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APPENDIX C

JUNE 1975 CONTENTS

EDITOR'S NOTES

As far as I know the location for the Summer Meeting is not definitely decided but it would be delightful to hold it in Shell Canyon.

Items of recent Legislative interest:

The Missouri Legislature is considering House Bill #787 which reserves to the state the exclusive right and privilege of field investigations on state and private lands. Director of the Department of Natural Resources shall designate as an archaeological "site of significance" those important sites on state and private lands, thus providing complete protection even in case of resale or transfer of state agency jurisdiction. All investigations shall be by permit only with the familiar misdemeanor penalty of the National Antiquities Act. It shall be deemed an act of trespass for anyone to remove artifacts from private land without the owners permission.

Louisiana Legislature just authorized a state archaeologist and a Commission to regulate, along with a $50,000 yearly budget. Archaeological materials recovered by authorized agencies, whether from state or private lands cannot be removed from the state until a monetary deposit equal to their value has been deposited with the Commission.

MINUTES OF THE ANNUAL STATE MEETING OF THE
WYOMING ARCHAEOLOGICAL SOCIETY IN THE
HOLIDAY INN, CASPER, WYOMING
APRIL 5, 1975

The meeting was called to order by President, Imogene Hanson at 9:45 A.M. There were 93 members and guests present.

The report of the Credentials Committee was given by Robert Randall and gave the following certified voting delegates:

Norbert Ribble and Larry Osborne, Fremont County Chapter
Mark Miller and George Brox, Cherokee Trail Chapter
Juanita Hinthorn and Helen Bryant, Casper Chapter
Craig Casner and Joe Bailey, Cheyenne Chapter
Charles Catron and Jerry Carbone, Sheridan Chapter
Audry Maycock and Albert Schumacher, Gillette Chapter
Mr. and Mrs. George Babel, Sweetwater Chapter
Jerry Ward and Robert Ellis, Northern Big Horn Basin Chapter

The minutes of the previous State meeting were read by the Executive Secretary, Lou Steege, and were approved as read.

The Treasurer's report was given by Milford Hanson.

The report of the Auditing Committee was given by Art Schoondermark. A motion was made by Robert Ellis that the report be accepted. The motion was seconded and carried.

After a brief discussion on the monies on hand in the treasury, a motion was made by Craig Casner that the Treasurer purchase a $1000.00 C.D. bond. The motion was seconded and carried.

In order to save time for the pending symposium, the President requested that Chapter reports be written and given to the Executive Secretary for publication in the "Wyoming Archaeologist".

The President asked for a show of hands of members present from the following Chapters:

Casper	10	Cherokee Trail	12
Cheyenne	10	Sweetwater	9
Gillette	3	Sheridan	5
Fremont Co.	7	Northern Big Horn Basin	7

Mr. and Mrs. Ned Frost from the Wyoming Recreation Commission were introduced. Mr. Frost reported the operating budget, as approved by the Legislature, had been received by the Recreation Commission. Pending approval by the Governor, there will be an Assistant State Archaeologist and also some additional clerical help. The Recreation Commission will proceed with the development of a visitors area, and a cultural and recreational program at the Medicine Lodge Creek Site near Hyattville, Wyoming.

It was announced that there will be a Navajo rug weaving demonstration at the Arts Council Museum from 1:00 to 5:00 P.M. this afternoon.

The business meeting recessed for a short break...

President Hanson announced the balance of the morning would be allotted to the Symposium, "The Future of the Amateur in Archaeology".

John Albanese, moderator for the Symposium announced the following panelists:
Hal Jensen representing the Bureau of Land Management
Dr. DeBlois representing the Forest Service
George Zeimens, University of Wyoming
Dr. George Frison, State Archaeologist
Milford Hanson, Wyoming Archaeological Society

There were discussions by each panelist on the legality of surface collecting of artifacts by individuals; the role of the amateur in making surveys; the investigations of historical and prehistorical sites, and the preservation of historical and prehistorical sites on all public lands. All panelists were in agreement that the Federal Antiquity Act should be enforced and that no special favors be granted to any specific activity in multiple use areas. There were numerous written questions directed to the panelists from the floor. The Bureau of Land Management is definitely opposed to any type of surface collecting on "their" lands. Dr. DeBlois stated that the Forest Service would continue to seek the cooperation of the University of Wyoming and the Wyoming Archaeological Society to assist with the archaeological investigations whenever a site was in danger of destruction. On all public lands surface collecting of artifacts is prohibited. Excavations of sites will be limited to qualified and certified personnel only, and on a permit basis from the controling Department. The Future of the Amateur in Archaeology will depend entirely upon the limits of his certification.

Meeting recessed for lunch at 12:10 P.M.

Business Meeting reconvened at 1:30 P.M.

George Zeimens introduced the following students at the University of Wyoming:

Danny Walker
Julie Francis
Jeanie Ladore
Debbie Foster

Tom Larson
Dave McGuire
Mark and Leona Miller

President Hanson announced that the banquet would be at 7:30 P.M.

The Legislative Committee report was given by Glenn Sweem. Mr. Sweem reported that the endeavors of the group to get some assistance for the State Archaeologist were solved by budgetary means rather than legislative action.

Jim Adams, chairman of the Petroglyph Committee reported some progress in the photography and documentation of petroglyph sites in his area. Mrs. Hanson stressed that all should get involved in this project which should be statewide.

George Zeimens introduced Dave McGuire who gave an account of the investigations at the Lummis Ranch Site. This site was a salvage project, and will be destroyed by highway construction in the Cheyenne area. 11 units were excavated, which included 5 components---4 Middle Period and one Late Period occupations.

Julie Francis has set up a site file at the University of Wyoming. She passed around some of the new site forms, and gave instructions as how to complete these forms. It is imperative that the Society members fill out forms for each site and get them into the University files.

Some discussions followed on standards and guidelines for cataloging artifacts and the reporting of sites. It was suggested that the incoming President appoint a committee to assist in drawing up these standards and guidelines. George Zeimens announced that he would work closely with all the Chapters this coming Fall and Winter with the recording of sites and artifacts.

President Hanson stated there is a definite need for Executive Board meetings to be held periodically during the year to cope with the increasing business of the Society.

John Albanese announced there would be a meeting of the Board of Directors of the Wyoming Archaeological Foundation at 9:30 A.M. Sunday morning. All members of the Archaeological Society are invited to attend.

The annual scholarship was awarded to Mark Miller. President Hanson announced that the $300.00 contribution to the scholarship fund was given by the Cherokee Trail Chapter.

Debbie Foster expressed her appreciation for the scholarship awarded to her last year by the Society.

The Educational Committee report was given by Robert Randall and Larry Osborne. The needs were outlined as follows:

1. A Speakers Bureau.
2. Collections of slides with tape recorded narratives of Field Work.
3. Student orientation towards Archaeological Field Work.

All are needed in the school systems to stimulate student interests in archaeology. This is a valuable endeavor and hopefully the Society will keep this project going.

Dr. Frison was called upon to give the State Archaeologist's report: There was an overwhelming number of Survey reports. Many surveys were made with the assistance of Chapter members. Many sites were discovered by these surveys. There will still be many more surveys to be made and Society members may be called upon to assist with these. Medicine Lodge Creek projects will be concluded this summer including some 25 paleo levels within the peripheral area. The faunal analysis of the Medicine Lodge Creek Sites will be the Master Thesis by Danny Walker. The Lookingbill Site near Dubois is to be investigated this summer. This is a mountain sheep and mule deer procurement site located on lands controlled by the Forest Service. A permit will be obtained from the Forest Service for this investigation. Hopefully, a Buffalo kill site near Upton will be investigated. This site appears to be late archaic. A re-appraisal of the Hawkins Site has been submitted to American Antiquity for publication. This is an early altithermal site with an intermediate bison group. Excavation of the Hanson site will be started this summer and the investigations at the Colby site will be continued. An invitation to hold the Summer meeting at the Hanson Site was extended to the Society members by Dr. Frison. This site is located near Shell, Wyoming. If complications arise and the meeting could not be held at the Hanson site, the Colby site would be an alternate meeting place. The invitation was accepted unanimously.

No recipient was named for the annual "Trowel" award.

John Albanese announced the following slate of officers as selected by the Nominating Committee:

President:	George Brox
First Vice President:	George Zeimens
Second Vice President:	Robert Ellis

A motion was made by Norbert Ribble that the nominations be closed; the report as given by the Nominating Committee be accepted, and a unanimous ballot be cast for the slate of officers. The motion was seconded and carried.

Larry Osborne was appointed to fill the office of Executive Secretary due to the resignation of Lou Steege.

There being no further business, the meeting was adjourned at 2:45 P.M.

Lou Steege,
Executive Secretary

MARCH AND JUNE, 1975
TABLE OF CONTENTS

MARCH AND JUNE, 1975
LIST OF FIGURES

MARCH ANDJUNE, 1975
LIST OF TABLES

CONTINUED FROM MARCH ISSUE

AN ARCHAEOLOGICAL SURVEY OF THE JACKSON HOLE REGION WYOMING

by

Charles M. Love

A THESIS

SUBMITTED TO THE DEPARTMENT

OF ANTHROPOLOGY AND THE

GRADUATE SCHOOL OF THE UNIVERSITY OF WYOMING

IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

University of Wyoming

Laramie, Wyoming

July, 1972

CHAPTER V

INTERMONTANE SITES

The following locations, description, and analyses represent selected areas in or near the Gros Ventre and Teton Ranges. It is not suggested that the patterns and conclusions formed from this small sample will stand any test of time, or be applicable to the five other ranges surrounding Jackson Hole which were not samples. The reason these two ranges are singled out is partly due to the writer's familiarity with them, and partly due to the fact that two major travel routes and several lesser ones involve them. It should be remembered that many of the flakes found in the following sites have use or deliberately retouched edges.

The Lower Gros Ventre River Drainage

Many of the sites in the lower Gros Ventre drainage are well known to local residents who have collected rather extensively from them. There are however, a number which have missed public detection as well as a few which are more rumored than accurately reported. Several sites to be discussed have received passing mention in earlier sections.

The lowest potential site reported in the Gros Ventre canyon area is on the north side of the canyon near the National Forest - Park boundary. From a cut bank, an accumulation of probable bison bone was weathering out and migrating down the slope. No cultural materials were mentioned for this site and it was not investigated.

Upstream on the north wall of the canyon above Lower Slide Lake, the sampled carbon layer taken from a delta built into a previous lake was investigated. It was originally thought that bison bones might be weathering out of this 5,000 year old deposit, but those collected appeared to have belonged to an aged bison whose skeleton was covered in a filled-in gully cross cutting the delta. No butchering marks were discovered on the bone and no hint of artifactual material was observed.

At least two sites exist in the vicinity of the mouth of Crystal Creek. One of these was reported to be a stone circle located on a bench near a red butte. The other is on a ridge overlooking a part of the Gros Ventre canyon. Although numerous collections have been made on this particular ridge, its potential may not yet have been realized. A few of the artifacts collected there were available for study (Fig. 12b-f). The remains of stone circles are present with much fire-cracked rock and debitage. One report mentions small rock shelter structures under some nearby cliffs, but this has yet to be verified. The roots of some huge solitary pinyon pines have been greatly exposed in protected places on the ridge and it was

thought that this was due to the stomping action of buffalo in the shade.

There are reports that remains of wickiups are present on the divide between Crystal Creek and Alkali Creek but search efforts have been in vain. Closer to the Gros Ventre River is a reported stone line or possible pound structure. Since this area is a favorite of migrating antelope, this structure needs to be studied. Unfortunately the information concerning this site was received after the field season.

An area recommended for search was north of Upper Slide Lake. Many bison bones in an old marsh were reported although no artifacts have been found associated with them. Upon visiting the site, the bison bone referred to is in moderate abundance, but it is associated with an actively seeping bod which may have been an area of winter kill. However, a site of possible importance was located half a mile away, and the top six inches were removed in a hasty attempt to determine its extent. While no cultural materials were uncovered, the bones of several animals were found concentrated in a small area. While long bones were not in evidence, all ribs along the left side of one carcass had been broken near the articular end, and one scattered rib fragment was found with indisputable cut marks. The bones recovered represent one yearling deer, an immature elk, and a much older or post mature bull elk. The deposits containing these remains are geologically very young, possibly as late as 1900. A metate was found less than 100 yards away on a nearby bench (Fig. 13).

