions of groups. As we better understand the impact of such effects upon the local Native American populations, we may also gain in our ability to apply ethnographic analogy to issues of prehistoric land use, and thus better understand 24GN13's role in the lives of prehistoric peoples. Too, we may yet find seasonal indicators to help us answer our questions.

The tool classes, if one associates scrapers (for example) with women and projectile points (again for

example) with men, suggest that the site saw at least some use by individuals of both sexes, perhaps at different points in time, perhaps in family groups. The scarred pine trees may also demonstrate the presence of women (who, in ethnographic times at least, generally were the exploiters of this resource) at the site.

If one accepts projectile points as reliable temporal diagnostics, this tool class further suggests that people visited the site over a period of several thousand years. Obsidian hydration analyses would supply dates of deposition for the CIR artifacts, and these might support the evidence offered by the point types. As Michels and Tsong (1980:405) note, "each time a fractured surface is prepared on a piece of obsidian, the hydration process begins from scratch. The depth of hydration achieved on any obsidian artifact, therefore, represents the amount of time that has elapsed since the artisan made the object." However, in using such evidence, one must keep in mind the possibility that some of these objects might have entered the archaeological record elsewhere, then been recovered by later people and transported to 24GN13. The sources of the site's obsidian suggest at least some trade or travel contacts to the south.

Additionally, the uses of CSSR, MIR, and MSSR strongly suggest (but do not demonstrate, given our current inability to usefully determine the sources) exploitation of local materials. More promisingly, it may become possible to use

these materials as chronological markers. As B.A. Purdy notes (1984:122), "scientists have developed techniques and kinetic equations for predicting the extent of weathering during the expected lifetime of a material. Techniques include electron microprobe analysis (EMP), scanning electron microscopy-energy dispersive x-ray analysis (SEM-EXDA), infrared reflection spectroscopy (IRRS), and auger electron spectroscopy (AES) coupled with Ar-ion milling." Thus, when a particular material is considered in the context of the local environment, the depth of the weathering could mark the time period in which the flintknapper flaked the stone.

Material types do show some correlation with size classes. Given the fact that primary and secondary flakes of CIR tend to be smaller than expected, and that the majority of identified resharpening flakes from the site tend to be of CIR despite the fact that it is the least-represented material, the inhabitants of 24GN13 were probably conserving obsidian.

Site 24GN13 and other local sites. The comparison of 24GN13 with other area sites again supports the conclusion that the former was a camp; it has yielded the expected variety of artifacts, including items suggesting tool manufacture. Unfortunately, my data do not supply opportunities to make statistical comparisons between the manufacturing debris present at quarries as opposed to that

at 24GN13. Nor do they allow one to state much more than that some other area sites have, apparently, seen relatively limited numbers of activities; 24GN13 might or might not have functioned as a base camp for groups visiting such sites.

Site 24GN13 and the regional and interregional perspective. If and only if one accepts projectile point types as reliable regional diagnostics, then 24GN13 may demonstrate Plains influence, as well as contacts with the Great Basin (given the possible Pinto point) and Columbia Plateau (given the possible Cascade point fragments). The obsidian sourcing results imply some form of contact with the Columbia Plateau.

The question of local traditions also exists. Although the point groups which I haven't assigned to a named, non-local type have somewhat variable members, a larger sample of points from the site or further comparison with other local materials might suggest that some of these sets are properly associated with the Northern Rocky Mountains as regional types.

Looking Forward: 24GN13 and Plans for the Future
1993, and future, undertakings at 24GN13. In 1992, Forest Service stabilization efforts included structural and external repairs to the cabin, specifically door replacement, re-roofing, and chimney reconstruction. In 1993, workers completed the interior repairs needed to

permit public use of the structure as a recreational rental. They also completed further excavations in areas which will undergo disturbance as a result of site modifications (planned activities include construction of a visitor parking area and a storage shed).

The agency intends to employ the site as an interpretive aid. Signs will present information not only about the area's prehistory, but also mining activities and settlement/agricultural activities. A trail from the visitor parking will invite the public to walk along the terrace and contemplate several thousand years' evidence of human lives and activities.

