

THE WYOMING ARCHAEOLOGIST



Clovis



Folsom



Agate Basin



Hell Gap



Alberta



Scotts Bluff

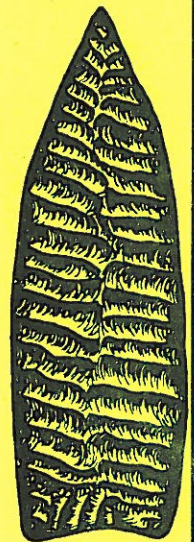


Eden



Cody Knife

CODY COMPLEX



Frederick



Meserve



Jimmy Allen

JULY 1971
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JULY, 1971 ISSUE CONTENTS

| | <u>Page</u> |
|--|--------------|
| State and Chapter Officers..... | Appendix I |
| Wyoming Recreation Commission..... | Appendix II |
| Membership and Subscription..... | Appendix III |
| Contents and Editor's Notes..... | 1 |
| Welcome to Beulahland - Notice of Summer Meeting By Bill Barlow..... | 3 |
| Annual State Meeting..... | 9 |
| Chapter News..... | 12 |
| Archaeological Investigations in the Bighorn Basin By Joanne M. Mack..... | 17 |

EDITOR'S NOTES

(1) We have such a long way to go. No more than ~~fifteen~~ states have legislation going beyond the appointment of a State Archaeologist. Only five states have a level of funding permitting developmental programs. Dr. C. R. McGimsey adds that only sixteen states have a minimal basic program. Antiquities Acts patterned after the Federal Act making it a \$25.00 misdemeanor is found in forty states and, with practically a perfect record of no convictions, this legislation is immensely popular.

Because of archaeologist's aversion to involvement with the public and politics, because of a negative approach of prohibition rather than education, it is no wonder that adequate funding for archaeological research is lacking.

Wyoming only has a little time before our archaeological sites are obliterated by dam construction, urban sprawl, highway and pipeline construction, homesite acquisition, strip mining, and general human cussedness. I would suggest that each chapter make it their primary goal to present to their own legislators, their own service clubs, and their own schools, the story of Wyoming Archaeology and the urgent need for adequate funds to support our State Archaeologist.

(2) Please Note "The GordonCreek Burial" by Duane C. Anderson previously printed in the Volume 10, No. 2, July 1967 Archaeologist. Here, a single isolated burial, half

eroded from a gulley wall, had the good fortune to be properly recovered by archaeologists instead of pot hunters. It yielded an astonishing 7750 B.C. date, and the associated grave materials indicate a specialized and formalized cultural trait complex of Paleoman. Wormington places this burial in the small list of reliable early man finds such as Tepexpan and Midland. How many other burials of early man have been thoughtlessly destroyed? For the new additional cultural information, and a change in sex, see American Antiquity, Vol. 36, No. 2, April 1971.

NOTICE OF SUMMER MEETING
WELCOME TO BEULAHLAND
Bill Barlow

The 1971 Wyoming Archaeological Society Summer Meeting will be informal and a working meeting. It will be "right on" U. S. Highway 14, east of Sundance 14 miles.

Twelve miles east of Sundance is the Aladdin road junction. One continues east on Highway 14 two miles from this junction. There the "Vore Site" will be found on the right hand, or south side, of the highway merely a few feet through a wire gate, the turn-off to which will be marked with a sign.

The Vore Site is unusual in that it surely is self-contained. There has been little, if any, loss of cultural material due to erosion. The explanation becomes apparent when, after traversing on undulating plain, one arrives at the brink of the sink hole into which Late Prehistoric men stampeded their bison. It is deep - like a crater.

No drainage outlets are visible nor have any existed unless, in early times, there were underground tunnels or shafts through the floor. Nearby similar sink holes can be seen today, some of which do have water outlet shafts in their floor.

Soft gypsum rock underlies the red earth in this scenic corner of Wyoming and the theory on the sink holes is that moisture in a wetter era dissolved the gypsum.

Three miles east of the Site is Beulah, Wyoming. About 5 miles southeast of Beulah is a U. S. Fish Genetics Laboratory offering free guided tours. For this, one can call Mr. Bruno Von Limbach at 643-3189 from Beulah.

If one is planning to continue his trip from the Vore Site on through the Sacred Black Hills, a visit to the Rushmore-size, mountain top sculpture of Crazy Horse near Custer might prove interesting. Members traveling to Beulah via Highway 16 can see the 90-foot coal vein in the open pit of Wyodah Coal Mine near Gillette. This pit is right along the highway.

Then, continuing east, one is on Interstate 90. East of Moorcroft is the Pine Ridge Road Interchange. About 7 miles north on this road is Keyhole Reservoir and State Park, a camping and picnic area. This is also the area of the famous McKean Site excavated by Dr. Mulloy and, I believe, now largely under water. I am told this is a great surface-hunting area.

Public museums are located in Newcastle, Sundance and at Devil's Tower. At the south edge of Gillette is a newly opened private museum with a huge inventory of anti-ques, etc. It contains a very intriguing steatite pipe taken from an Indian grave.

L. J. Turner, stalwart Gillette Chapter member, can be employed as guide by anyone desiring to surface hunt on the scenic summit of Devil's Tower. And, I assure you,

one can have his choice of routes up the side of the Tower .

An easier climb would be to the top of Inyankara Mountain some ten miles south of Sundance where General George A. Custer is reported to have left his initials carved on a rock.

The Town of Sundance, of course, derives it's name from the chief ceremony of the Sioux which, according to legend, was often held on top the mountain at the edge of town (See photo).

I may be biased a bit, but the northern Black Hills are really beautiful. They are not rugged as most of Wyoming mountains. They enjoy high precipitation and low elevation, hence a long growing season. Scrub oak is the common gulch tree. Wild turkeys thrive here on the acorns. Whitetail deer are plentiful. Even during such arid periods of prehistory is the Altithermal, the Black Hills must have furnished a favorable environment and food to foraging bands.

Doris and Woody Vore, landowners of the Site, inform me that a camp spot is available nearby where members may camp. This means a "pasture camp". Then in Beulah, 3 miles east, there is a commercial campground and a motel which you may write or call:

Echo Hill Motel and Cafe
% Hilma Saari
Phone 307 643-2237
Beulah, Wyoming 82712

In Sundance are these motels: Arrowhead, Bear Lodge and Apache..... reservations are a must.

The University crew has been working now for nearly a month opening the excavation. This means there will be ample and interesting archaeological exercise for those so inclined at the meeting.

So bring your broadest sombrero and the new findings in your collection of "bragging stones" and we'll see you Saturday morning, August 7th at the Vore Site in Crook County.