A mile upstream from the Gros Ventre River bridge is Collier spring. Nearby are buildings and haysheds belonging to the Wyoming Game and Fish Commission. On the bench above the spring are the remains of perhaps half a dozen destroyed stone circles and much fire-cracked rock. Although most of the flaked materials have long since been collected, fortunately a few remained for analysis. Seventy per cent of the flakes obtained were chert, including one piece of silicified wood, perhaps from the Green River basin area. While the rest of the flakes were mostly obsidian, one flake of black ignimbrite, not quite like the Conant Pass materials, and one flake of silicified tuff were also collected. Among the cherts, a slightly concave base of a large side notched projectile point was recovered. If this small collection can be considered representative, one hypothesis might be that it represents a camp site used by populations both entering and leaving Jackson Hole. The high percentage of cherts indicates perhaps more use of this route as an inroad, since the much smaller percentage of obsidian would have to be carried in from farther west.

At the mouth of Dry Cottonwood Creek canyon the surface of a low bench to the south contains two or three partly destroyed stone circles. Most of the cultural materials have been completely removed. A few flakes of obsidian, chert, but primarily quartzite were found along with hammerstone, a core, and a few chunks

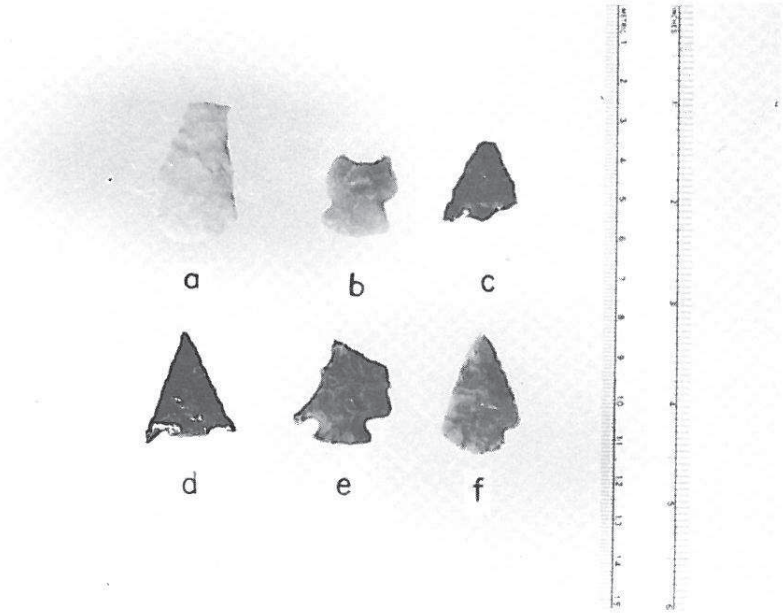

Figure 12. Possible awl or drill from Two Ocean Lake: a. Artifacts from a ridge near the mouth of Crystal Creek: b-f.

Figure 13. Metate found near Upper Slide Lake.

of an orange sandstone metate. Nothing diagnostic was discovered.

As mentioned previously, some miles to the north of this part of the Gros Ventre River is the topographic feature known as gunsight notch. It is in this cleft, reported pinyon pines have been crudely and partially chopped through, then green-bent for their cones. This has not been confirmed.

At least 16 stone circles can be found on the 110 foot terrace near the mouth of Cottonwood Creek. Either some disturbed rings exist on the southeast edge of this group or there are some peculiar stone figures visible. Most of the rings are within the range of 12 to 18 feet in diameter. All of those with an apparent fire hearth in the center have been dug into by local collectors. The only artifactual materials left were a number of large, hard quartzite cores, spalls, and a few flakes. No chert or obsidian was present. These rings are in different stages of burial on the terrace, but their placement pattern suggests contemporaneity. They are strung out in a slightly curved line along the southeast edge of the terrace overlooking the river. The circles at the southern end are a little jumbled and grouped.

From several sources come reports of two or more groups of stone circles. One is several miles upstream on the west terrace of Fish Creek, and the other is high on a ridge between Bacon Creek and the Gros Ventre River. On this latter ridge is also reported a huge tepee structure with the poles standing around a central tree. This has been searched for but without success.

The Upper Gros Ventre Drainage

All sites in the following discussions are above 8,000 feet. There are no sources for flaking materials in the entire region, save the rarely used and poor quality chert nodules in the Madison Limestone. The nearest Precambrian quartzite cobbles are downstream in the lower Gros Ventre drainage.

Only one petroglyph site has ever been reported in the Jackson Hole region, and this one is apparently on the west side of the Tetons (Driggs 1970: p. 171). This needs to be verified. However, two separate glyphs were found on the Nugget Sandstone near the Darwin ranch (Fig. 14). This is far closer to the Green River than it is to Jackson Hole proper. Beneath the panel is a small flat area from which were obtained a number of chert and obsidian flakes, the latter in a minority. The site is some 45 difficult miles from the nearest obsidian source at the white hills. A small test hole was scraped away and showed flakes to exist at least down to 6 inches below the loose surficial dung and dirt. This site should be tested very carefully, for dispersed charcoal occurs on the surface and at depth. There is the chance that the charcoal represents forest burns and not campfires.

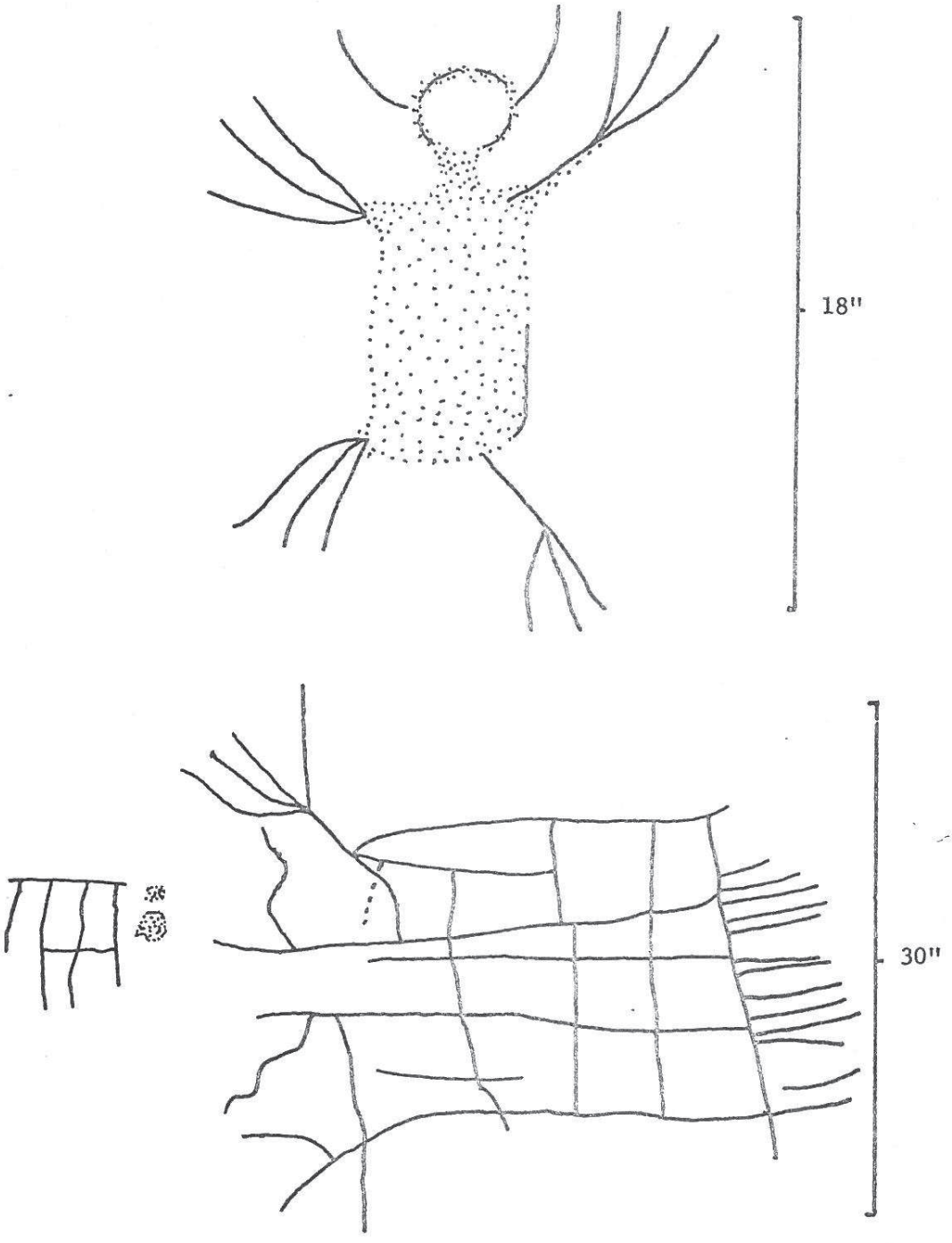

Figure 14. The two figures comprising the Darwin Ranch petroglyphs.

Some distance away a rockshelter containing a cache was located. Under a slight overhang, the buildup of a pile of slope dirt away from the wall and a few placed blocks created a tiny concealed area behind. With surface trowling a tight concentration of 63 large bluish chert flakes together with three white chalcedony knife-like implements were uncovered at the east end (Fig. 15). Underneath the surface debris a fire hearth was sampled for charcoal. In this process a multitude of pressure flakes, both of the bluish chert and the chalcedony were found. A shallow and narrow test trench exposed an apparent rubbing stone, a lower level of charcoal 12 to 14 inches down, and a number of small bone fragments. The lower charcoal was sampled carefully.

The analysis of the materials showed the three chalcedony tools are from different cores. The long white pressure flakes found a few feet away do not come from these implements although they are of the same three types of white chalcedony. The retouch on the chalcedony tools is extremely fine, there being over thirty tiny pressure flakes driven off in a distance of less than two inches. Only four of the 63 chert flakes appear to be unretouched, and all but three or four appear to have come from the same core. Two flakes have been retouched to the point of becoming specific tools (Fig. 15d, e). The type of chert is unusual and nothing else like it has been found anywhere in the entire survey region. A sack of these flakes clink metallically. Presumably the chert comes from the Green River basin. A total of two rounded and slightly polished fist-sized Madison Limestone pebbles were found. These have longitudinal scratch marks on them and appear to have been used for some rubbing purpose due to the slight polish. Only by human interaction could these stones and a few other non-indigenous unworked stones have found their way to the top of the high talus slope. The bone fragments were largely undiagnostic, although a portion of an antelope, deer, or bighorn sheep femur and a fragment of a bison-sized metacarpal condyle were identifiable. Few of the fragments were thick enough to have been bison. A single tiny pressure flake of obsidian was found.

No diagnostic artifacts were revealed at this site to indicate an age, and no geologic evidence hinted at a relative age. The floor of the overhang and extended living area is dry, relatively protected, 60 feet long and up to 8 feet wide. All collecting activities took place in the eastern 20 feet. It should be tested further.

A few flakes of chert and obsidian were collected on top of the cliffs above this site. The chert flake is very similar to one of the pressure flakes found in the hearth of the rockshelter.