Future research on the prehistoric artifacts from 24GN13. 1993 excavations at the site yielded a variety of artifacts, adding items such as ground stone tools and perforators to the existing inventory. I hope to begin evaluating these tools in March of 1994, probably with the help of other Forest Service volunteers.

Other questions about 24GN13 involve its geological history and the possibility that relatively undisturbed cultural deposits exist below a depth of 60 cm on the upper terrace. Those of us involved with the site hope that it will eventually be possible to explore these and other avenues of investigation.

Some suggestions for ongoing research emphasizing relatively large local sites. In conducting typological

investigations, one might examine private collections of artifacts from 24GN13. Patterned and relatively large specimens are the ones most easily recognized, and formal tools presumably interest collectors more than do flakes; thus, our sample may lack representatives of some artifact types. Additional specimens could help us infer unrecognized activities and/or periods of occupation. Further examples of mentioned classes might clarify interpretation (for example, points definitely representing certain types would strengthen my more tentative identifications).

The points from the Graybeal collection arguably suggest a stronger influence from the west, and greater elaboration of local traditions, than do those of 24GN13, which tended to yield Plains-type examples. Given the geographical locations and descriptions of the sites, functional explanations for these distributions are relatively unconvincing; one would expect preferred game species, and associated hunting practices, to have been too similar to encourage use of different point types. Arguments requiring different times of use are even less compelling; the implied periods of site occupation are similar, though the point types which imply them sometimes differ.

Thus, if this distinction is not merely a result of sampling or interpretation, it may imply that the use patterns of these sites differed, despite their proximity.

Did groups temporarily leaving the Plains for mountain country occupy 24GN13 more often than Graybeal? Did groups at the former site trade more with Plains inhabitants? As we add to the collection of 24GN13 points and explore in more detail the spatial distributions of the point types in question, we can better address these issues.

Several other potential research topics exist. For instance, some bones might bear cut marks. The animals' species, and perhaps the marks themselves, may help us identify/distinguish prehistoric and historic exploitations of particular fauna.

Further, use-wear and residue studies of the end scrapers might allow us to identify (or at least make better-informed guesses about) the materials on which they were used. An examination of the break patterns of projectile points could also be interesting. Do some fractures suggest that people brought shafts back to the site after hunting with them, there replacing broken points, an activity one would expect to introduce point bases into the archaeological record? Do other breaks reflect faulty raw materials and/or errors on the part of the flintknapper? Or do most of the breaks probably reflect damage by other means, such as plowing? Answers to these questions should help us understand patterns of tool manufacture, use, maintenance, and discard.

Some suggestions for ongoing research involving all local sites. Regarding possible prehistoric uses of 24GN13 as a "base camp," such an approach might, at least to some degree, have substituted for seasonal rounds by increasing the area (and the number and/or variety of resources) which the group could exploit. It might also have augmented cyclic movements by allowing subgroups to exploit a variety of seasonally available resources at the same time. To better understand this issue, we need to identify, if possible, sites at which the residents engaged in a limited number of activities (as indicated by the attributes), and to relate these finds to 24GN13. The distribution of sites possessing particular attributes likely deserves investigation. Also, a comparison of the sites near 24GN13 with those close to, for example, Graybeal or 24GN4 could help clarify the issue.

When related to materials from other sites, Hogback projectile points could assist a study of point traditions. Specifically, one might compare the apparent relative strengths of Columbia Plateau, Great Basin, local, and Plains influences upon each collection. An interesting question, for example, is whether one finds more local-type points in permanent or semi-permanent occupation areas than at those inhabited only briefly.

Lithic types are also of interest. Did most groups, for example, know the area sufficiently well to obtain preferred

materials? Were the various populations familiar enough with the general vicinity of Hogback to emphasize lithic resources in areas which also provided other advantages, such as comfortable camping accommodations? Or did they sometimes either camp in an uncomfortable location or obtain raw materials quickly and then move on to process them elsewhere? If we examine lithic sources, occupations near outcrops, and the types and quality of processed materials, we can perhaps begin to answer these questions.