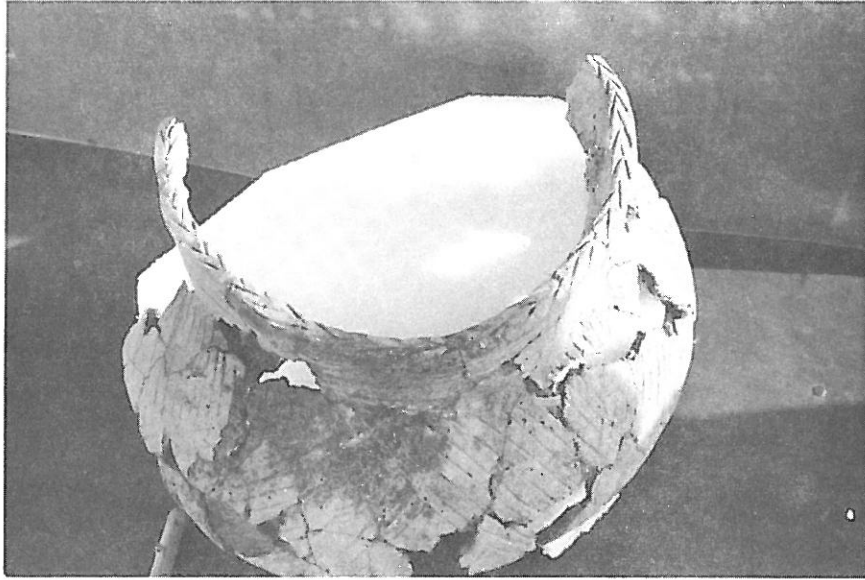
Bill Barlow, Secretary
Gillette Chapter



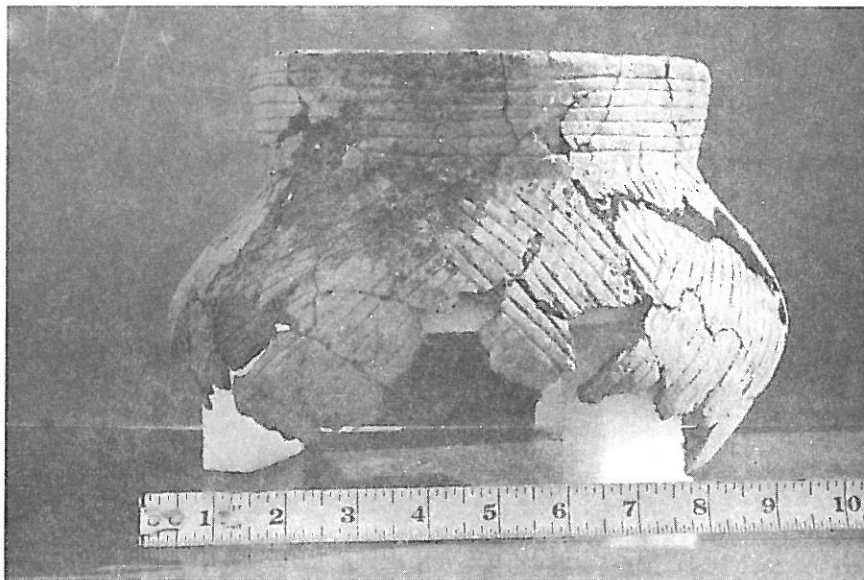
#1 Vore Site sink hole in early spring looking south.



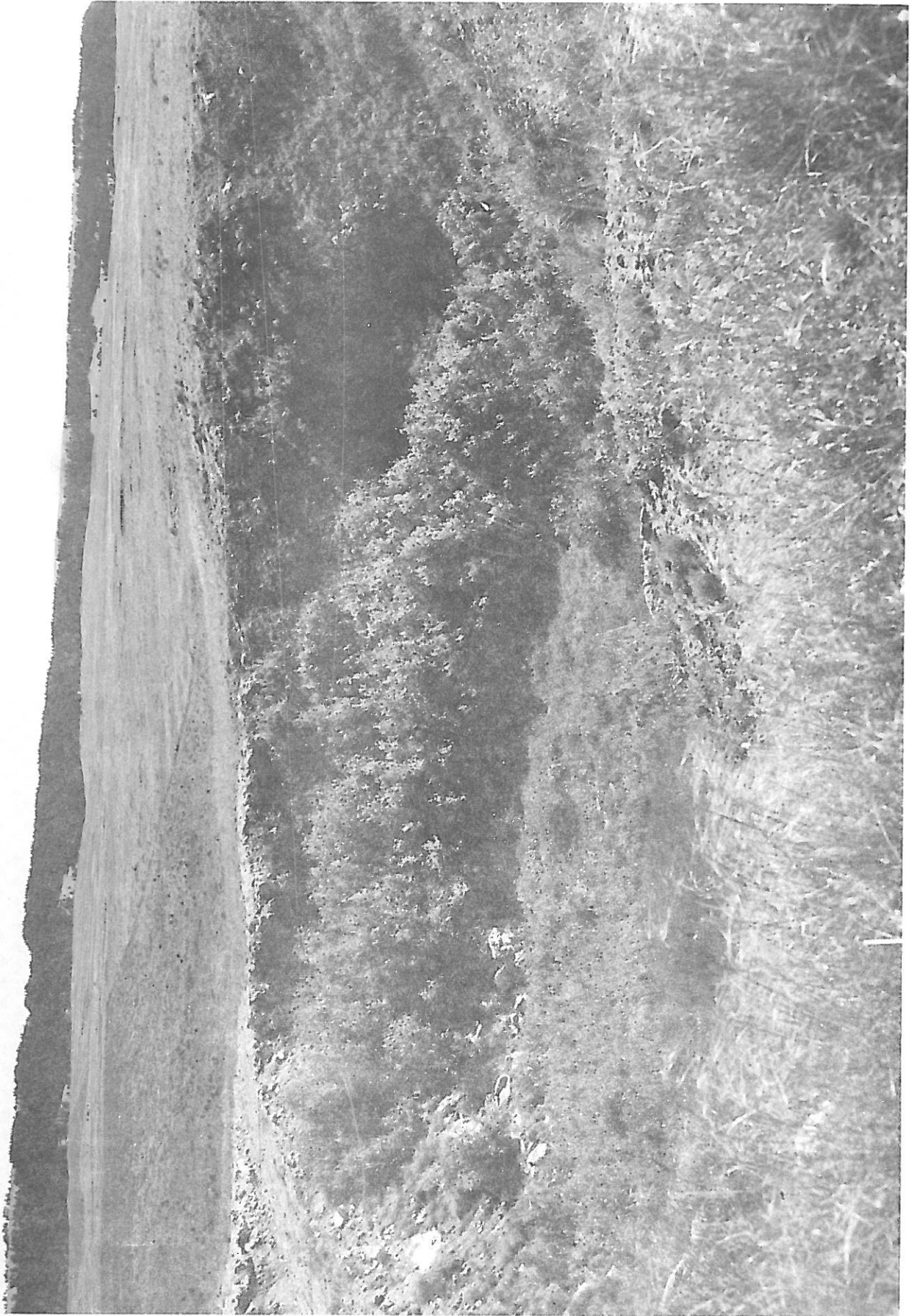
#2 Sundance Mountain as seen from Interstate 90.



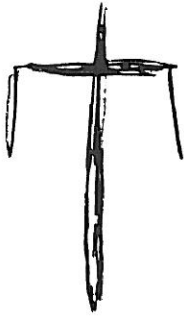
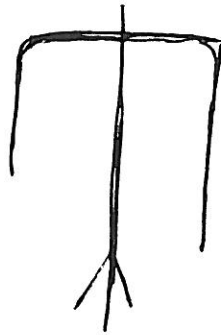
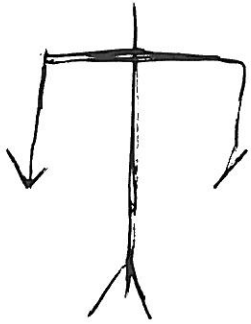
#3 Northeastern Wyoming incised.



#4 Pottery partially reconstructed.



#5 Wyoming Highway Department photograph of Vore Site
looking South



Northeast Wyoming Petroglyphs

Arch Creek

Crook County

ANNUAL STATE MEETING
April 3, 1971, Holiday Inn, Casper, Wyoming

The meeting was called to order by President, John Albanese, at 9:50 A.M. with 86 members and guests present.

The following committees were appointed:

Credentials Committee:

Bill Barlow, Bob White, and Carlton Belz

Auditing Committee:

Bill Judge, Gary Fry, and Bob Hanke

Nominating Committee:

George Babel, George Berger, and Jim Adams

The following certified voting delegates were announced by the Credentials Committee:

| | |
|----------------|-----------------------------------|
| Casper Chapter | Florence Coates and Helen Bryant |
| Cherokee Trail | Carl Sjoden and Curt Helwick |
| Cheyenne | Art Schoondermark and Bill Sutton |
| Fremont County | Jim Adams and Helen Lookingbill |
| N.B.H.B. | Danny Smith and Gene Smith |
| Sheridan | Margaret Powers and Gary Fry |
| Sweetwater | Susan Miller |

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

Mildord Hanson stated that the State Society Treasury had not gained any funds in 1970 and suggested that the dues be raised in 1972 so that a deficit would not occur. Since this subject was the main topic of discussion at the open meeting held the evening before and had been accepted by the persons in attendance, it was proposed by Hanson that the dues be set as follows commencing in January 1972:

| | |
|-------------------|------------------|
| Active Individual | \$5.00 per year. |
| Active Family | \$7.50 per year. |
| Insitutional | \$7.50 per year. |
| Associate | \$6.00 per year. |

A motion was made by Bill Judge that the dues be set as suggested by Hanson. The motion was seconded, and a roll call vote of the delegates was unanimous.