Near the base of Upper Ouzel Falls, several obsidian and Precambrian quartzite flakes were collected which showed no use or deliberate retouch. It would be suspected that these materials came from prehistoric peoples moving down the Gros

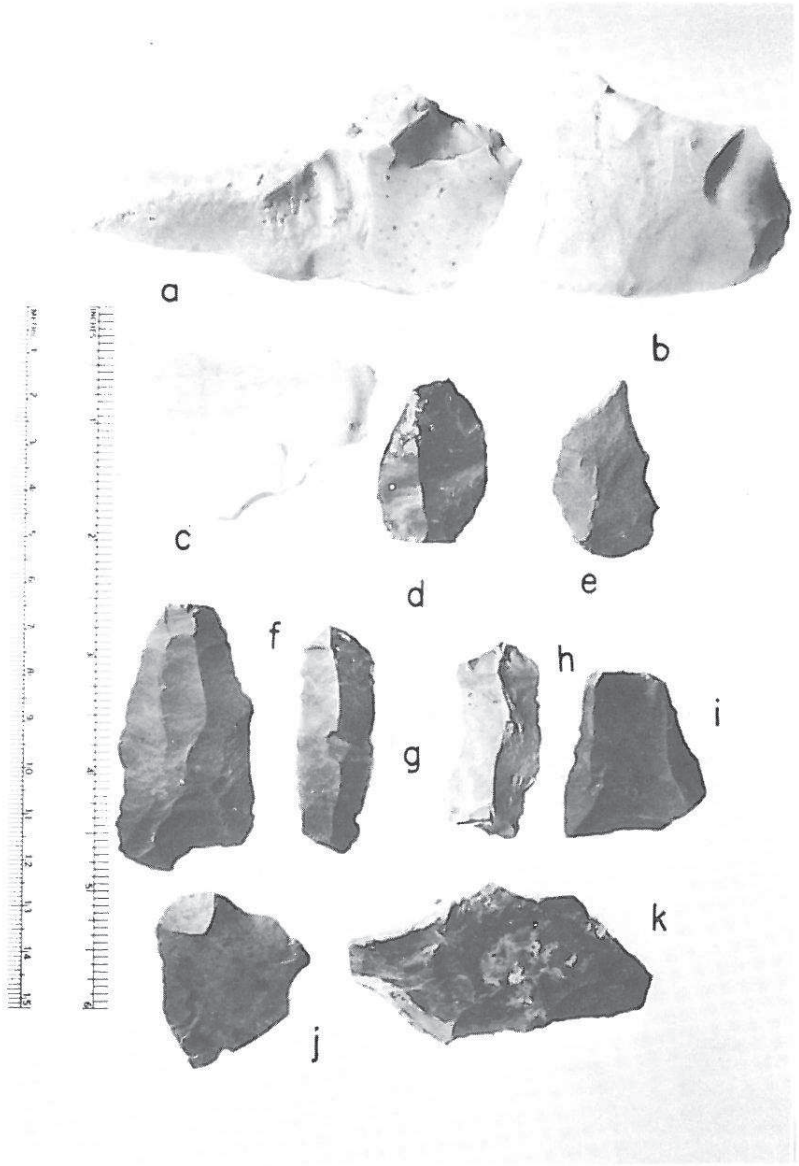

Figure 15. Artifacts from the Gros Ventre rockshelter cache. Chaldecony knives a,b,c; specific chert tools (?) d,e; variety of retouched chert flakes h-j.

Ventre River towards the Green River. The obsidian at least would have to come from the west. The quartzite, if from distant eastern sources would most likely be accompanied by chert. In the obsidian, curious impurities are present in an opaque black matrix, and the combination is unlike the sampled quarries in Jackson Hole. It is, however, very similar to some of the obsidian collected at Collier spring.

Upstream from the Chateau Lakes area, a tepee ring site is located on the northern bank on a Madison Limestone terrace. This was reported by an individual who had seen five radiating poles inside the stone circle some five years ago. When visited during the survey, only one pole remained inside, although the others were scattered nearby. The longest weathered pole remnant was 15 feet, and since the nearest scrub trees were over 100 yards away it seems likely that they were indeed part of the structure. No cultural materials were found at this particular site, but four other distinct flake localities were located within 300 years of it. These four sites, all less than 100 yards apart, show a curious breakdown of materials (Table II). Sampling was so limited however, that conclusions about them may not be valid.

Table I I - Materials from the Tepee Ring Area, Upper Gros Ventre River

	SITES			
Flake Material	A	B	C	D
Obsidian	43	2	0	0
Quartzite	0	1	0	1
Chert	2	6	2	0
Basalt	0	0	3	5

Site A might represent a prehistoric group moving east, while site B hints at westward movement. Not only are sites C and D somewhat enigmatic because of the presence of basalt, but a different type of basalt is in each. The basalt sources need to be determined. There is also the very real chance that flakes from previous camps were reused when found in this high country, since no other local material sources are available. This might explain the chert in site A and the obsidian in site B.

Farther upstream but just under 9,000 feet, a Folsom point base was found by Henry Fraser on a cut bank of the river. He was kind enough to take the writer to the spot. It appears the Folsom point was either weathering out of, or sliding down the cut bank of some glacial lake sediments. It was located on the higher of two terraces and is a white, finely flaked chalcedony.

Within 50 feet of this find was a site which produced a variety of materials and artifacts. It undoubtedly was camped upon many times by small groups traveling in both directions. The collection of materials show 101 obsidian flakes and

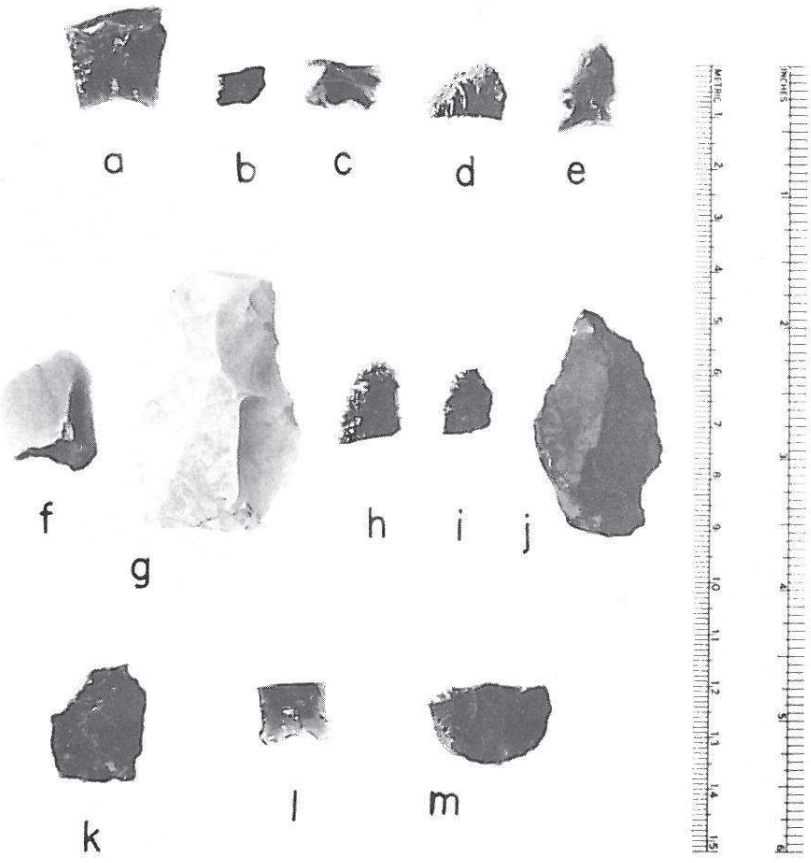

Figure 16. Artifacts found near the Gros Ventre Folsom point find a-g; artifacts at 6" depth from same site: h-j; artifacts from site A (text) on the upper Gros Ventre River: k-m.

tools, 34 cherts, and 5 Precambrian quartzites. Distinctive is a jet, nearly opaque, brown-tinted obsidian, and a mysterious grey opaque obsidian, neither of which are known from the Jackson Hole quarries. One of the black chert flakes is strikingly similar to the type found on Conant Pass. Not one of the cherts is agatized wood. Five of the chert flakes are white chalcedony pressure flakes. The projectile points and fragments from this site show a variety of potential time periods (Fig. 16 a-j). Obsidian fragments of two ground-edged, concave based points, one unground straight based type, and a point tip were found. A small, crude, brown agate side and probably base notched point was included. A small amount of trowling in a tiny blowout area showed obsidian points, flakes, and dispersed charcoal to a depth of at least 6 inches (Fig. 16h, i, j). Although the terrain of the site is very uneven, little soil turnover appears to have taken place. A wide test pit seems in order for those willing to hike in the equipment.

There is a report of a find in the Farney Lakes area, and although this was not visited, a long-stemmed obsidian McKean point from the site is available for observation. Below the Farney Lakes on the Gros Ventre drainage, a broken white hills pebble was discovered with other obsidian flakes.

Four sites were located above 10,000 feet on the Gros Ventre drainage. Three of them were extensive and had a wide range of materials suggesting long term camps and/or many separate visits. Some of the materials suggest recurrent habitation by the same group. Rapid and probably complete soil turnover is the rule for all of these sites, and it would eliminate stratigraphic control in any test pit. No charcoal was evidenced in any of the sites, and no hint of structures were found. The sites are all shallow, that is, the soil cover is rarely thicker than about one foot. A materials breakdown is seen in Table III.

Table III - Materials from the Headwaters of the Gros Ventre River

	SITES			
Flake Material	A	B	C	D
Obsidian	48	145	123	1
Quartzite	11	29	64	0
Chert	18	97	62	93
Agatized wood	2	0	3	1
Basalt	0	0	3	0
Silicious tuff	0	1	1	0

Sites B and C of this group are located within 300 yards of each other and are so situated that they may have represented two living areas of one camp at certain times. Site B is located in a protected area below timberline and site C is just above it along a ridge covered with old stubby trees. It is likely that prehistoric

groups at one site knew about and used materials from the other campsites. Site A is on an unprotected extensive overlook and the extent of site D could only be estimated from its position between snowfields at the time of discovery. This latter site is on the upper limit of timerbline.

Indicative cultural tools from site A consist of two bases of obsidian projectile points. One has lightly ground edges and a concave base (Fig. 16 k), the other a straight base, unground, and flaked in such a way as to give the impression of having been reworked (Fig. 16k). An end of a small obsidian biface was also discovered (Fig. 16 m).

The extensive site B had a most exotic split Precambrian quartzite cobble chopper (Fig. 17). The nearest known source for this heavy implement is 20 miles away and 3,000 feet below. That it was brought to this area and left is a comparatively distinct camp might suggest recurrent use of this site by the same group. More diagnostic artifacts are seen in the discovery of two fragments of obsidian points and one nearly complete white agate point. One of the obsidian point fragments is a convex-edged, narrow but long-stemmed piece which does not fit well the present range of typologies. It may have been some other hafted tool (Fig. 18a). The

Figure 17. Split cobble chopper of Precambrian quartzite found near the head of the Gros Ventre River.

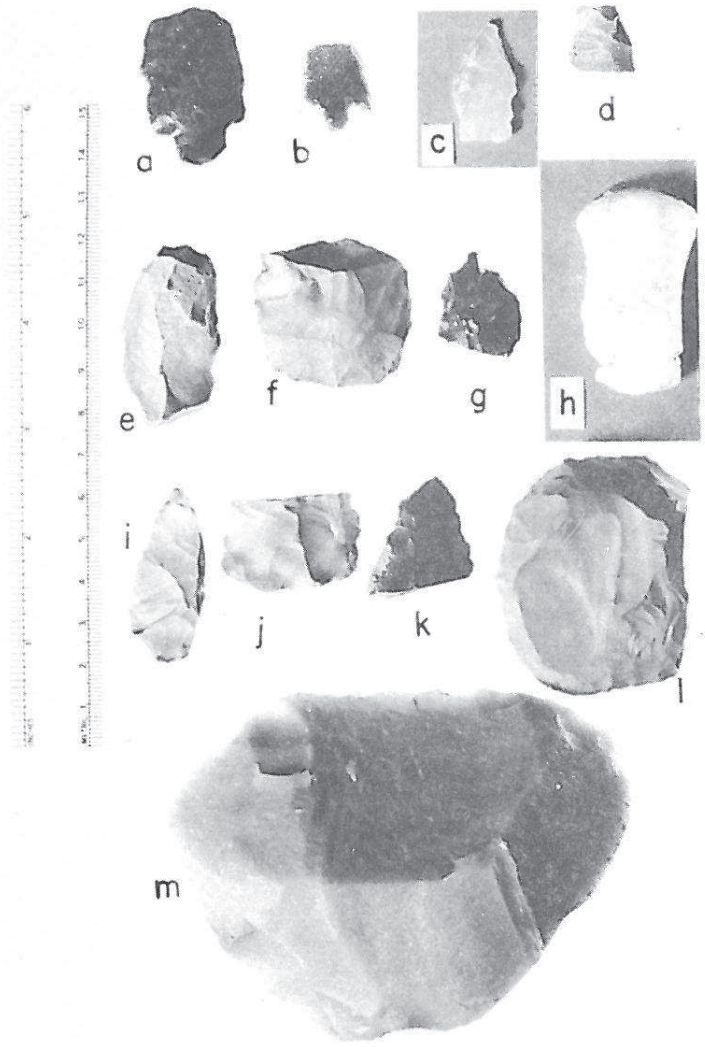

Figure 18. Artifacts from site B (text) on the upper Gros Ventre drainage a-m.

other obsidian piece is a fragment of a corner notched or base notched point (Fig. 18b). The clear white agate point appears to be a corner notched point with both tangs broken (Fig. 18c). Close scrutiny reveals these may have been deliberately broken so that it could be reused or rehafted. Several complete chert and chalcedony end-scrapers were found as well as fragments of chert and silicious tuff bifaces, a quartzite chopper or knife, and an obsidian graver (Fig. 18d-l). Flake material disclosed brown-tinted jet obsidian, some Conant Pass-like impure obsidian, and a thick worn-out blade-like tool of silicious tuff.