Finally, the variety of materials and tool types at Hogback make it especially promising for demonstrating activities carried out at area occupation sites. For example, a microscopic analysis of the scrapers could indicate the materials processed with their aid, and thus imply hide working, plant processing, or other on-site activities. We can then compare the tasks performed at 24GN13 with those at sites having various sets of attributes, then use this information to interpret, on a regional scale, the spatial patterning of particular activities.

References Cited

- Ahler, Stanley A.
1989 Mass Analysis of Flaking Debris: Studying the Forest Rather Than the Tree. In Alternative Approaches to Lithic Analysis, edited by Donald O. Henry and George H. Odell, pp. 85-118. Archaeological Papers of the American Anthropological Association No. 1. Tulsa, AZ.
- Alt, David, and Robert W. Fields
1971 Tertiary Paleoclimate and Origin of Drainage--Northern Rocky Mountains. Geological Society of America Abstracts Vol. 3:71. Boulder.
- Archaeological Records Office
1992 (Current copies of forms completed on various dates.) Site forms for the resources listed in Tables 17a and 17b. On file at the Archaeological Records Office, Department of Anthropology, University of Montana. Missoula.
- Binford, Lewis R.
1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. American Antiquity 45:4-20.
- Bolton, J., and A. Hubber
1990 National Register of Historic Places Nomination Form for site 24GN167. Prepared by Historical Research Associates. On file at the Montana State Historic Preservation Office, Helena, Montana.
- Cannon, Aubrey
1983 The Quantification of Artifactual Assemblages: Some Implications for Behavioral Inferences. American Antiquity 48:785-792.
- Choquette, Wayne
1987 Archaeological Investigations in the Middle Kootenai Region and Vicinity. In Prehistoric Land Use in the Northern Rocky Mountains: A Perspective from the Middle Kootenai River Valley. Center for Northwest Anthropology Project Report Number 4:57-120. Washington State University, Pullman.
- Collins, Michael B., and Jason M. Fenwick
1974 Heat Treating of Chert: Methods of Interpretation and Their Application. Plains Anthropologist 19:134-145.

Davis, Leslie B.

- 1972 Prehistoric Stone Quarrying and Redistribution of Yellowstone Rhyolite Plateau Obsidian. Montana Geological Society Annual Field Conference Guidebook No. 21:181-186. Billings, Montana.

Fields, Robert W.

- 1983 Nevada Creek Basin Archeological Project: Western Montana. On file at the Montana State Historic Preservation Office, Helena, Montana.

Flint, Patricia Robins

- 1977 Archaeology and Ethnohistory of the Bearmouth Area. Unpublished Master's thesis, Department of Anthropology, University of Montana, Missoula.

- 1982 The Northern Rocky Mountains Region: Environment and Culture History. Ph.D. dissertation, University of Oregon, Eugene. University Microfilms, Ann Arbor.

Frison, George

- 1978 Prehistoric Hunters of the High Plains. Academic Press. New York.

Gould, Richard A., and Sherry Saggars

- 1985 Lithic Procurement in Central Australia: A Closer Look at Binford's Idea of Embeddedness in Archaeology. American Antiquity 50:117-136.

Gregg, Michael L., and Richard J. Grybush

- 1976 Thermally Altered Siliceous Stone from Prehistoric Contexts: Intentional versus Unintentional Alteration. American Antiquity 41:189-195.

Greiser, Sally T., and Payson D. Sheets

- 1979 Raw Material as a Functional Variable in Use-Wear Studies. In Lithic Use-Wear Analysis, edited by Brian Hayden, pp. 289-296. Academic Press, New York.

Griswold, Gillett (editor)

- 1953 Archaeological Sites in the Flathead Lake Region, Montana: A Symposium. Anthropology and Sociology Papers No. 15, Montana State University, Missoula.

Griswold, Gillett, and Dave Larom

- 1954 The Hell Gate Survey: A Preliminary Archaeological Reconnaissance of the Hell Gate Canyon Area, Montana. Anthropology and Sociology Papers No. 16, Montana State University, Missoula.