Chapter reports were given by:

Casper

Florence Coates

| | |
|----------------|-------------------|
| Cherokee Trail | George Berger |
| Cheyenne | Grant Willson |
| Fremont County | Helen Lookingbill |
| Gillette | Bill Barlow |
| N.B.H.B. | Sharon Smith |
| Sheridan | Elaine Hilman |
| Sweetwater | Susan Miller |

The Editor's report was given by Grant Willson. He stressed the need for material for publication, and outlined the requirements for photos and sketches submitted for publication.

Mrs. Lookingbill gave the Librarians report and stated that the Library materials had been used more during the past year than ever before.

The report of the Library Study Committee was given by Carl Sjoden in the absence of Bob Randall.

This report suggested a file and index system be made by the State Society of the Library materials on hand, and that these lists be duplicated and sent to all Chapters. This would mean that an active librarian be appointed in each Chapter. Albanese suggested that the incoming President appoint a permanent Library Committee to follow up the study by Randall. The suggestion was made in a motion by Schoondermark and seconded by Helen Bryant. Motion carried.

It was announced that the library of the Sheridan Chapter was also available to all members.

Jim Moorhouse, Division of Planning of the Bureau of Land Management in Cheyenne addressed the attendance on the development of projects on public lands and asked the Society for assistance in locating archaeological sites which may be in jeopardy through these developments. He stated that there is approximately 17,000,000 acres of public lands in Wyoming and much of this could contain sites of various natures. Helen Bryant gave the Mulloy Scholarship report. Ross Hilman was the recipient for the award.

Meeting adjourned at 11:50 A.M.

Meeting reconvened at 1:30 P.M.

An invitation was given by Bob Hanke for all Chapters to display archaeological methods and artifacts at the State Gem and Mineral Show in Casper in June.

The Summer meeting will be held at the site near Beulah, Wyoming. Dates will be announced later. All Chapters will be notified. President Albanese announced there would be a meeting of all Directors of the Wyoming Archaeological Foundation at 9:00 A.M., Sunday morning.

A very pleasant surprise award was presented to Lou Steege in the form of an engraved trowel for outstanding achievement. This is to be an annual award to a member of the Society and will be known as the "Lou Steege" award.

The State Archaeologist, Dr. George Frison, was introduced and he, in turn, introduced the graduate students and students from the University of Wyoming.

Chuck Reher gave an informative lecture on the study of Bison bison population dynamics, as learned from studies of various bison kills in Wyoming.

Joanne Mack showed slides of petroglyphs and pictographs from the Girl Scout property in Eastern Big Horn Basin.

Ross Hilman thanked all the members of the Society for their assistance in awarding him with the Mulloy Scholarship. Ross also presented a slide lecture program on the investigation of the Medicine Lodge Creek site.

Dr. Frison gave a slide lecture on the butchering of a bison with stone tools. This study was on the Buffalo Ranch near Gillette, Wyoming. The method of butchering was based on the studies made from bones from buffalo butchering sites.

The treasurer's report was given by Milford Hanson. The auditing committee reported the books to be in excellent condition. A motion was made to accept the report. Motion seconded and carried.

Ned Frost, speaking in behalf of the Wyoming Recreation Commission, commended the Society for their progress and good programming. The Commission will continue to support the summer studies of the Department of Anthropology, and will continue to publish the "Wyoming Archaeologist". With this continued support, the Society will continue to grow, and have a progressive future.

The nominating committee presented the following slate of officers for 1971:

| | |
|--------------------|---------------|
| President | Grant Willson |
| 1st Vice President | Gary Fry |
| 2nd Vice President | Bill Barlow |

A motion was made by Schoondermark that the nominations be closed. Seconded by Bryant. Ballot of the delegates was unanimous for the slate.

Meeting adjourned at 4:30 P.M.

Dr. Leslie Davis of Montana State University was the guest speaker at the evening banquet. His topic, "Obsidian Dating Methods", was enjoyed by all.

Louis C. Steege,
Executive Secretary

CHAPTER NEWS

Fremont County

Each year at the last of January, Lander has a Winter Fair which provides an opportunity for local merchants to advertise and display their wares by setting up booths at the Lander Valley High School Field House. Clubs and other organizations are also welcomed to display their projects. This year the Fair was held January 28-30.

This year the Henry Mortuary of Lander said they would buy the space for a booth for a club or other organization. Our club decided to accept the offer and we set up a booth displaying our club member's artifacts.

Eddie Appleby and Sarah Appleby were made chairmen of the project. Others who helped and donated time and artifacts were: Irene Morgan, Mr. and Mrs. Jim Adams, Mr. and Mrs. Art Lookingbill, Mr. and Mrs. Ken Johnson, Mr. and Mrs. Ted Scoggan, Mary Higby, Ester Guthridge, LaVerda Mann, Lela Heldebrant, Betty Hutchinson, and Mr. and Mrs. Myron Lembke.

In addition to the display of artifacts the club gave a free year's membership to the club in a drawing and solicited many people's names who were interested in becoming members and have joined now within the area. Mrs. and Mr. Duane Appleby were the winners of the free membership.

The project was termed a huge success in that: (1) people in the area were made aware of our club and many of the beautiful things each member has found (2) hundreds of people toured our booth and left greatly impressed (3) many new members were gained through this project.

Mrs. Myron Lembke, 1970 Secretary



CHAPTER NEWS

Flintstone Chapter Fremont County

Additional information on 48 SW 303 previously reported June 1970 by James Adams and Joanne Mack

I am sending you the pictures so that you can run a supplement on this dig. These pictures should have been printed along with Figure 1 on Page 26 of the 1970 June issue as they tie in with our numbered grid system based on Datum A.

The north east part of fire pit No. 10 was very hard and well baked. This is the pit that we found the red fire ring around the top and we had hoped to have a magnetic reading of this pit, but when Dr. Dubois visited the site to take a reading, there had been a terrific cloud burst in the area and the site was almost obliterated and this fire pit was full of mud almost the consistency of soft cement and he could not take a reading there so moved to a point a mile to the east of the site and took his reading in another fire pit. (Incidentally we have never heard from Dr. Dubois in regards to this reading). There are many such sites surrounding 48 SW 303 and numerous surface finds have been found in the adjoining area. We felt that this firepit may have yielded more than any other pit as it appeared, one firepit on top of another, with a 1 to 1-1/2 inch baked clay partition between them which we would not have known about, had I not accidentally broken through the bottom of the top pit and found the lower pit. The diameter of this pit was 29 inches across, being round, and 19 inches deep. This firepit showed more fire and heat than any of the other pits and the part marked X with a pencil in the group of three pictures, was so hard we couldn't dent it with a pick.

Picture No. 2 is of your truly and a golden eagle's nest. I asked a B.L.M. man about this nest and showed him the tail feather we found at the nest. He told me the first two or three years of the golden eagles' nesting life they don't know any better than to build on the ground, then get wised up and move to a higher-off-the-ground location. This picture gives an insight into the flora and in a way, the fauna of the area. Many such nests are scattered throughout the desert.

The days we worked there were very hot and windy. The nearest water at this time was probably 3 miles to the southwest. It is a reservoir into which several springs drain.