Site C is also extensive and involves a small treed ridge. The important or complete artifacts from it include basalt flakes (one with deliberate retouch), a small battered knapping pebble, quartzite core remnants, a broadly side notched, almost stemmed obsidian point, and several bases of possibly hafted implements (Fig. 19a-h). One of the latter, of obsidian, was found in two pieces which together form a thick unnotched implement (Fig. 19a). Several unifaces, mid-sections of points, and side notched bases were also recovered. There were enough obsidian flakes containing pebble surfaces to estimate that perhaps 50% of it came from the white hills quarries. Test excavations of this site might be difficult as only a very little rocky soil has developed and the materials are spread over a 100 yard long slope.

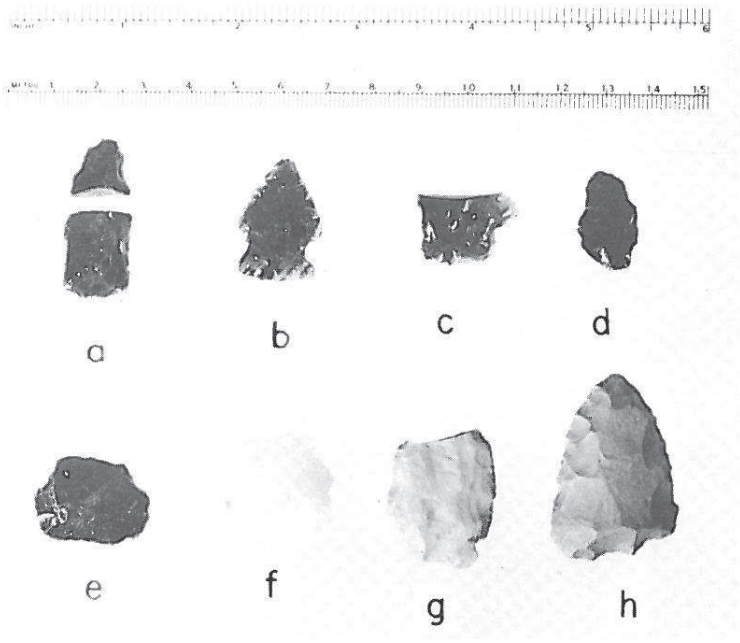

Figure 19. Artifacts from site C (text) on the upper Gros Ventre drainage a-h.

Just west of the Gros Ventre - Crystal Creek divide site D was found, possibly indicating a partial cache. Some 91 of the 93 chert flakes were from the same core, probably of a high quality local Madison nodule. Some of the nodule surface fragments have fossil brachiopods on them. It would have necessitated carrying for several miles at least, since the Madison does not outcrop in the immediate area. Unlike the rockshelter cache previously mentioned, only 40% of the 91 similar chert flakes showed possible use or deliberate retouch. The site as discovered was overlapped by two snowfields in mid-July, suggesting of course a late summer use in prehistoric times. One agatized wood and one obsidian flake were recovered.

Crystal Creek

Four flake sites were discovered at the 10,000 foot level or above on the upper Crystal Creek drainage. On the whole these sites are in marked contrast to those on the Gros Ventre side of the divide. Their material breakdown is less voluminous than that from the Gros Ventre sites (Table I V).

Table I V - Materials from Upper Crystal Creek

	SITES			
Flake Material	A	B	C	D
Obsidian	15	72	23	0
Quartzite	0	3	5	3
Chert	0	12	1	0
Basalt	0	0	1	0

Site B and C appear to be the most extensive, even though the collection from C was limited by snowfields. Sites A and D are simple non-extensive localizations of flakes. Curiously the locations of sites C and D give the impression they are possibly camp areas, while sites A and B are located on the same ridge with light tree cover. No refined artifacts were located in any of these sites except fragments of bifaces and a few undiagnostic possible mid-sections of points. The only attempt at utilization of Amsden chert in the survey region was found in site C along with a basalt flake with deliberate retouch. In site A, three flakes of the jet, nearly opaque, brown-tinted obsidian was found. In site C, a classic pyramidal core of obsidian 3-1/2 inches across at the base and nearly 2 inches high was located (Fig. 21 a). Other obsidian from this site included some unusual, impure specimens with the unflaked edge pieces somewhat similar to the Conant Pass ignimbrite.

From the general paucity of chert, three of these sites suggest little overlap in quantity or quality with the sites on the Gros Ventre side. This could be explained if chert-bearing prehistoric groups in late summer moved west to the crest of the Gros Ventre drainage from the Green River and then simply did not bother to

descend into Jackson Hole or camp on upper Crystal Creek. Meanwhile, obsidian-carrying groups moving east from Jackson Hole may have ascended the Gros Ventre valley to Crystal Creek, then traveled up that stream to its divide with the headwaters of the Gros Ventre River. The upper Gros Ventre and Crystal Creek sites showing quantitative mixtures of cultural material types may have been used by groups traveling in both directions. Those sites showing minor mixtures might indicate reusing of minority materials found in sites along the way or remnant collections carried or traded from a source. Quartzite was available from either direction, though the closest source is about 20 miles to the north, and substantially farther than that to the east.

Farther downstream on Crystal Creek is a cave formed by a large overhang. The 50 foot wide entrance has been barricaded by the standing of flat limestone slabs against each other in "tepee" fashion. This cave was reported by several sources and seems to have been exposed to view by the avalanche removal of some camouflaging trees. The interior has several more barricade structures, though the one farthest north appears to be of recent origin (Fig. 20). A large heavy slab has fallen from the ceiling onto the sharp breakdown-covered floor. Previous collectors assumed that this heavy breakdown did not exist underneath the slab, for a pile of rubble was present on each side resulting from attempts to obtain the treasures beneath. Search of the "back dirt" revealed a polished bone tool made from a femur fragment of a bighorn sheep or deer. No flakes or material other than limestone was found with it. A time consuming narrow trench into the midden outside the barricades was fruitless. Only three obsidian flakes were uncovered with slight trowelling near the mouth. A test trench into this otherwise barren cave would require removal of tons of breakdown.

A lake high above Crystal Creek to the west was visited, but a reported site there eluded discovery. A site below the Crystal Creek - Swift Creek divide to the south had only a few undiagnostic obsidian flakes as evidence.

Gros Ventre - Crystal Creek Conclusions

Perhaps one of the most important observations about the Crystal Creek and Gros Ventre drainage sites is that the sites on the lower Gros Ventre drainage show a dominance of chert flakes suggesting a predominantly westward prehistoric movement. The Crystal Creek and upper Gros Ventre drainage sites exhibit a dominance of obsidian flakes suggesting most movement was to the east. This in turn implies early summer westward travel in the lower elevations and late summer or fall eastward travel at higher elevations. The use of these potential travel routes may be directly related to the rate of snow melt during the summer and/or game movements from spring to summer grazing areas.

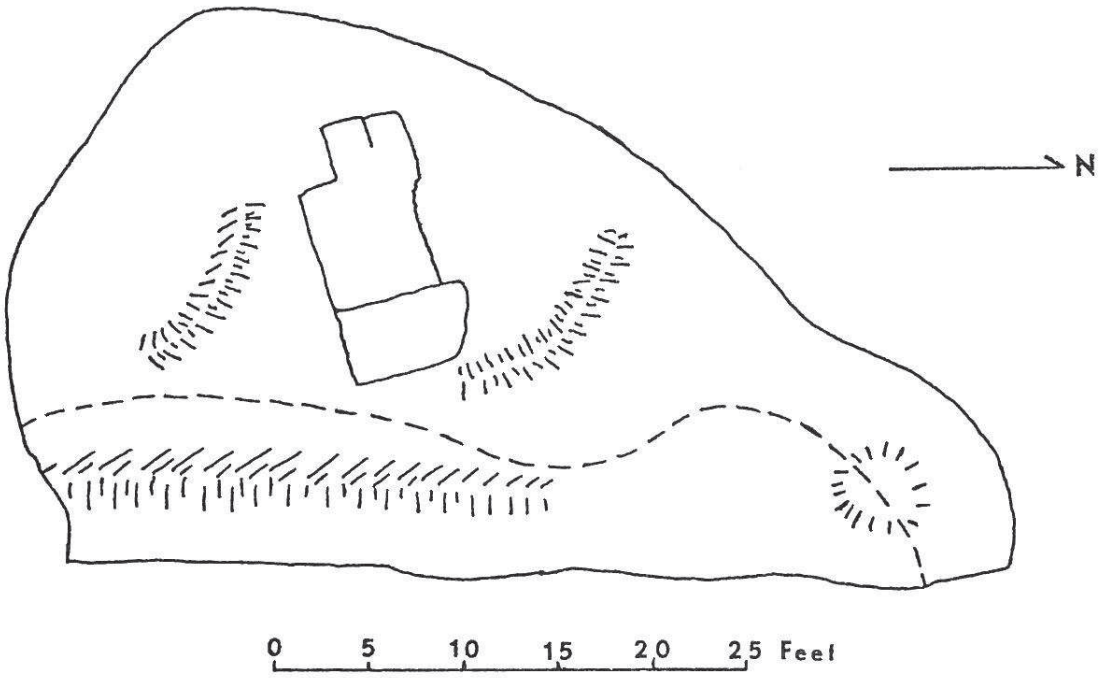

Figure 20. Floor map of the Cave on Crystal Creek showing position of barricades, large fallen slab, and line beyond which the interior ceiling is less than 4-1/2 feet high. The circular structure on right is probably of recent origin.

Dry Fork Clear Creek

Three sites were discovered, accurately located, and sampled by Hank Fraser on the middle course of the Dry Fork of Clear Creek. The sites are within a mile of each other and the flake collections are as follows

Table V - Materials from Dry Fork of Clear Creek

	SITES		
Flake Material	A	B	C
Obsidian	0	8	10
Quartzite	8	0	6
Chert	0	3	22

The flakes from site A are mostly a green quartzite. None of them were

refined in any way, and they give the impression they are purely waste flakes from the same quartzite core. From site B comes an obsidian fragment of a convex-based, side notched or corner notched point and a peculiar reworked flake (Fig. 21b,c). Collected from site C is a complete chert and scraper, an obsidian point tip, and a broken, slightly stemmed point of dark red chert, remade into a graver (Fig. 21 d, e, f). All of these sites are apparently on a flat meadow area mixed with trees and not far from water. The writer also made a discovery of an isolated point near the Clear Creek headwaters (Fig. 22 a).

Flat Creek - Granite Creek

On past research projects the writer located and sampled a number of sites on the headwaters of Granite and Flat Creeks, and in the high country surrounding these drainages. Perhaps the three most unusual are the high altitude stone circles. No cultural materials were found in or around these sites. The largest was found at the 10,200 foot level northwest of the so called "Grovont" peak at the head of Granite Creek. This curious circle is constructed on the uneven surface of a rock glacier not far from a high glacial lake. Although the nearest trees are several hundred yards away, cross-slope, a large chunk of wood was discovered in this 10 foot diameter structure. The "walls" have been piled up with large but movable boulders to the height of two feet, and a definite opening is on the east. The floor has been neatly cleared of large rocks and a pavement of small angular pebbles remains. The entire structure is 900 feet below the top of the nearest high peak.