- Heizer, Robert F., and Thomas R. Hester
 1978 Great Basin. In Chronologies in New World Archaeology, edited by R.E. Taylor and Clement W. Meighan, pp. 147-199. Academic Press, New York.
- Herbort, Dale
 1987 Montana City Archaeological Study: Environmental Analysis and Prehistoric Settlement. GCM Services for the Montana State Historical Preservation Office. Manuscript on file at GCM Services, Butte, Montana.
- Joukowsky, Martha
 1980 A Complete Manual of Field Archaeology: Tools and Techniques of Field Work for Archaeologists. Prentice Hall Press, New York.
- Keeley, Lawrence H.
 1982 Hafting and Retooling: Effects on the Archaeological Record. American Antiquity 47:798-809.
- Kehoe, Thomas
 1973 The Gull Lake Site: A Prehistoric Bison Drive Site in Southwestern Saskatchewan. With contributions by Frances Eyman. Milwaukee Public Museum Publications in Anthropology and History No. 1. New Berlin, Wisconsin.
- Kuenzi, W. David, and Robert W. Fields
 1968 Depositional Sequences and Their Significance in Interbasinal Correlation of the Bozeman Group (Tertiary), Southwestern Montana. Geological Society of America Special Paper 115:430. New York.
- Lahren, Larry
 1976 The Myers-Hindman Site: An Exploratory Study of Human Occupation Patterns in the Upper Yellowstone Valley from 7000 B.C. to A.D. 1200. Anthropologos Researches International Incorporated. Livingston.
- Leonhardy, Frank, and David Rice
 1970 A Proposed Culture Typology for the Lower Snake River Region, Southeastern Washington. Northwest Anthropological Research Notes 4:1-29.
- Lewis, R. Barry
 1986 The Analysis of Contingency Tables in Archaeology. In Advances in Archaeological Method and Theory, Vol. 9, edited by Michael B. Schiffer, pp. 277-310. Academic Press, New York.

McLeod, Milo

- 1992 Archaeological Excavations at Hogback Homestead. Paper on file at the Lolo National Forest Supervisor's Office, Fort Missoula, Missoula, Montana.

McLeod, Milo, and Douglas Melton

- 1986 The Prehistory of the Lolo and Bitterroot National Forests: An Overview. U.S.D.A. Forest Service. On file at the Lolo National Forest Supervisor's Office, Fort Missoula, Missoula, Montana.

Malouf, Carling

- 1952 Economy and Land Use by the Indians of Western Montana, U.S.A. Paper on file, Department of Anthropology, University of Montana, Missoula.

- 1956 The Cultural Connections Between the Prehistoric Inhabitants of the Upper Missouri and Columbia River Systems. Unpublished Ph.D. dissertation, Department of Political Science, University of Columbia.

Mandeville, M.D.

- 1973 A Consideration of the Thermal Pretreatment of Chert. Plains Anthropologist 18:177-202.

Michels, Joseph W., and Ignatius S.T. Tsong

- 1980 Obsidian Hydration Dating: A Coming Of Age. In Advances in Archaeological Method and Theory, Vol. 3, edited by Michael B. Schiffer, pp. 405-444. Academic Press, New York.

Montet-White, Anta

- 1974 Significance of Variability in Archaic Point Assemblages. Plains Anthropologist 19:14-24.

Odell, George H, and Frank Cowan

- 1987 Estimating Tillage Effects on Artifact Distributions. American Antiquity 52:456-484.

Pavlish, L.A., and P.J. Sheppard

- 1983 Thermoluminescent Determination of Paleoindian Heat Treatment in Ontario, Canada. American Antiquity 48:793-799.

Pederson, Robert John

- 1976 Geology of the Upper Rock Creek Drainage, Granite County, Montana. Unpublished Master's thesis, Montana College of Mineral Science and Technology, Butte, Montana.

Purdy, B.A.

- 1984 Quarry Studies: Technological and Chronological Significance. In Prehistoric Quarries and Lithic Production, edited by Jonathon E. Ericson and Barbara A. Purdy, pp. 119-127. Cambridge University Press, New York.

Sappington, R.L.

- 1984 Procurement Without Quarry Production: Examples from Southwestern Idaho. In Prehistoric Quarries and Lithic Production, edited by Jonathon E. Ericson and Barbara A. Purdy, pp. 23-34. Cambridge University Press, New York.