Lela V. Hildebraut

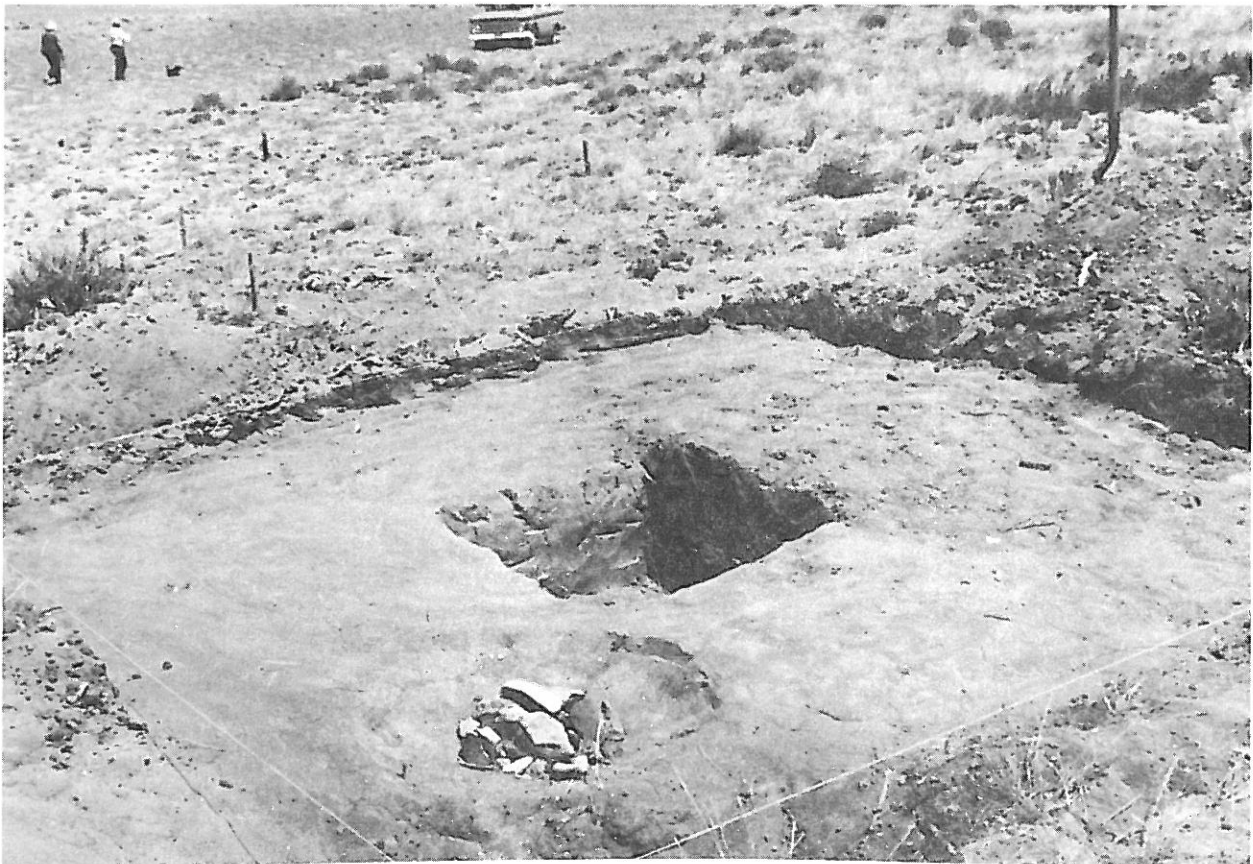


Lela Hildebrant behind Golden Eagle nest found on level ground at Northeast end of site. Nest composed of dead, weather worn sagebrush was eight ft. in diameter, three ft. high in center.



Firepit #10

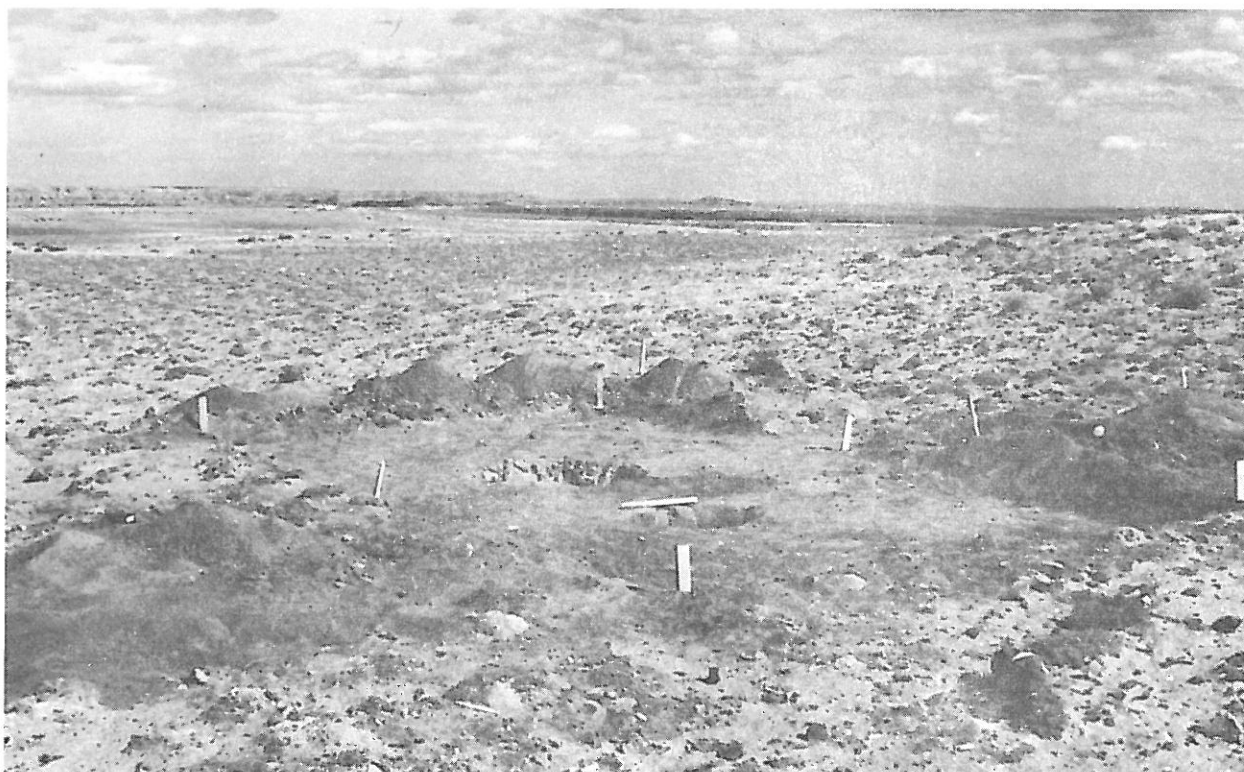
Irene Morgan pointing out baked hardness of the soil. Verda Mann supporting shovel and Lela Hildebrant in an authentic W.P.H. pose with pick.



Firepit #1 in Grid #1 in foreground. Behind this shallow rounded pit was square test pit dug in an area where charcoal layers were concentrated to a depth of over twelve inches.



Close-up of Feature #10 which shows in the foreground the extremely hard-well baked and red colored firepit which was superimposed on a lower firepit. Artifacts in this area consisted of a base and a mid section of the unnamed point. The smaller firepit in background was sharply tapered and filled with fine grained charcoal.