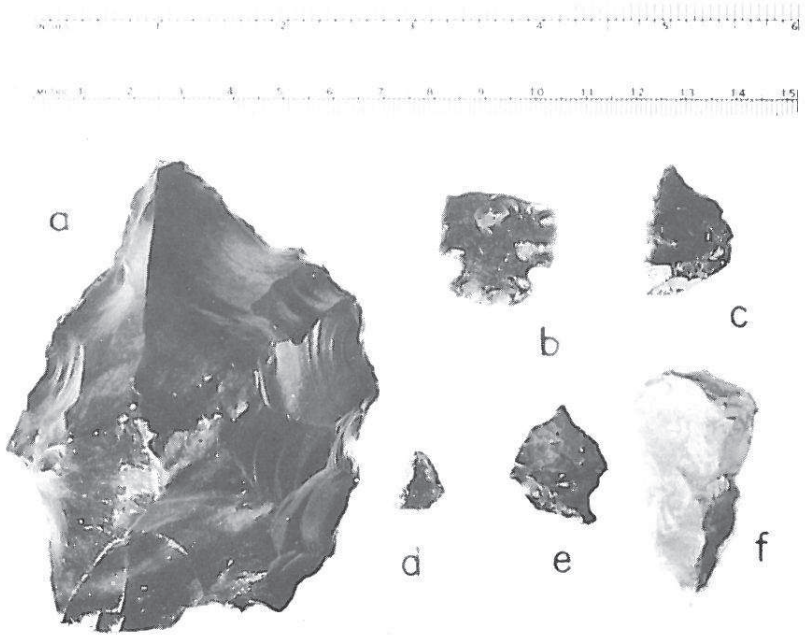

Figure 21. Obsidian core from upper Crystal Creek; artifacts from site B (text) on Clear Creek: b,c; artifacts from site C (text) on Clear Creek: d,e,f.

The second site is a 6 or 7 foot diameter stone circle found at the Cambrian - Precambrian contact on the northeast ridge of Jackson Peak. This is about 100 yards below the summit at an elevation of 10,600 feet. The circle is one or two rocks high and without opening.

The third site is near the top of Sheep Mountain, otherwise known as the chest of the "Sleeping Indian". In spite of the disturbance by many dudes taken for horseback trips up this peak, two or three low stone circles remain on top. The tourists have mimicked these structures by weak attempts to build their own. The imitations are obvious. The only reason the two or three possibly authentic circles were noticed is because of their undisturbed lichen growths and slightly inset position. They are not more than seven feet across. Sheep Mountain was rightly named. The writer has encountered bighorn sheep running across these very structures. The possibility should not be discounted that these are potential bighorn sheep blinds, since they are located on a narrow portion of the top of the mountain. They are, however, perhaps a mile from the nearest trees.

Some 45 flakes were found on the divide between Granite Creek and a southeastern tributary to Flat Creek. All but one of the flakes are obsidian, thirteen of which show use or deliberate retouch. No finished artifacts were found. The pass is narrow but partially open at the top, with camouflaging trees on both descending slopes. The ridge on the east is high, rocky, and steep, and the western ridge slopes unevenly onto a series of sandstone ledges ultimately bounded by cliffs. The pass is a natural game funnel, and the clack of jousting bighorn sheep was heard during collection of the flakes.

Below the divide to the north is a large basin and several meadows. Obsidian and chert flakes were collected from one of these meadows. Although no finished artifacts were found, one of the obsidian flakes is of the jet, nearly opaque, brown-tinted variety, and the chert flakes are of high quality, locally collected Madison chert.

On the 10,000 foot divide between Granite and Flat Creeks, nine obsidian flakes were discovered and one each of chert and Precambrian quartzite. In the obsidian sample, a projectile point tip and an edge of a biface were recovered. No other refined pieces were found. This pass is narrow, has a few scraggly trees, and is bounded by a steep broken rock slope on the south. The north side is a cliff of hard sandstone. Not far away was located a pecked "metate" of steatite. This pass is another prime game funnel, and elk and bighorn sheep presently summer throughout the area.

Farther south a nearly inaccessible lookout was discovered quite by accident on top of the lower member of the Death Canyon Limestone. In addition to trilo-

bite fossils, 17 obsidian and 2 non-local chert flakes were collected. With them was a flat piece of serpentine. The base of an obsidian biface was present. Two flakes of an unusual grey obsidian and both chert flakes displayed use or deliberate retouch. This lookout commands a view of the entire upper drainage of both Flat and Granite Creeks. Most impressive is the route by which these cultural materials, including the serpentine, must have ascended to the lookout without the use of climbing boots.

Several years ago a major campsite was located near the headwaters of Flat Creek and a profuse variety of obsidian, quartzite, and non-local chert flakes were observed. Unfortunately the only exotic material collected at the time was a three inch complete biface of brown agatized dinosaur bone. This particular site is well camouflaged from any of the mountain passes in this region.

Several sporadic obsidian finds have been made throughout the headwaters of Flat and Granite Creeks. These have been largely along the western wall of Flat Creek canyon, on Goodwin Lake, Turquoise Lake, and on the divide east of Sheep Creek.

A High Altitude Game Procurement Method for the Gros Ventre Range

The following discussion is primarily the result of indirect evidence. Not a single bone or tooth has been discovered in any of the previously mentioned sites above the 8,200 foot elevation of the Gros Ventre rockshelter. Since the isolated high altitude finds of a Folsom, Agate Basin (Rudd, quoted in Frison 1971: p. 34), early McKean, and later projectile point varieties, an explanation must be found for why populations left the more game-rich basins for the mountains. What animals were so common above 8,000 feet in the mountains that so much artifactual material would be carried in to exploit them? Was there any organized method of procurement? Why do certain sites seem to have been utilized time after time?

Undoubtedly small herds of plains oriented animals occasionally wandered into the mountains. The evidence is positive that the bison, elk, and antelope did come to Jackson Hole on a regular basis, mostly from the Green River Basin. A few of them may have strayed up the Gros Ventre River instead of down it. Certainly only a few would have made it into the Granite and Flat Creek highlands from Jackson Hole or the Hoback Basin. But the extent and size of some of the high altitude sites suggest a more steady diet than a few scattered bands of plains animals. The writer's hypothesis is that the bighorn sheep was well established in the Gros Ventre high country long before 1880 as Honess and Frost (1942) postulated. The hypothesis suggests that certain mountain passes were used as game funnels since Middle Period times for the taking of bighorn sheep and other animals from blinds.

Most modern hunters who frequent the mountains are aware of what might be considered "slow herding" of game. This is often evidenced by the fresh but unhurried tracks of three or four animals through a pass just shortly before the hunter arrives. Or, if one is camped near a pass, tracks of three or four small separate groups can be detected passing through it in the course of a day or evening. Those who frequent bighorn sheep territory in the summer are also aware that the ewes, spikes, and lambs feed on open meadows in flocks, occasionally numbering up to 50, during the early morning and late afternoon. This is supported by the observations of Honess and Frost (1942) as well as by the writer's experience. To panic them is to send them towards the cliffs. To let them sense you are there gradually is to move them more slowly.

In the case of the Gros Ventre - Crystal Creek divide, the following scene might have been enacted. This pass has been chosen because it represents the largest area and hence the largest number of people necessary for this procurement method.

A group of half a dozen individuals would quietly sneak several miles down Crystal Creek during the night or at dawn. Two sentries would be placed at the two low points on the Swift Creek divide, the only other potential escape route. During the late afternoon, the half dozen people would fan out on the irregular floor of the canyon and begin ascending toward the divide, making a moderate amount of noise. As they slowly moved up, at least some of the game, especially the groups of bighorn ewes and lambs, would gradually migrate away from the noise rather than chance going between the advancing people. If they move toward the guarded escape routes, they met with more noise. The alternatives are to take to the rocks and cliffs or move more easily through the low Grow Ventre - Crystal Creek pass, walking down wind. In order to do this today, they would be forced to pass close by several long strips of scraggly trees which would serve as a natural hiding place for a group of hunters. If the animals were not frightened or moving fast, the chances would be good for taking several of the flock at this point. However, should the animals bolt, two or three widely spaced exposed sentries on the down wind side of the pass might turn their path from the rocks, if necessary, towards the inviting safety of a spotty growth of trees. Here are stationed a few more hunters who would have a chance at taking the animals at close range. Should artificial tree blinds be set up at advantageous spots in the pass itself, this would greatly increase the odds of a kill. The hunter's camp, of course, should be down wind. Interestingly, the sites found on the down wind side of the pass are out of direct sight of the pass, are more extensive, and contain far more voluminous and varied cultural materials than any of the sites on Crystal Creek.

The idea behind this type of game drive is two-fold. The first is not to panic the animals if they are bighorn, for they might take to the nearby rocks. The second

is to capitalize on the herding or nudging of small bands down wind through a tight area near natural or artificial blinds. The pass represents just such a natural funnel. If the animals are not bighorn sheep, but elk or deer instead, the chances are greater of a kill since they tend not to move toward the talus slopes when alarmed. Also, within a few days, the same operation can be accomplished again.

The passes on the Flat and Granite Creek divides mentioned earlier are much smaller, narrower, and have almost no escape routes. Their contexts are far more advantageous for natural and/or artificial blinds. It would be far easier, in the writer's opinion, to "herd" game through these passes and take them, than the comparatively open passes on the Gros Ventre. On the other hand, more game probably utilized the Gros Ventre divides for migration purposes than the Flat and Granite Creek divides.

Some of the Flat and Granite Creek passes are so narrow that a short rock and tree fence could be built to advantage, but no evidence for such a hypothetical structure has been discovered. With longer observation of bighorn sheep habits, advantage in other types of procurement might easily have come about. Knowledge of summer bedding grounds, escape routes, or alternate safety pastures might be factors in plans for structures or directed drives. The unusual high altitude lines of rocks and other similar structures that have been found in the Absaroka Range may have fit such prehistoric hunting strategy.

High Altitude Teton Range Sites

The quarry sites of the Tetons have already been discussed, however there are a number of sites associated with them which may be indirectly involved with the obsidian or ignimbrite quarries. These appear to be workshop area or camps some distance away where the quarried materials could be worked into preforms. Five such localizations of obsidian flakes were sampled near the southern obsidian quarries. Since only one crudely worked local chert flake appeared in the entire sample, this will be ignored. It might be helpful in this case to analyze the obsidian flakes from the view of possible use. The following table has also ignored the unused raw obsidian cobbles in quarry 1 and quarry 2.

Table V I - Materials from the Southern Teton Sites

	SITES						
Obsidian Flakes	A	B	C	D	E	Q1	Q2
No Retouch	52	8	306	119	5	36	11
Possible & Probably Retouch	9	4	36	25	3	11	0
Blades	0	0	3	3	1	0	0
Pieces of Bifaces	1	0	1	1	0	1	1
Projectile Point "Preforms"	0	0	3	2	0	0	0

These sites are probably not terribly important. Their significance lies in whether or not any of the obsidian was actually used near the quarries. At the time of sampling it was thought that prehistoric populations might have been selective towards the types of obsidian available in the quarries but this has not been verified. No bones, structures, fire pits, or fire-cracked rocks have been found associated with any of these sites.

The quarry in the north end of the Teton range has 16 sampled flake sites within five miles of it, and in all cases the quartzite and cherts vary tremendously. Only the local ignimbrite remains a constant material type. Three more localities were sampled as potential chert sources. In over 100 of flakes materials obtained from these sites, only a single nearly complete projectile point was found (Fig. 22b).

Some curious general finds might be mentioned however. True obsidian and an impurity-free obsidian-like ignimbrite were found in five separate sites. The flakes are rare. Ignimbrites came in three shades of several sites: black, grey, and a definite intermediate shade of grey-black. One isolated large, rusty-red ignimbrite flake was found. By contrast, only the black variety was found in the quarry. A single flake of questionable petrified wood was found in the entire region, and this was a white opaline variety. One banded grey rhyolite flake was recovered. Of the 16 flake sites, only four of the smallest collections did not contain a fragment of some sort of biface. In some sites as many as seven were found. It seems unusual that not one flake of basalt was discovered, since the writer tacitly assumed that all basalt flakes came from the north, northwest, or west of Jackson Hole.