Schiffer, Michael B.

- 1979 The Place of Lithic Use-Wear Studies in Behavioral Archaeology. In Lithic Use-Wear Analysis, edited by Brian Hayden, pp. 15-25. Academic Press, New York.

Semenov, S.A.

- 1964 Prehistoric Technology: an Experimental Study of the Oldest Tools and Artefacts from Traces of Manufacture and Wear. Translated by M.W. Thompson. Barnes and Noble, London.

Smith, Craig S.

- 1988 Appendix B: Artifact Analysis. In The Taliaferro Site: 5000 Years of Prehistory in Southwest Wyoming. Bureau of Land Management Cultural Resource Series No. 6. Document on file at the Pinedale Resource Area office, Rock Springs, Wyoming.

Smith, Craig S., and Steven D. Creasman

- 1988 The Taliaferro Site: 5000 Years of Prehistory in Southwest Wyoming. Bureau of Land Management Wyoming Cultural Resource Series No. 6. Document on file at the Pinedale Resource Area office, Rock Springs, Wyoming.

Taylor, Dee

- 1967 University of Montana Statewide Archaeological Survey site form for 24GN501. On file at the Archaeological Records Office, Department of Anthropology, University of Montana. Missoula.

- 1973 Archaeological Investigations in the Libby Reservoir Area, Northwestern Montana. University of Montana Contributions to Anthropology No. 3, edited by Susan R. Sharrock. On file at the Department of Anthropology, University of Montana, Missoula.

Thoms, Alston V.

1987 Adaptive Strategies in the Northern Rockies: Land Use and Archaeological Assemblage Variation. In Prehistoric Land Use in the Northern Rocky Mountains: A Perspective from the Middle Kootenai River Valley. Center for Northwest Anthropology Project Report Number 4, pp. 231-278. Washington State University, Pullman.

White, Thain

c. 1953 Scarred Trees in Western Montana. Flathead Lake Lookout Museum Publications No. 8. Lakeside, Montana.

Wormington, Hanna Marie

1965 An Introduction to the Archaeology of Alberta, Canada. Proceedings of the Denver Museum of Natural History No. 11. Denver, Colorado.