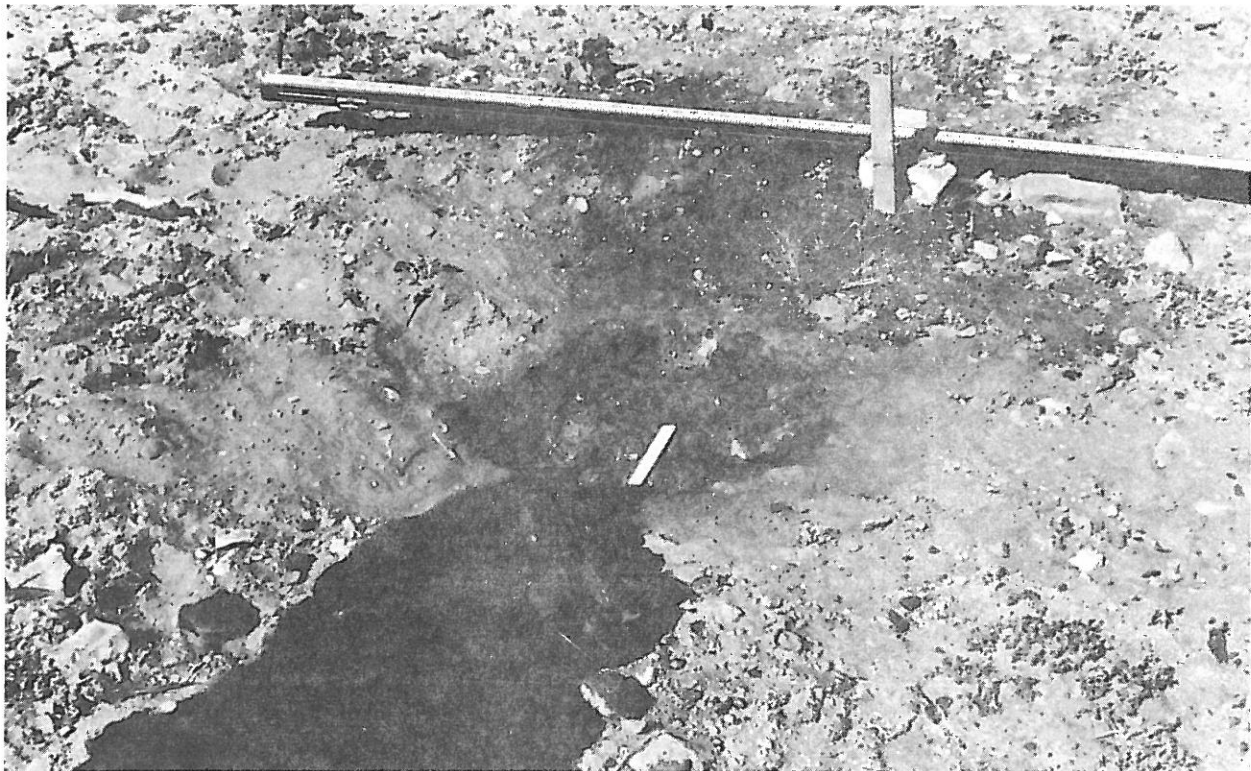


Looking North over Feature #10. In the background are badlands between Oregon Buttes and Continental Peak. Here the Continental Divide forms the North rim of this Great Divide Basin.



Firepit #1

The fire burned rocks, replaced in pit, were the surface indications of a campsite when site was first located.



Firepit #38

Tapered and filled with burnt rock. Nothing but flake debitage in immediate area. However this is the only Bebat shadow ever photographed. According to our reservation friends this name is applied to the Spirit of the Dead who guard the ancient campsites. Disobediant children often are threatened with a visit from a Bebat.

ARCHAEOLOGICAL INVESTIGATIONS IN
THE BIGHORN BASIN, WYOMING

By
Joanne M. Mack

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 Art

University of Wyoming

Laramie, Wyoming

May, 1971

"This paper was prepared in fulfillment of requirements for a Master's
Degree at the University of Wyoming."

ACKNOWLEDGMENTS

The author wishes to express sincere thanks to the staff in the Department of Anthropology for its help and support. Special appreciation is due Dr. George Frison, who contributed much time and knowledge while directing the thesis. Also due sincere thanks are the members of the Girl Scout National Center West staff for the summer of 1970 as well as the Girl Scout Organization, itself. Due special thanks are Mrs. Caroline Adams, Mrs. Harriet Marble, Mrs. LaVern McMillan, Miss Maryanna Wood and Miss Arla Gibson. Also due thanks for taking me to various site locations and showing me hospitality all summer are Mr. Charles (Dudge) Yost and his wife Mrs. C. (Pauline) Yost.

CHAPTER I INTRODUCTION

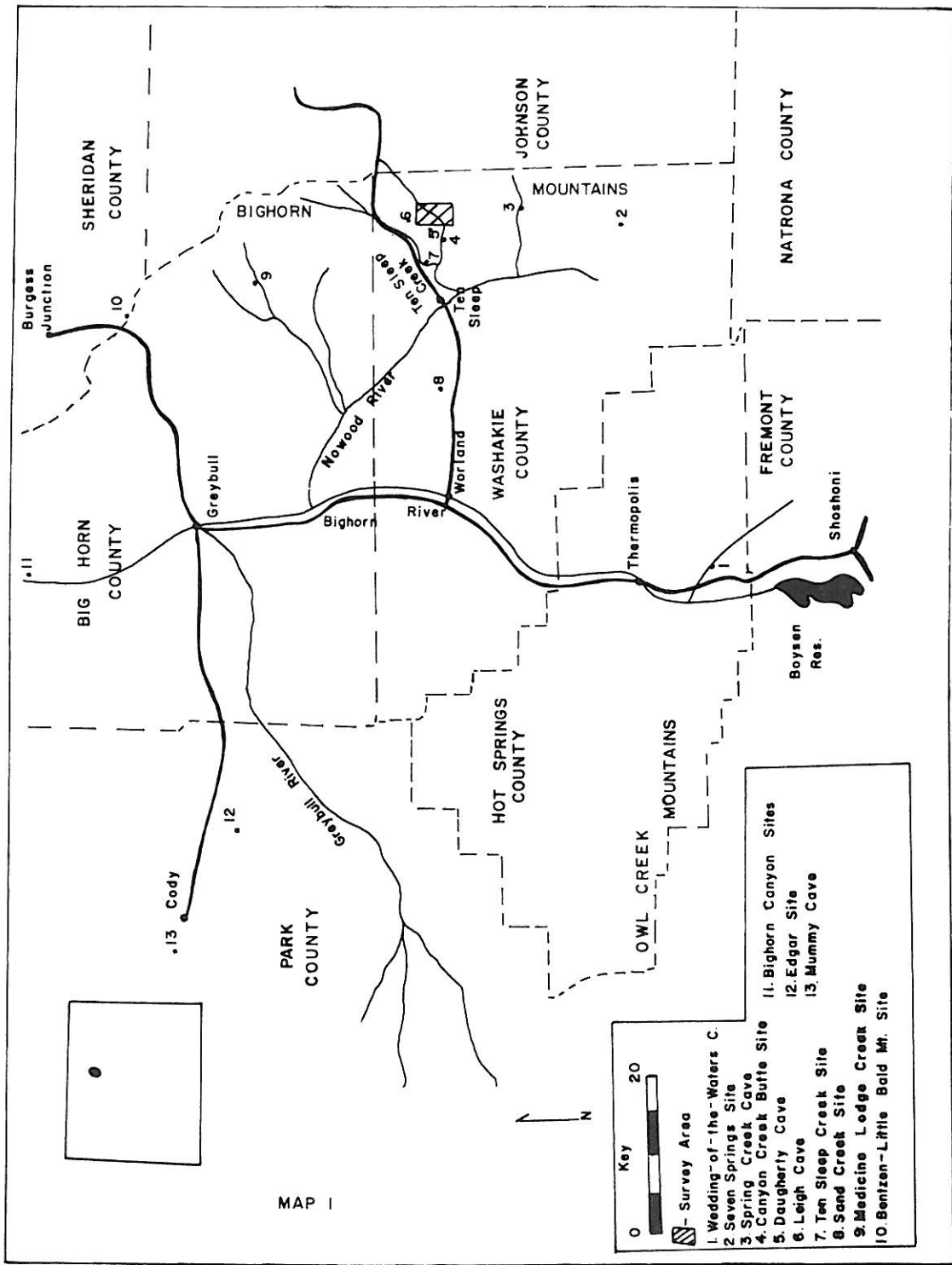
The Bighorn Basin of Wyoming has just begun to be investigated by archaeologists in the last seven years. Information on the cultures of this area is needed to help complete the picture of culture sequences and systems in the Rocky Mountain/High Plains region. This particular portion of the Bighorn Basin was chosen because the land had been recently acquired by the Girl Scout National Organization as a camping facility. Future plans for construction and excavation by troops of Girl Scouts indicated an immediate need to survey the area in some systematic manner.