Rather than list all the sites and their almost uniform cultural material assemblages, only the most salient sites or features will be reviewed.

Most important perhaps is the ignimbrite quarry itself. The sampled preforms or cores are huge, up to 9 inches in length (Fig. 5). Not one of these was found beyond the general working area of the quarry. If any were carried farther, they were completely used up as flakes. The area at the top of the quarry should be test-trenched to see what kind of depth the debitage might have. There are at least two places this should be done, and it is suspected that charcoal from either fire pits or forest burns will be encountered to act as possible time horizons. Soil turnover has been slight on this loess surface, and it stands in marked contrast to the gravelly ridges and deeply over-turned soil elsewhere in the region. It would be necessary, however, to field a crew able to backpack the excavation equipment into the site.

The next most important site was discovered along the shores of a small pond in the area. Virtually the entire northern and eastern shores of this pond are covered with flaked materials. A few flakes of true obsidian were found there as well as

the corner notched point previously mentioned (Fig. 22b). Because the debitage was so profuse, two separate 10 foot squares were established and all of the surface flakes within them collected. The tallies of these are compared below with a general sample from the area (Table VII).

Table VII - Materials from a Pond Site in the Northern Tetons

Flaked Material	West 10 x 10	East 10 x 10	General Sample
Ignimbrite non-retouched	10	60	100
retouched	1	1	8
Chert, non-retouched	57	19	70
retouched	6	0	8
Precambrian quartzite			
non-retouched	76	277	139
retouched	4	13	14

This is the only site found in this region of the survey that gave the impression more was happening than just prehistoric collecting or working of materials. The materials had to be brought in from elsewhere, since this site is away from the conglomerate and ignimbrite formations. Thus the assemblage would indicate the majority of material transport was moving east, or toward Jackson Hole. The fact that there were no agatized wood pieces and few true obsidians tends to suggest that the site was not used by populations coming all the way from the Wind River Basin or southern Jackson Hole. The tremendous numbers of pressure flakes found in the two 10 foot squares also suggests much refinement of artifacts at this site, especially of quartzite implements.

Due to hunting and an obvious amount of poaching in this area, game populations are not what they might have been in the past. Anderson (1958) shows one of his prehistoric fall migration routes for elk to go through this region. It may be that human populations at this site and others along the travel route made use of this migration. Certainly they had to have a rather consistent game procurement to sustain their tool making and quarrying operations. This economy or procurement was not evidenced by the discovery of bones or structures.

The largest flake collection was made from a site having a wide spatial distribution of cultural materials along the Conant Pass travel route. No limits could be defined for separate flake localities. Most of the material worked came from this stretch, with quartzite and chert utilized primarily, and ignimbrite utilized much less.

Several sites were discovered in connection with a spring, or near an area of intermittent runoff. Two other sites were located where possible branching from the main travel route might have occurred. Another site was located on the edge of a

steep embankment, the collected cache of unused quartzite flakes coming from two feet beneath the exposed root system of an old stump. Areas along the same scarp showed three layers of charcoal up to three feet down in the loess. Although flakes were obtained near the top of these sections, none were associated with charcoal in the exposure.

The three sampled areas for chert did not appear to have been used as quarry locations, although occasional flakes of similar materials were found. One of these sites was a red chert in the Amsden Formation or upper Madison, and the other two were large unusual boulder-shaped outcrops in an Eocene volcanic conglomerate.

Miscellaneous Teton Sites

Several collections and reports remain for the bulk of the Teton Range. One of these has been known since the first government surveyors arrived in the 1870s. This is the report of the stone circle on the west spur of the Grand Teton known as the Enclosure. Mr. Leigh Ortenberger has the most extensive collection of historical written records about it which describe it to be about the 13,200 foot level, some 6 feet across and with the walls built up to a height of about two feet. A soil sample from the floor of this structure is in the possession of Mr. Ortenberger. Comparable to several high altitude stone circles discussed previously, it may be a vision quest structure. The high central portion of the Tetons has not been known for its bighorn sheep populations and it seems unlikely that it is a game blind structure.

Over ten years ago a site was located and sampled in the Buck Mountain area above 9,000 feet by a Montana geologist. The report states that obsidian and quartzite flakes and partially shaped tools were found. In addition, there may have been flakes of basalt. The upper sides of some of the obsidian flakes are apparently frosted. This area was not visited during the field season.

In northern Jackson Hole are located several low shell mounds of freshwater clams near the banks of a stream. In the present survey, it is the only place in Jackson Hole where this occurs. Some artifacts have supposedly been collected in the area. This spot has yet to be visited and studied in detail.

Three deliberately retouched flakes were recovered from the Owl Creek - Moose Basin pass. Two of these are the Conant variety of ignimbrite and one is quartzite. The non-used edges of one ignimbrite flake are rounded as though it might have been polished through carrying in a bag.

There is a report of old fire hearths present above the "wall" on the west side of Death Canyon. Another report mentions artifacts and what was termed "fortifications" on the Death Canyon divide. Artifacts and flakes have also been discovered

in Alaska Basin to the north of Death Canyon. Detailed information about the context of these sites was not obtained.

Two general areas of obsidian flakes were located on the ridge ascending toward the previously discussed steatite quarry in the north end of the range. One of these is within half a mile of the quarry and displays obsidian from at least two or three sources. A stream-rounded pebble edge of Conant Pass ignimbrite, a sandy obsidian flake, a basalt flake, and one white agate flake were among the 41 collected. The other site was over a mile from the quarry and disclosed two grey, high quality, ignimbrite flakes containing no crystalline impurities, and abrown-banded obsidian flake.

In the south Darby Canyon area two flake sites were located. A collection of 17 obsidian flakes from within the range of several Jackson Hole sources were found on the southern part of the canyon floor. The other site was near 10,000 feet on the Fox Creek divide, and contained both quartzite and obsidian flakes. An isolated find of a piece of Conant-type ignimbrite was also discovered.

Near the mouth of Fox Creek canyon at the level of the stream, three broken obsidian artifacts were found, two of which are probably Late Prehistoric Period (Fig. 22 c-e). One of these is a grey obsidian or ignimbrite, the other is a nearly jet obsidian. Neither fall into the range of the Jackson Hole quarries. This area seems to have been at the western base of a possible travel route across the Teton Range, discussed below.

The last report concerns the fortifications of the "battle of Pierre's Hole". Local residents dig at the site of the weathered down barricades on a mountain known as Baldy Knoll. This is located on the south canyon rim of Fox Creek (Fig. 1), and if the accounts are correct, groups of Indians used this ridge as a regular travel route across the range. Piles of flint chips were known to exist along one part of this route. The feeling was that the Indians preferred to travel the high ridges for the view and to avoid the dense avalanche debris in the canyons. The writer has found obsidian flakes along the upper divide between Granite and Moose Creeks, slightly off the trail traversed by users of the route. It seems likely that Granite Canyon would have had to be the descending pathway, rather than to swing south four miles to descend through Phillips Pass. There appear to be some interesting topographic discrepancies and improbabilities involved with this reported route, and it needs a complete field check. It should be noted that the early snowshoe mail route went over Phillips Pass before a trail was established over Teton Pass.

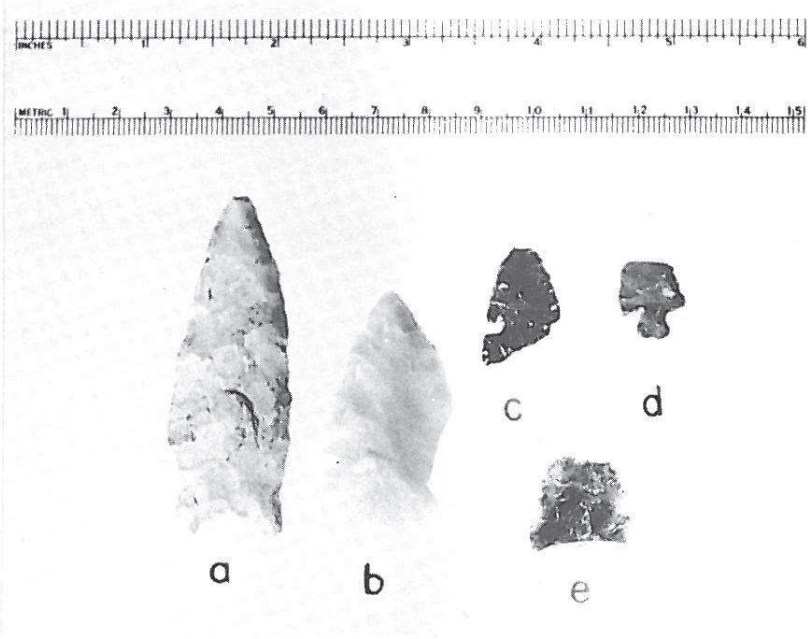

Figure 22. Artifact from upper Clear Creek: a; artifact from Conant Pass: b; artifact from mouth of Fox Creek Canyon: c-e.

CHAPTER VI

LOCAL COLLECTIONS

Several individuals in Jackson Hole have accumulated artifacts from various sites throughout the valley. Perhaps the most important and extensive collection belongs to W. C. "Slim" Lawrence. The vast majority of his entire collection comes from the presently drowned delta at the north end of Jackson Lake. The collection is important because it came primarily from one area and it is large enough to allow some minor statistical comparisons. Some four days of the field season were spent in an attempt to categorize the points in this collection. Because the writer had limited practical experience with plains typology, the groupings should be regarded with suspicion.

With a few exceptions, Mr. Lawrence kept only the complete artifacts. Hopefully the number retained is in some way indicative of the proportions of each point present, and the proportions of materials used in their manufacture. There is a very definite trend toward utilization of quartzite, basalt, and obsidian in older point types, and as they become progressively younger, obsidian becomes dominant, chert replaces quartzite, and basalt is no longer used. Although the diagnostic point varieties are tallied in the tables below, the numbers indicated should be considered rather conservative.

No classic Clovis or Folsom types were present although several unfluted varieties of the same shape had been found. The Agate Basin shape and dimensions had both ground and unground convex edges. Their lengths varied from one to four inches, and all were lenticular in cross section (Fig. 23a,b,c).

Table VIII - Agate Basin Point Tally for the W. C. Lawrence Collection

Typology Agate Basin	Quartzite	Obsidian	Basalt	Chert	TOTAL
convex base	4	6	0	0	10
straight base	7	10	2	5	24
concave base	3	10	1	2	16
Total					50

There were only three tiny Hell Gap-shaped points of basalt, quartzite, and obsidian, and none were over two inches long.

In table IX, the McKean varieties ranged from the basal notched, stemmed and smooth-shouldered types, to the square-shouldered, to the broadly side notched types. These form a continuum in the collection. A few have a straight or convex base.