Young, David E., and Robson Bonnichsen

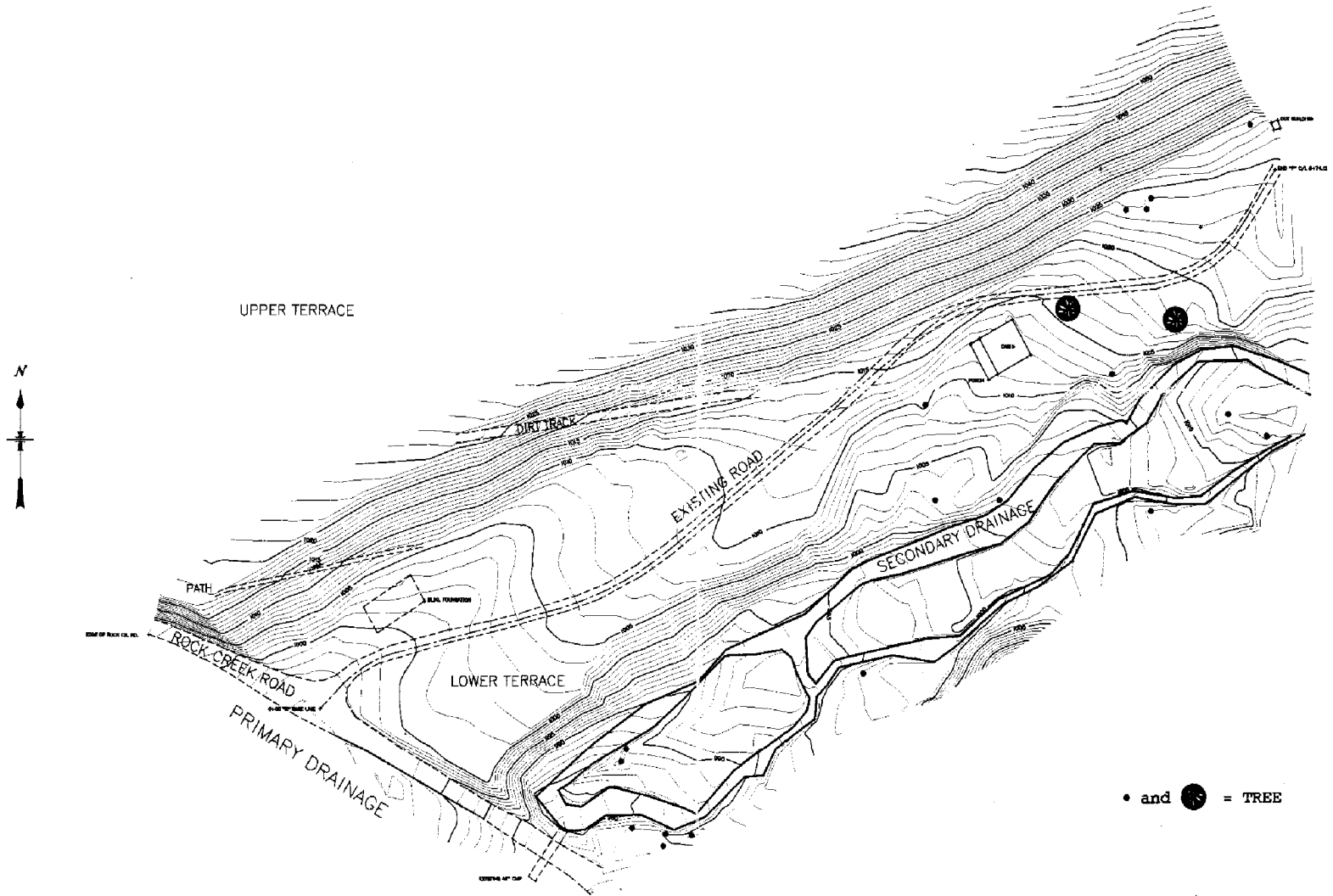
1984 Understanding Stone Tools: A Cognitive Approach. Peopling of the Americas Process Series Vol. 1. Center for the Study of Early Man, University of Maine, Orono.

Young, Donald, and Douglas B. Bamforth

1990 On the Macroscopic Identification of Used Flakes. American Antiquity 55:403-409.

Note: Pages 151 (Figure 4), 152 (Figure 5a), 153 (Figure 5b), 155 (Table 17a), and 156 (Table 17b) are in the pocket at the back of this thesis.

Figure 4: A Bird's-Eye View of The Hogback Homestead Site
CONTOUR INTERVAL = 1'
NOT TO SCALE