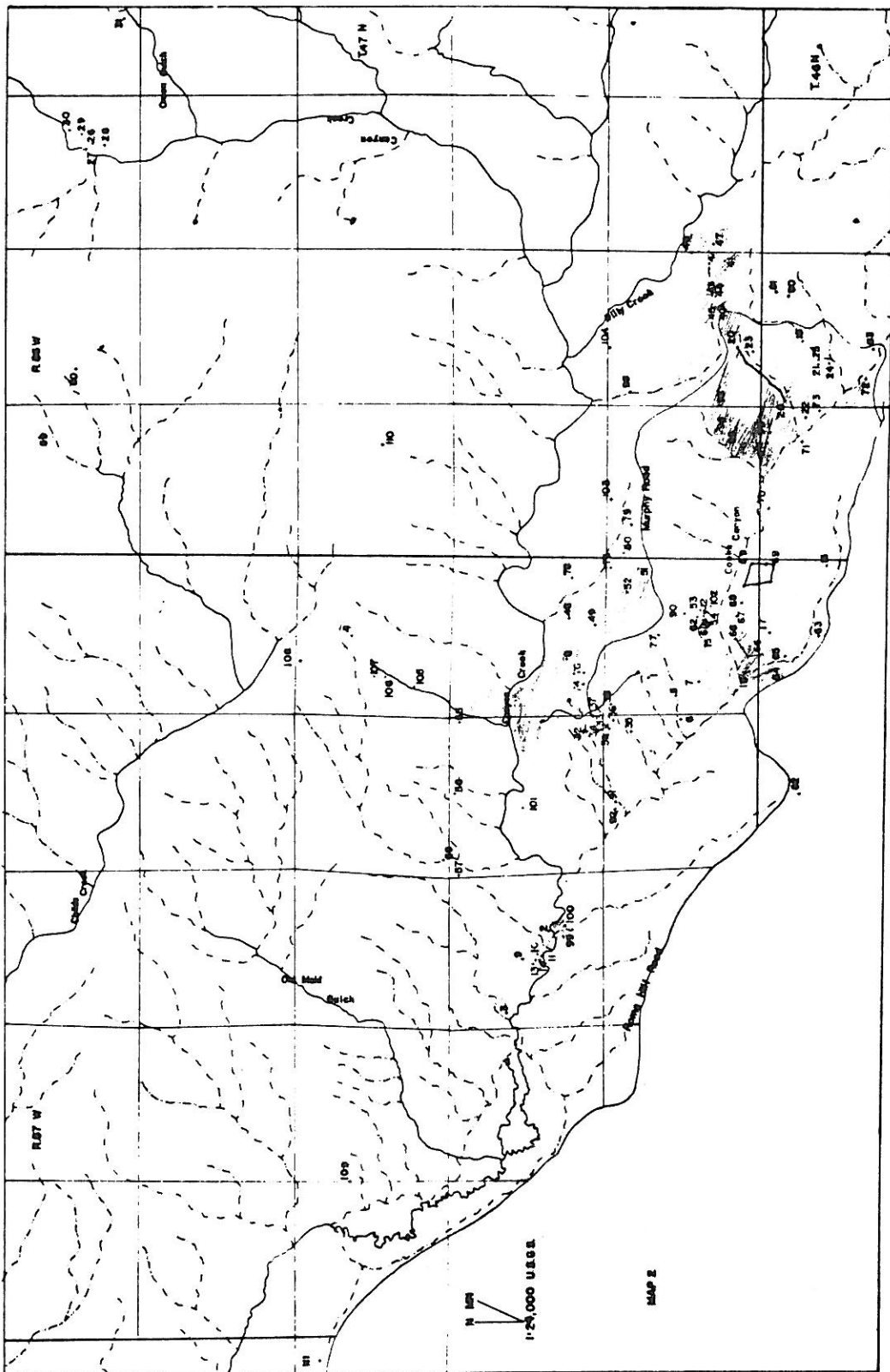
The purpose of the research was twofold. At one level was the need for a general survey of possible sites within the 13,000 acres owned by the Girl Scouts and selected surrounding areas. On another level, it was hoped that a settlement pattern or land use pattern would emerge from the survey and test excavations of sites, as well as possible connections with other sites and cultures within the Bighorn Basin and the Rocky Mountain/High Plains region.

LOCATION AND ACCESSIBILITY

Most of the area involved in the survey was in the central portion of the Canyon Creek drainage system (Map 1). Two sites, however, are found in the Childs Creek drainage system. Both Childs Creek and Canyon Creek are main tributaries of Ten Sleep Creek. The area is part of the southwestern flank of the Bighorn Mountains. The western border of the area is approximately four miles east of Ten Sleep, Wyoming (Map 1). The area surveyed can be found on four U.S.G.S. quadrangles: Old Maid Gulch, Onion Gulch, Big Trails N.E. and Monument Hills. The area includes sections 19-28, 35 and 36 of T47N, R87W, sections 7-10, 19 and 31-33 of T47N, R86W, sections 1 and 2 of T46N, R87W, and sections 5 and 6 of T46N, R86W (Map 2).

Several sites included in this report are found outside this area. They are found along a ridge within the Bighorn National Forest in the Cloud Peak area of the Bighorn





Mountains. These sites are in T49N, R86W section 18 and sections 29 and 32 of T50N, R85W (Map 3).

Access to most of the area involved in the survey was obtained through the use of good to poor gravel roads. Rome Hill Road, a good gravel road, runs just south of the southern boundary of the surveyed area. Murphy Road, branching off of it into the Girl Scout property, runs north and then west giving access to most areas within the southern portion of the Girl Scout property. Tolman Road, a poor gravel road, runs north from Rome Hill Road giving access to the northern area of the Canyon Creek drainage and Childs Creek drainage. There are also several fair to poor dirt roads, which a sturdy, four-wheel drive vehicle could navigate, branching from all three gravel roads. All of the area is within one and a half miles of a gravel road.

FIELD AND LABORATORY WORK

Field investigations were carried on in June, July, August and September of 1970. Originally, a systematic plan of survey was intended over the 13,000 acres owned by the Girl Scouts. There were eight survey areas based on drainage systems. However, lack of time and a four-wheel drive vehicle prevented such a systematic plan from being carried out completely. Certain areas were walked by the writer and various assistants from the Girl Scout staff in an effort to discover sites or investigate sites reported by others throughout the summer. Those areas walked by the writer are shaded on Map 2. Note that some recorded sites were never personally visited by the writer. These sites were noted by various individuals, who donated the artifact material collected and gave a description of the area, as well as locating it on a map.