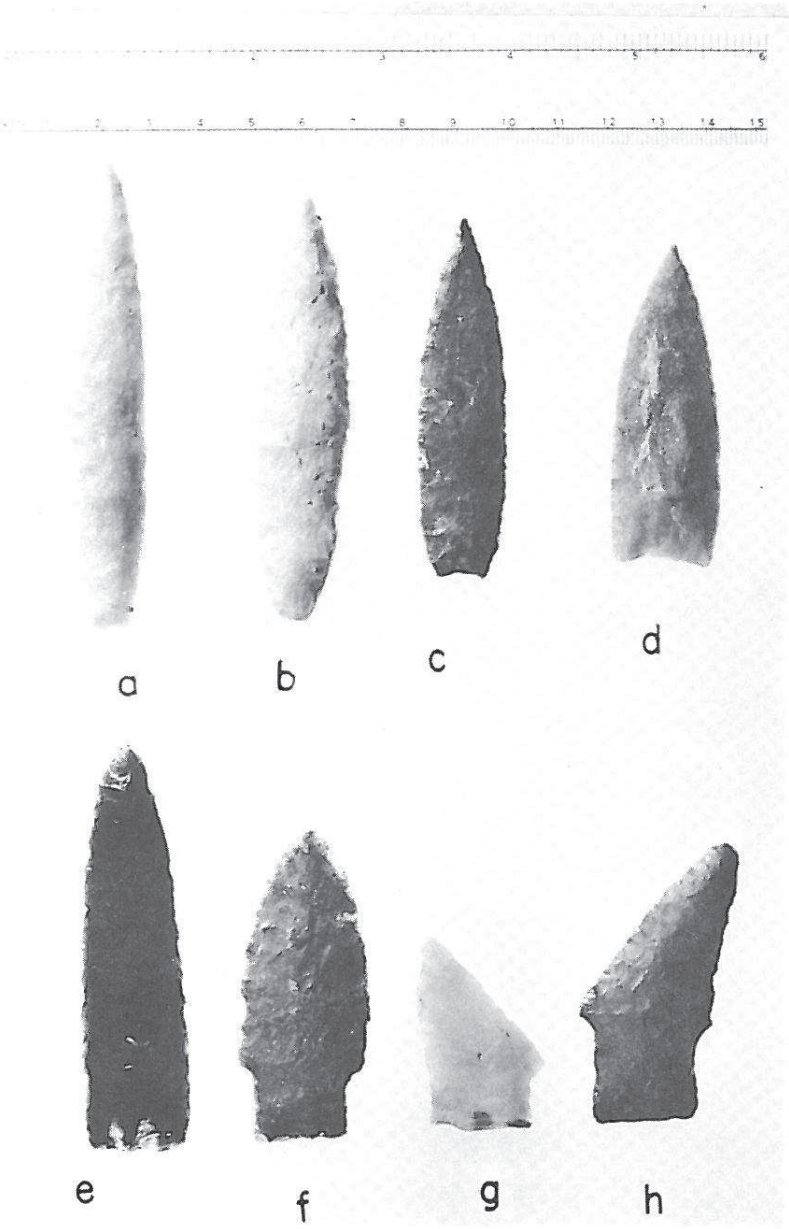

Figure 23. Artifacts from the W. C. Lawrence collection. Agate Basin: a, b, c; Allan point: d; Eden point: e; Scottsbluff point: f; Cody knife: g; square-based knife: h.

A representative of each typology was selected for illustration (Fig. 23, 24).

Table I X - Point Tally for Archaic Materials from the W. C. Lawrence Collection

Typology	Obsidian	Quartzite	Chert	TOTAL
Allan Points	0	1	3	4
Eden Complex variants	2	1	3	6
Scottsbluff variants	4	1	4	9
Cody Knife-like variants	0	1	3	4
S Q R Based Knives	1	3	11	15
McKean varieties	86	5	16	107

Some of the varieties in Table X need minor explanation. A continuum existed between broad or wide-stemmed, corner-notched points and narrow stemmed varieties (Fig. 24f,g). The triangular corner notched type were almost identical equilateral triangles with slightly concave bases (Fig. 24h). The variants of the same ranged to isosceles triangles with slightly concave bases (Fig. 24i). The triangular points or preforms are unnotched varieties of the previous two categories. (Fig. 25a). The small lanceolate category was distinguished from the agate basin group by the much deeper concave base and the fact that all contained part of the original surface of the single flake from which they were made (Fig. 25b). Most of them were less than two inches long and edge grinding was not apparent. The round base "notched" type has wide convex edges and a rounded concave base. Sharp corners or tangs are usually not present at the base and they are less than 1-1/2 inches long (Fig. 25c). The small round based points are less than 1-1/2 inches long and are simply too wide to be considered lanceolate and too narrow to be considered a triangular variety (Fig. 25d). The side notched varieties posed a real problem in that different lengths were ignored and the side notched triangular and lanceolate types were lumped in (Fig. 25e,f,g). It is obvious that table X consists of the writer's descriptive categories fitting the majority of the artifacts, and they may only in part fit plains typologies.

Table X - Descriptive Point Tally for a Portion of the W. C. Lawrence Collection

Descriptive Typology	Quartzite	Obsidian	Chert	TOTAL
Wide stemmed corner notch	0	24	18	42
Narrow stemmed corner notch	0	12	2	14
Triangular corner notched	0	3	7	10
Variants of corner notched	0	13	6	19
Unnotched triangular	1	11	2	14
Small lanceolate	6	17	4	27

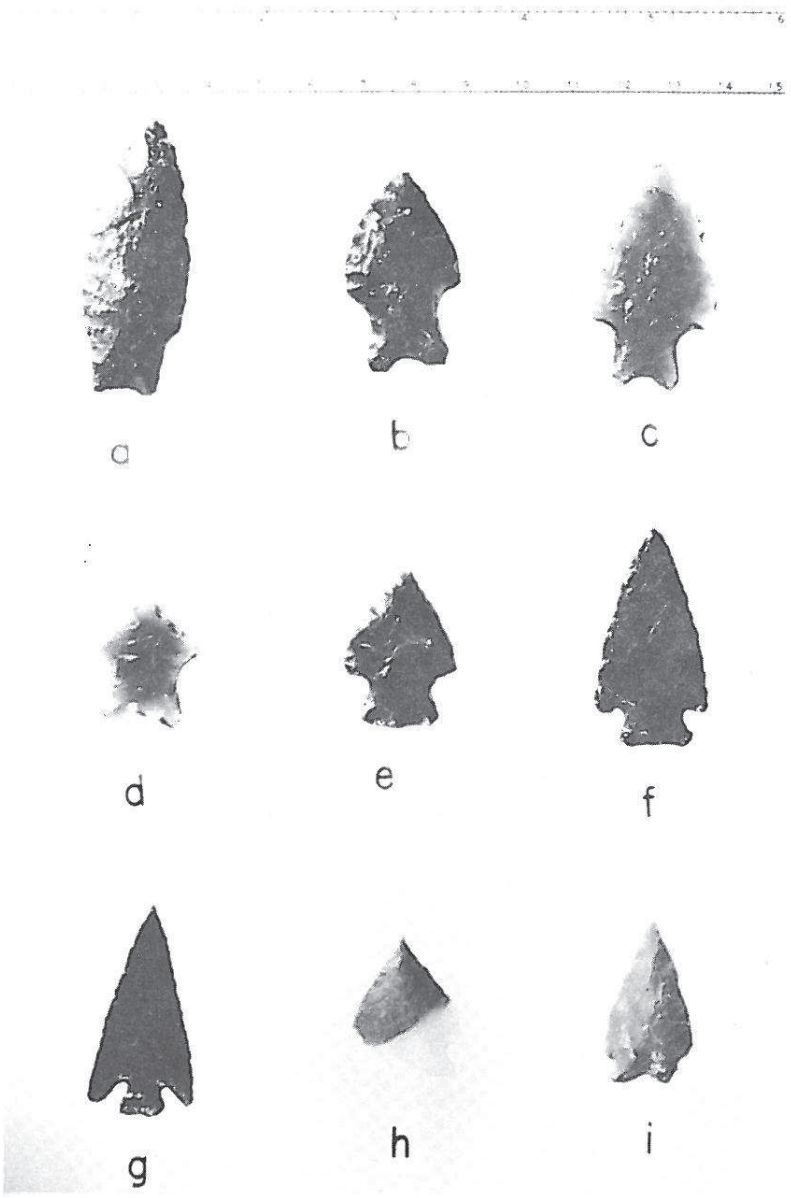

Figure 24. Artifacts from the W. C. Lawrence collection. McKean continuum: a-e; wide stemmed corner notched: f; narrow stemmed corner or base notched: g; triangular corner notched: h; variant of corner notched: i.

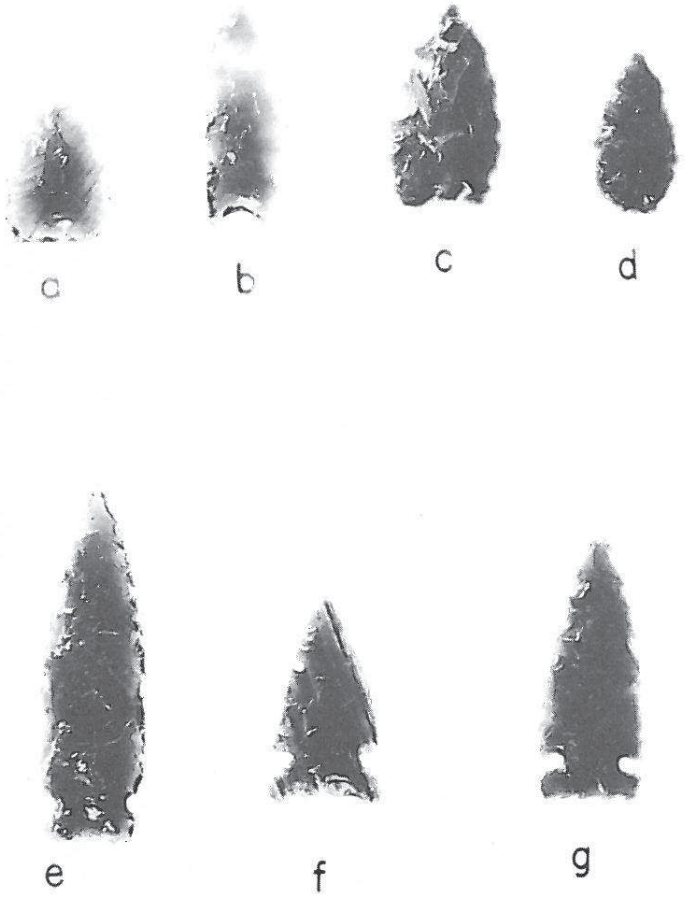

Figure 25. Artifacts from the W. C. Lawrence collection. Unnotched triangular: a; small lanceolate: b; round base "notched": c; small round base: d' side notched varieties: e,f,g.

Round base "notched"	1	4	1	6
Small round based	0	5	1	6
Side notched varieties	8	94	21	123

This brief summary does not include a number of points which do not fit into the categories the writer has used. Several hundred biface knife-like implements are present which might be broken down into types based on shape of the cross section, base shape, stemming, tangs, or other shape geometries. They are completely dominated by quartzite, chert runs a poor second, obsidian much less common, and least common is basalt. This collection also contains some rather peculiar points of non-local materials. There are several large stemmed, grey-red, chert points reminiscent of the eastern Archaic, and several obsidian points indicative of the early southwestern desert varieties. A few crude basaltic lanceolate attempts hint at the Old Cordilleran complex. Three or four crude, grey, potsherds with quarts temper are also in this collection. They are the only indigenous clay pottery fragments known in Jackson Hole.

Mr. Lawrence also possesses the most extensive steatite bowl collection in Jackson Hole. Many of these are crude and flat-bottomed, although some much finer shallow, wide-mouthed bowls or deep platters are present (Fig. 26). The majority of these were discovered on the drowned delta at the north end of Jackson Lake. The steatite presumably came from one or more steatite quarries in the Teton Range.

It is of paramount importance that Mr. Lawrence's entire collection be numbered, catalogued, and described by a competent archaeologist, and then special measures taken to safeguard it. It is especially significant that it all came from a comparatively small area and was so soluminous as to enable useful typological comparisons to be made.

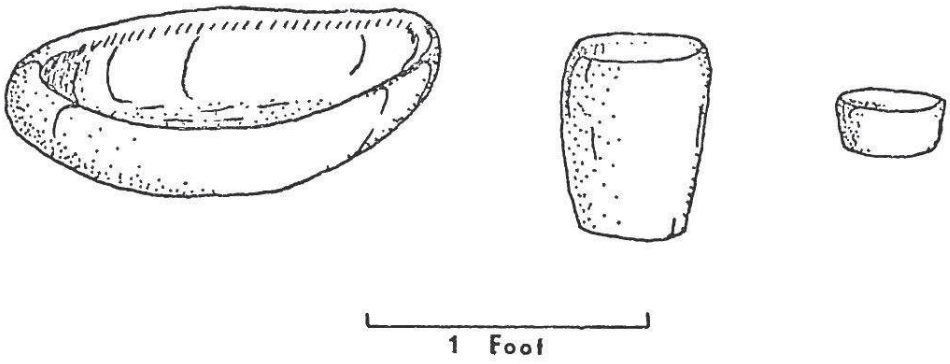

Figure 26. Steatite bowl types in the W. C. Lawrence collection.