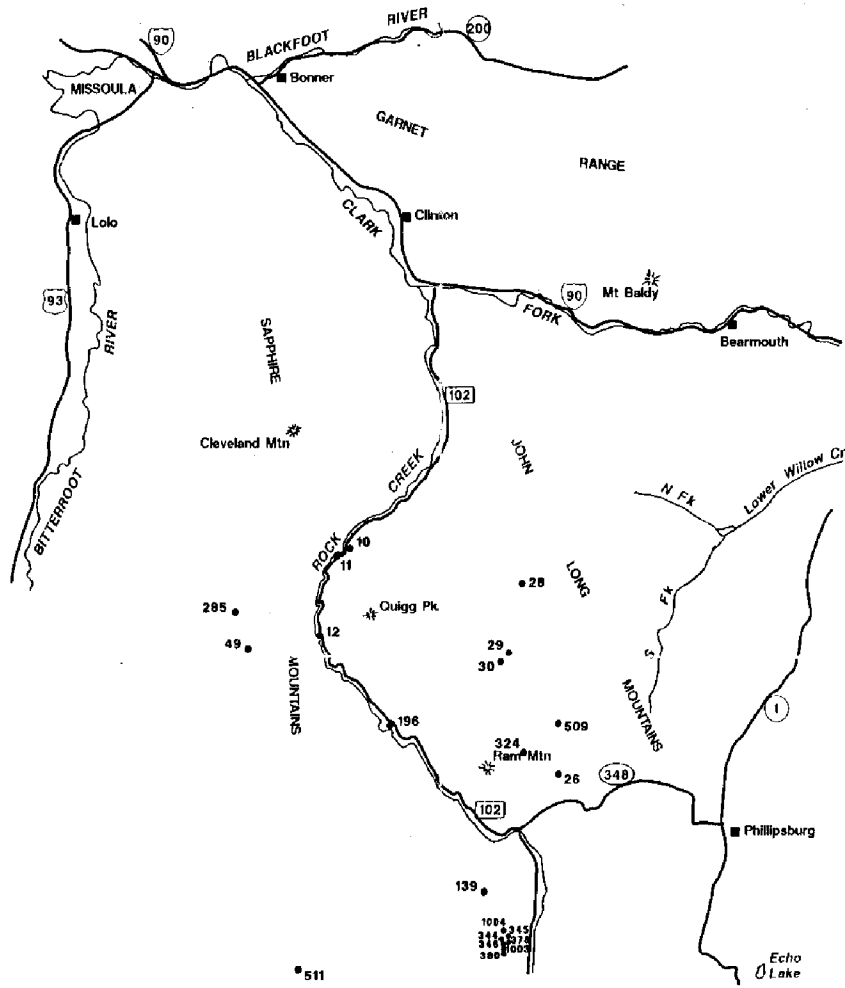


1/28/1974
K3232
A. H. H. H.

• and ○ = TREE

Figure 5b: Sites Listed in Table 17b.

178.40100497
K3000?



● RECORDED SITES



Attribute Key for Tables 17a and 17b

Features/Non-Lithic, Possibly Cultural Remains

- A. Hearth(s)
- B. Depression(s) or pit(s) in the earth (quarry pits?)
- C. Rock ring(s)
- D. Vision quest structure(s)
- E. 3/4 of a rock circle, one course high
- F. Pit(s) in a talus slope (hunting pits?)
- G. Scarred tree(s)
- H. Cairn(s)
- I. Bone--unburned or not described
- J. Burned bone
- K. Charcoal
- L. Fire-cracked rock
- M. "Large hole" in the earth

Lithic Artifacts

- 1. Core(s)
- 2. Flake(s) or chip(s) (not further described)
- 3. Secondary flake(s) (including retouch, thinning, and pressure flakes)
- 4. Primary flake(s)
- 5. Shatter
- 6. Unspecified lithic debris
- 7. Deliberately modified flake(s)
- 8. Use-modified flake(s)
- 9. Probable blank(s) or preform(s)
- 10. Biface(s) or bifacially modified fragment(s)
- 11. Uniface(s) or unifacially modified fragment(s)
- 12. Blade(s)
- 13. Knives(s)
- 14. Scraper(s), type unspecified
- 15. End scraper(s) (working edge presumably convex)
- 16. Side scraper(s) (working edge presumably straight, although one example is sinuous)
- 17. Spokeshave(s) (tools having concave working edges)
- 18. Projectile point(s)
- 19. Unspecified tool(s)/tool fragment(s)
- 20. Flakes "of all classes" or varied but otherwise undescribed debitage
- 21. "Worked and unworked" lithic materials

Note: single question marks indicate attributes which the investigator believed were present, but wasn't as sure of as (s)he was of other finds; double question marks indicate attributes I've inferred from the descriptions.

Table 17a: Known Quarries and Associated Sites within
Approximately 35 Miles of 24GN13