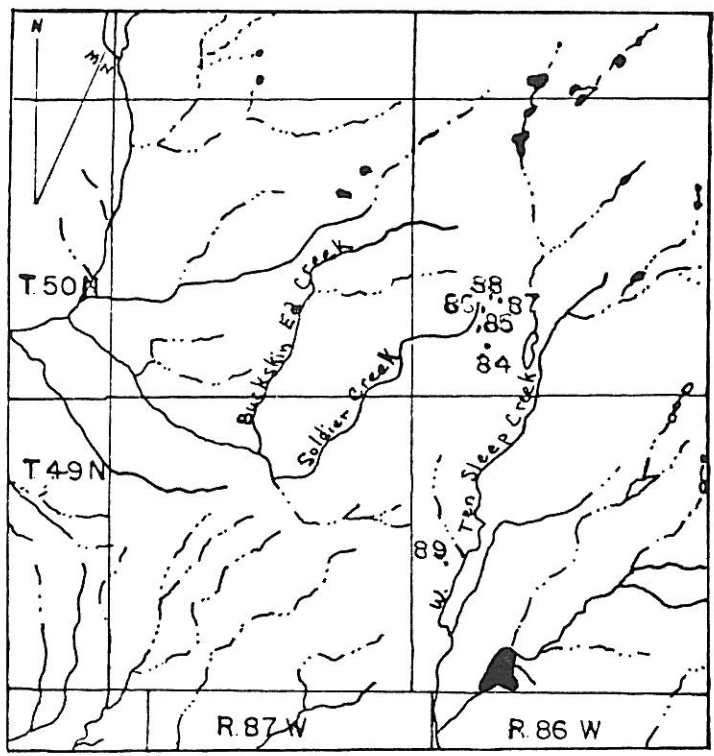
All sites upon discovery were recorded on a site survey form (Appendix I) and located on the National Center West Map. Later the site locations were recorded on the U.S.G.S. quadrangles for the area, scale 1:24,000. Those sites in the Bighorn National Forest were located on the National Forest Map and transferred to the U.S.G.S. Sheridan quadrangle, scale 1:250,000 (Map 3).

Those sites with well preserved pictographs were photographed (See Plate I; a, b, d-f) as were many of the pictographs. The pictographs were sketched and measured with a calibrated steel tape. All photography was done with an Instamatic 124.

The excavated sites were photographed while excavation was in progress. Maps were also made of three of the excavated sites using an alidade, plane table, Brunton compass and a stadia rod.

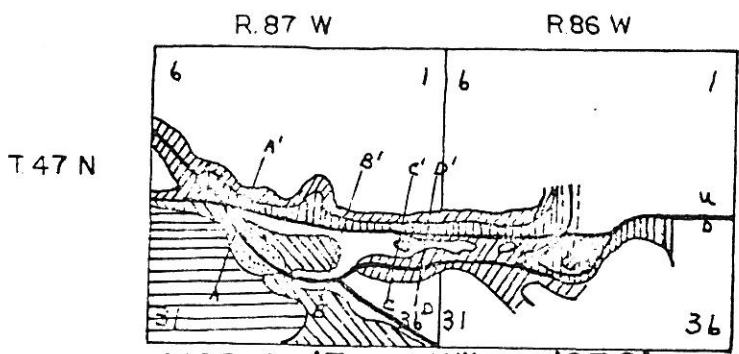
The sites excavated were layed out with a Brunton compass and steel tape. Site 2 had already been layed out the previous summer by Dr. G. Frison and Mrs. C. Adams.

Laboratory work included cleaning, labeling, and cataloging all artifacts. Tools and some flakes were analyzed with the aid of a binocular microscope. Maps were



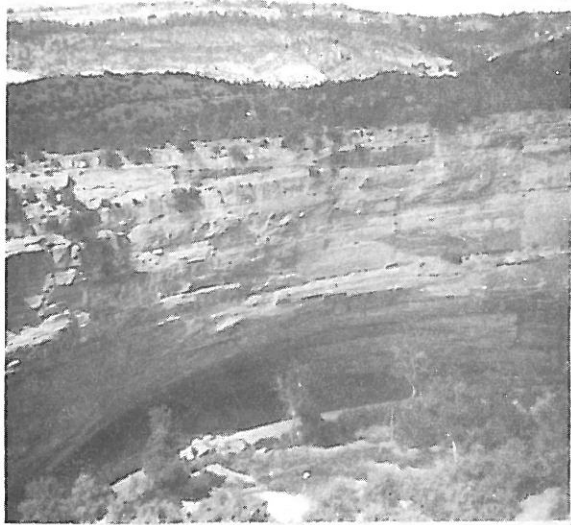
MAP 3 Bighorns 1:125,000

Canyon Creek Drainage

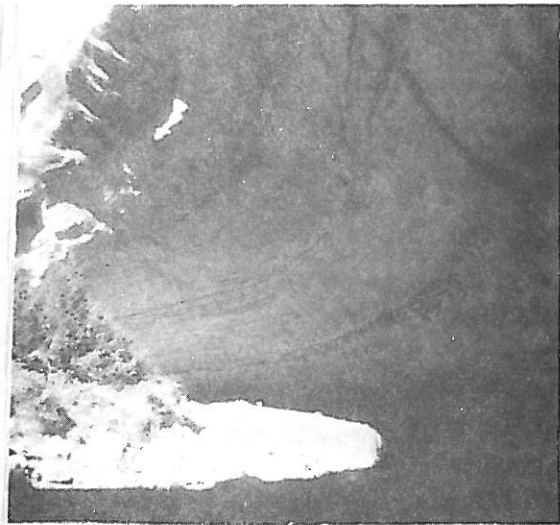


MAP 4 (From Wilson 1938)

- Chugwater
 Embar
 Ten Sleep
 Amsden
- Madison
 Bighorn
 Ten Sleep Fault
 Creek



Site 2



Site 2 - Interior

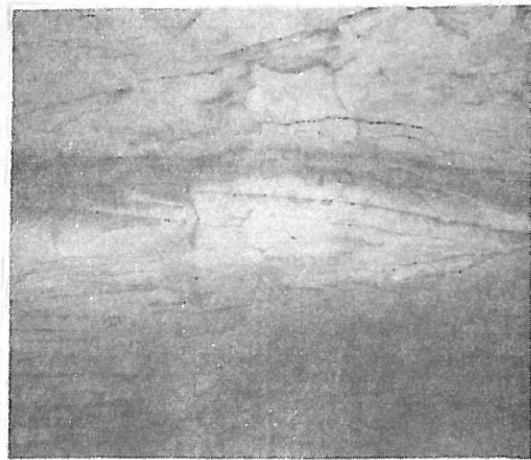
Site 12



Site 54



Site 111



Site 61

enlarged with use of the Graflex Photo-Plus.

PREVIOUS INVESTIGATIONS

Until the last seven years very little archaeological work has been done in the Bighorn Basin or the flanks of the surrounding mountains. To date five cave sites have been investigated and published: Wedding-of-the-Waters Cave, Spring Creek Cave, Daugherty Cave (Frison 1962, 1965, 1968), Leigh Cave (Frison and Huseas 1968) and Mummy Cave (Wedel, Husted, and Moss 1968). Daugherty Cave is in the immediate area of the survey. It is an eighth of a mile from the northwest boundary of the Girl Scout property. Spring Creek Cave is located six miles south of the southern boundary of the survey area. Wedding-of-the-Waters Cave is located in the extreme southern portion of the Bighorn Basin about sixty miles from Ten Sleep, Wyoming. Mummy Cave is in the extreme western part of the Bighorn Basin 123 miles west of Ten Sleep. Leigh Cave is located along Leigh Creek 2.25 miles north of the survey area. The Bentzen-Little Bald Mountain Site is an open, high elevation site in the Bighorn Mountains (Bentzen 1963). It is 55 miles north of the survey area. The Edgar Site is an open site in the Oregon Basin, a subdivision of the Bighorn Basin near Cody (Coe 1959). It is approximately 86 miles northwest of the survey area. A series of sites was excavated by Husted in the Bighorn Canyon on the northern border of the Bighorn Basin, as part of a salvage archaeology program for the Yellowbird Reservoir: the Sorenson Site, Mangus Site, Bottleneck Cave, Site 24-BH-250, Fallen Rock Site, Site 48-BH-7, and the Crooked Creek Site (Husted 1969). These sites are approximately 64 to 70 miles northwest of the survey area. There are also miscellaneous investigations done in the Bighorn Basin by the Sheridan Chapter of the Wyoming Archaeological Society.