A second collection is possessed by the National Park Service at Moose, Wyoming. A significant fraction of this was donated by W. C. Lawrence. The bulk of it comes from park personnel and other scattered finds throughout the valley. Unfortunately a large segment, without labeled locality or collector, contains several Agate Basin and McKean varieties but no Eden-Scottsbluff types. The most curious item in the collection is a painted ladle handle of grey-pink slipped pottery (Fig. 27). Black stripes and circles have been painted on the concave part of the handle. A tourist apparently found this on the east shore of Jackson Lake.

A third collection has been accumulated by Mr. Otto Nelson and his now deceased brother Charlie Nelson. The broad smattering of point types from Jackson Hole reflects much the same age depth as the W. C. Lawrence collection. It is noteworthy that Otto Nelson's collection has a much higher percentage of chert artifacts than the W. C. Lawrence collection. The greater portion of Mr. Nelson's Jackson Hole collection has been accumulated from areas along the upper and lower Gros Ventre River drainage. Also in this collection are steatite potsherds from the south end of Blacktail Butte, and the three-quarter grooved, polished serpentine ax head from the hot spring area discussed in another section. This collection too should be numbered, catalogued, described, and located on a map. Mr. Nelson has a keen memory for the locations of his artifacts.

The collection belonging to Wesley Goetz is an unusual one and represents materials from primarily within the National Elk Refuge. The majority of his collection focuses on the large cores and bifaces discussed in connection with the Goetz site and the south end of Blacktail Butte. Only a few projectile points have been collected. The importance of this collection is similar in some respects to that belonging to W.C. Lawrence. Most of Mr. Goetz's numerous bifaces and cores come from several sites alone. They represent a large enough sample that patterns of core

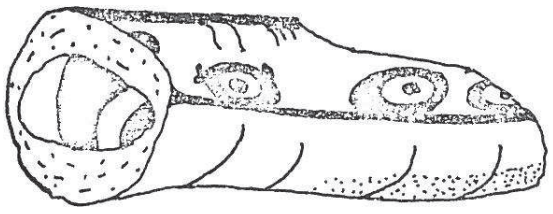

Figure 27. Black painted slipped pottery in the National Park Service collection.

working and biface construction become evident. A cursory breakdown of the more important types of his core and biface collection is shown below (Table XI). It should be remembered that almost none of these implements is smaller than three inches in length. The figure listed are examples collected from other sites, but which are illustrative of those in Mr. Goetz's collection.

Table XI - Materials in the Wesley Goetz Collection

Descriptive Type	Number and Material
Circular, thick biface cores (Fig.4a)	5 Precambrian quartzite
	4 Tensleep quartzite
Long oval-shaped cores, lenticular cross section, 6 - 12 inches long (Fig. 4 g,h)	1 Precambrian quartzite
	13 Tensleep quartzite
Flat or thin cores of above (Fig.4 b)	1 Precambrian quartzite
	6 Tensleep quartzite
Pear-shaped cores and cobbles worked to a broad single point, 3 - 8 inches long (Fig. 11 d)	33 Precambrian quartzite
Split cobble uniface choppers (Fig. 17 b)	3 Precambrian quartzite
Full cobble biface choppers	3 Precambrian quartzite
Disc cobbles flaked to square with four points as corners	4 Precambrian quartzite
Side notched disc cobbles (Fig. 7 a,b)	9 Precambrian quartzite
Cores with one steep end (duckbilled shape), 4 - 12 inches long (Fig. 8 a,b)	51 Tensleep quartzite
Olduvai-type pebble choppers	21 Precambrian quartzite
	2 Tensleep quartzite
Miscellaneous thick cores	10 Precambrian quartzite
	82 Tensleep quartzite
Miscellaneous thin cores	50 Tensleep quartzite
Cores with apparent retouch	15 Tensleep quartzite
Square-based bifaces, smallest is 2 inches wide by 6 inches long	5 Tensleep quartzite

Mr. Goetz's collection also contains a number of the more usual small chert bifaces and flakes. Fortunately the writer was able to see this collection early in the field season and hence recognized much in the survey that otherwise would have been missed. It would be extremely worthwhile for an archaeologist concerned with progressive manufacture of artifacts to study this collection and attempt to determine the possibe perimeters of what seems to be reasonably distinct typologies.

There are several other large collections in Jackson Hole that have not been examined. It would be wise for a future investigator to ferret out these collections and attempt to place the finds on maps. The writer believes most of the artifacts previously discovered in Jackson Hole to have remained in the valley. However, with the National Park Service and National Forest Service presently encouraging people to enter the lands surrounding the more restrictive park lands, the disappearance of materials may hamper future study.

CHAPTER VII

CONCLUSION

The intent of this survey has been to unify as much information pertinent to the archaeology of Jackson Hole as possible. It is necessary to know what the effects are of loess deposition, glaciation, recent faulting, landsliding, and active alluvial fan construction with resepct to the preservation, destruction, and exposure of archaeologic sites of different time periods. It is important that local collections be studied so that some idea of the time depth for man in Jackson Hole can be surmised. The topography, climate, and local materials must be analyzed with an orientation toward travel routes and quarries and seasonal access. Some picture should be presented of the band economics, for without some form of subsistence pattern the bands would not have entered at all. Lastly, some ideas should be forwarded as to the next research steps to be taken, for this work represents primarily a listing of information containing few answers for questions an observant individual would raise.

The major conclusions with varying amounts of factual support start with the determination of seasonally open access routes to the Jackson Hole area. The major topographic pathways are the Wind River - Blackrock Creek, the Green River - Gros Ventre River, and the Conant Pass routes. Less commonly used routes include travel from the Hoback Basin, the Little Greys River - Snake River Canyon, the Mosquito Creek - Teton Pass area, and possibly the Pacific Creek area. Barriers to traveling these routes may hinge on the spring melting of the snow and the necessity of crossing major rivers, especially the Snake. Since Jackson Hole is unique in having a paucity of chert and localized abundance of volcanic glasses, inroad and outroad camps may be partially determined by the proportions of these materials found in them. The spread of materials from known quarry areas is important in tracing local travel possibly trade route.

While the lowland populations may have been following bison, elk, or antelope migrations, the high altitude sites suggest probable bighorn sheep procurement on a semi-regular basis. They may have accomplished this by exploitation of the funneling effect that high mountain passes have on most game. The number of edible plants and berries at both high and low elevations should not be ignored. Prehistoric camps may have been oriented for exploitation of these at certain times of the year. It may not be coincidence that the huge drowned site at the north end of Jackson Lake, besides being on a travel route, is in an area known for its many varieties of profuse berry bushes. In this intermontane environment restrictive economics would be difficult to maintain. It seems more reasonable to expect utilization of all possible food sources by seasonal prehistoric bands. This would not only include plants and scattered big game, but probably fish, birds, and small mammals.

Although only four clay potsherds have been found in all of Jackson Hole, four steatite quarries and quite a number of bowls and deep platters have been located. Influences from much more distant regions are slight in the local collections, and consist of two serpentine three-quarter grooved axes, a few possibly eastern Archaic points, a few Old Cordilleran complex varieties, and an obsidian projectile point or two reminiscent of southwestern variations.

Few complete diagnostic artifacts were recovered during the survey. Comparing extensive local collections with prevailing beliefs about plains typology, it seems presently that the first great influx of prehistoric groups into Jackson Hole were those carrying the Agate Basin variety of projectile points. This may have begun at the time glacier ice was receeding from moraines on the valley floor about 9,000 years ago. The oldest known positively identified projectile point is a Folsom base, collected from the 9,000 foot level to the southeast on the Gros Ventre River. The least common projectile points in all of the collections are those from the Eden-Scottsbluff complexes. Most common are the McKean varieties, corner notched and large side notched points. They hint at a larger influx of populations into Jackson Hole than previously. By contrast, sites containing older points could have been buried or destroyed by various geologic processes. Hence fewer sites would be available for surface collecting. There is also a relative lack of Late Prehistoric Period small side and/or base notched points in the collections observed. While this might suggest less travel to Jackson Hole from the plains, it may also mean that a different method of hunting and procuring other food prevailed in a mountain environment.

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APPENDIX

Areas Not Surveyed

The majority of the Teton-Jackson Hole region remains to be surveyed. Although a great meny reported sites have yet to be field inspected, a number of areas were completely neglected. This includes almost the entire drainage of Blackrock Creek and the Buffalo River. Nothing specific about the known sites along these waterways was investigated. The pinyon Peak Highlands, the Washakie Range, and the Mount Leidy Highlands are virtually untapped. Likewise no information is available for the Snake River Range and anything west of the Teton Range.

Of the specific areas within Jackson Hole proper, the entire west side of the Snake River south of Jackson Lake needs to be carefully surveyed. In spite of the known sites, this should include the strip from the town of Wilson south to the Snake River Canyon. While a few sites are recorded north of Blacktail Butte, most of the valley floor east of the Snake was not researched. Only a small portion of the Gros Ventre Range and smaller portions of the Teton Range was investigated, and both these were aided by trips in previous years.

Priority List of Test Excavations

1. South end of Blacktail Butte
2. Elk Refuge sites (2 and possibly 3)
3. South Teton obsidian quarry (2)
4. North Teton ignimbrite quarrr (3)
5. Gros Ventre rockshelter
6. Gros Ventre Folsom point area (1)
7. Upper Slide Lake area (1)
8. Hoback Cave

Ideas for Future Projects

One project of top priority should be the complete neutron activation analysis of a wide variety of obsidian from each of the separate quarry areas. The same should be attempted for the ignimbrite quarries. Once this is accomplished, a multitude of samples collected from the various sites in the survey could be run and their source quarries hopefully determined. This would possibly result in determination of how effective postulated travel barriers have been. It might also yield data to propose a network or potential travel-trade routes. Included in this analysis should be the determination of obsidian source areas from the points in the W. C. Lawrence and others collections. This might give an approximate account of when certain obsidian sources were discovered and utilized, thus providing maximum date limits on obsidian

flakes found in other sites and outside the region.

Connected with the above project could be the hydration rate analysis of different obsidians in a variety of areas and altitudes. Approximate mean annual temperatures could be calculated for the non-buried obsidians based on altitude, and good control could be had if the hydration rates were from specific artifacts.

A second major project concerns the sources of the cherts in Jackson Hole. Without some kind of chemical tracing methods, about the only solution seems to be surveys in surrounding regions to determine chert variations in those areas. It is the long way around a problem but it would accomplish many things. First, the surveys in other areas would be beneficial in themselves, secondly, the amount of chert migration into Jackson Hole might be estimated as well as the obsidian migration in the opposite direction. In addition, the time depth and density of prehistoric populations surrounding Jackson Hole might be discovered, and hence some idea of the potential versus actual access to Jackson Hole could be estimated.

A third project involves the time depth of floral patterns. There are virtually hundreds of ponds and lakes in different parts and elevations of Jackson Hole which have been collecting pollen since before glacial times. Dates on pond cores in the potholes area might confirm or refute the idea of ice on the floor of Jackson Hole at 9,000 years as well as give a floral history. The younger ponds found on some of the slower landslides might give minimum dates for landslide formation. The Gros Ventre Range has not been as sensitive to glacier formation as the Teton Range, and many of its lakes and ponds have been free of glacial ice for much longer periods. Pollen profiles as well as carbon dates from several of these could give an approximate picture of the floral sequences. It is possible these could be contrasted with pollen from cores from warm spring swamps in the lower elevations to explore elevational adjustments.

A fourth project of value would be the determination of erosional processes for different parts of the region. The terraces on waterways other than the Snake River and uuper Hoback have never been studied. The loess deposition sequence needs more and better dates. Alluvial fan development rates and extensions need to be determined. In some places the rates of faulting and time of stream diversion might be established. Landslides and possible lake formation times should be researched. In total, the geological events since the start of loess deposition about 20,000 years ago need to be concentrated on.

Throughout all of the above projects, accurate notes and collections should be made on any and all buried faunal remains discovered. A copy of these notes and/or the collections should be sent to a central research station, such as the one proposed for the Yellowstone-Teton region, so that ultimately faunal arrivals might be dated or determined.