1972, 1973, 1974
R 4224

Site	Attributes	Culturally Modified Lithic Materials	Locations	Known Deposition
24GN34	1,2,5(?), 21	CSSR	streamside, CSSR source	surface
24GN62	1,2,6,18,B	CSSR	CSSR source	surface and perhaps subsurface; flakes appear in gopher holes
24GN105	1,3,14	CSSR (?)	springside, CSSR source, meadow near intermittent stream	surface
24GN146	6(?)	not stated	not described	surface
24GN147	6	not stated	streamside, rise/bench	surface
24GN148	6	not stated	bench	surface
24GN201	2,5	CSSR	saddle	surface
24GN203	2,3,16,18,K,L(?)	CSSR, MIR	saddle, MMSR cobble concentration	surface and buried to at least 3 cm
24GN209	B	CSSR (?) (site destroyed)	CSSR source	surface
24GN213	6,21	CSSR	sheltered hollow, gulch bottom near intermittent stream	surface
24GN216	2,6,14(?),21,I	CSSR	possibly near an intermittent stream	surface, perhaps buried
24GN217	6,21	CSSR	streamside	surface
24GN219	6(?), 18	CSSR	bench	surface
24GN222	1,3,4,6,21	CSSR	rise/ridge, CSSR source	surface
24GN226	2,21	CSSR	not described	surface
24GN232	3,4	CSSR	flat (ridgetop), stream confluence	surface, four concentrations
24GN238	3,4	CSSR, MIR	stream confluence	surface
24GN242	6	not stated	flat area, forks of gulch	surface
24GN260	18,B	CSSR (?)	CSSR source	surface
24GN268	1,2	CSSR	depression	surface
24GN288	6,M	CSSR	bank of intermittent stream	surface
24GN298	2	CSSR	hilltop	surface
24GN304	3,4(?),6,9(?),19,A,J	CSSR	bench, springside, CSSR source	surface to about 30 cm
24GN335	6(?)	CSSR (?)	saddle, CSSR source	buried to, at most, 5 cm
24GN350	1,2	MIR	hilltop	surface, several concentrations
24GN381	6	CSSR	ridgetop, bench, CSSR source	surface
24GN382	6(?)	not stated	saddle	surface
24GN407	2,21	CSSR	ridgetop adjacent to saddle, CSSR source (?)	surface
24GN448	1,2,18,B(?)	CSSR	CSSR source	probably surface and buried
24GN501	1,2,7,9,13,14,18, B(?),C(?),E	CSSR	ridgetop or hilltops, saddle, other areas; CSSR source	surface (?)
24GN535	1,6(?),9,10,13	CSSR, MIR	springside, streamside, CSSR source	surface and buried, several concentrations
24GN1002	2	CSSR	springside and in adjacent drainages	surface, seven concentrations

Table 17b: All Known Sites within Approximately 12 Miles of 24GN13

478, 6/10/17
R 2017

Site	Attributes	Culturally Modified Lithic Materials	Locations	Known Deposition
24GN10	2	MIR	streamside	surface
24GN11	2,L(?)	MIR, MSSR	flat, streamside	surface
24GN12	1,2,7,12(?),18	CSSR	streamside	surface
24GN26	2	CSSR, MIR, CIR	flat (terrace), streamside	surface
24GN28	B(?),H(?)	N/A	scree slope	surface
24GN29	2	CSSR, MIR	flat (meadow)	surface, possibly subsurface
24GN30	H(?)	N/A	knob or "scree peak"	surface
24GN139	2 (and others?)	CIR (and others?)	illegible	illegible
24GN196	G	N/A	flat (stream valley)	surface
24GN323	2,10,14,18	CSSR, MIR, CIR, MMSR	rise, streamside	surface, possibly subsurface
24GN324	7,6(?),L(?)	CSSR	flat (meadow), streamside	surface to 20 cm
24GN344	6,18	CSSR, MIR	ridgetop	surface
24GN345	1,7,8,14,20	CSSR	bench and springside in basin	surface to 8 cm
24GN346	6,18,19,D	CSSR (and others?)	CSSR outcrop, basin, ridgetop	surface, artifacts in three major concentrations
24GN378	2,K(?)	CSSR, MIR	flat, slope, streamside	surface to at least 10 cm-- charcoal at 80 cm
24GN380	1,3,6,8,11,15,L	CSSR, MSSR	bench	largely buried to about 8 to 10 cm
24GN509	H(?)	N/A	hillside	surface
24GN511	3	CSSR	saddle, springside	subsurface; depth at least 15 cm
24GN1003	2	not stated	bench, slope, springside	surface
24GN1004	6(?),14,18	not stated	benches, draws, ridgetops	surface
24RA49	2,7,10,12,15,16,17,18	CSSR, MIR, CIR	saddle	subsurface, about 8 to 15 cm
24RA235	F	N/A	talus slope	surface