There are several sites in the Bighorn Basin which are in the process of excavation and/or publication. These include the Medicine Lodge Site, along Medicine Lodge Creek, 20 miles northwest of the survey area, the Seven Springs Site approximately 30 miles southeast of the area, the Ten Sleep Creek Site approximately 2 miles from the northwestern edge of the survey area, the Canyon Creek Butte Site three miles from the western edge of the survey area and the Sand Creek Site approximately eighteen miles west northwest of the survey area (Frison 1967).

CHAPTER II ENVIRONMENTAL SETTING

The area concerned in the survey is considered a portion of the Bighorn Basin. The Bighorn Basin is enclosed by several mountain ranges. There is a narrow corridor to the north which connects the basin to the northern High Plains. However, the basin is not a plains environment but a basin environment similar to the Great Basin to the west. The Absaroka Mountains on the west join the Owl Creek Mountains on the south. The Owl Creek Mountains are an east-west trending extension of the Bighorn Mountains which are on the east of the basin. The Pryor Mountains, also an extension of the Bighorn Mountains, form the northern boundary. The basin is drained by the Bighorn River and its tributaries.

The main survey area is drained by several small mountain streams. Canyon Creek cuts east-west through the area before trending northwest to join Ten Sleep Creek. It parallels the Ten Sleep Fault, which has a vertical displacement of several hundred feet in this area. Canyon Creek rises in the Bighorn Mountains cutting a V-shaped valley for several miles; at this point it is a consequent stream. Abruptly, the stream goes from youth to maturity where the stream emerges from its canyon onto an alluvial valley meandering northwesterly. It is a subsequent stream at this point. It abruptly changes again to a youthful, consequent stream when it enters a gorge in the north wall of the alluvial valley. Apparently, at one time Canyon Creek flowed south into Alkali or Spring Creek, but it was captured by a headward-working branch of Ten Sleep Creek causing it to flow northwest into Ten Sleep Creek (Fig. 1) (Trotter 1954).

Canyon Creek cuts through a variety of formations along its course. The most prominent, forming steep canyon walls, is the Ten Sleep Sandstone Formation. There are several tributaries of Canyon Creek involved in the survey area. Most of these also have cut through the Ten Sleep Sandstone. One of the largest is Cook's Canyon. It joins Canyon Creek flowing in from the southeast. Both Cook's Canyon and Canyon Creek have several small side canyons. All of these canyons have permanent or intermittent springs at their heads. These springs originate in the Ten Sleep Formation. Two other important tributaries of Canyon Creek are Billy Creek and Onion Gulch. Onion Gulch, in the survey area, cuts through the Bighorn Dolomite Formation as does Canyon Creek in that locality (Map 4).

The climate of the area varies with elevation. The closest weather station to the area is located at Worland, Wyoming, in the middle of the Bighorn Basin. The interior of the basin is warmer and dryer than the surrounding uplands. The lowest temperatures for both zones occur in the winter months of November through March. The highest temperatures occur in July and August. The mean temperatures for Worland in the summer months run in the low seventies, those for the winter months in the twenties (Becker and Alyea 1964). The precipitation for Worland averages 7.5 inches a year with May and June being the months with the most precipitation (Becker and Alyea 1964).

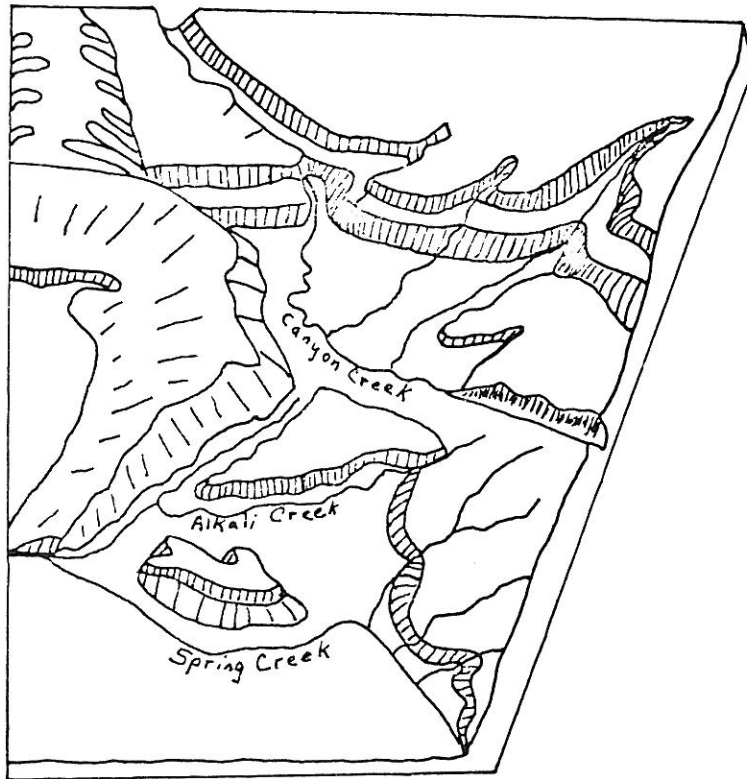


FIG.1 (From Trotter 1954)

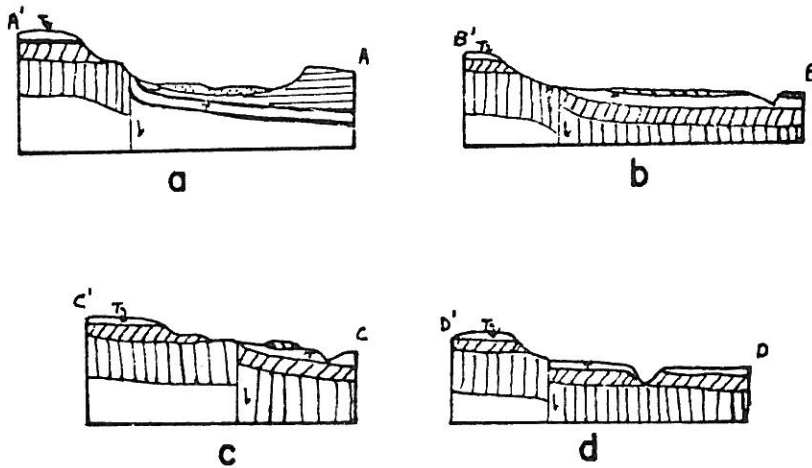


FIG.2 (From Wilson 1938)

Canyon Creek Drainage

The basin floor, being around 4,000-5,000 feet, places the basin in an Upper Sonoran Life Zone (Carey 1917). The area of the survey is in four life zones. The lowest is the Transition Life Zone (Carey 1917). It includes most of the drainage systems of Canyon and Childs Creeks. There is a higher precipitation with lower mean monthly temperatures by approximately 5-10 degrees than in the Worland area. The next highest zone is termed the Canadian Life Zone (Carey 1917). Again the temperature mean would be slightly lower and the precipitation slightly higher. The two highest zones are the Hudsonian Life Zone and the Arctic-Alpine Life Zone (Carey 1917), the environment for the sites in the Cloud Peak area of the Bighorn National Forest.

The vegetation of the area reflects most often climate. However, other factors such as soil type, available moisture and grazing patterns also have their effect on vegetation. Those plants to be found in the Transition Life Zone are greatly affected by the amount of water available. Therefore, in the dry interfluves above the canyons, sagebrush (Artemisia sp.) is the dominant plant. Also found in this type of environment are juniper (Juniperus sp.), mountain mahogany (Cercocarpus ledifolius), prickly pear cactus (Opuntia polyacantha), prickly poppy (Agemone sp.), sego lily (Calochortus gunnisoni) and a variety of grasses. The dominance of sagebrush rather than grass may well be due to overgrazing of selected areas. In several open areas with good soil depth, overlooking springs, the writer found a great deal of cultural material. It seems unlikely that these areas would have been favored camping areas if the sagebrush had been present at the time of use. It is well known by autecologists that in areas where sagebrush and grasses naturally occur together, sagebrush will become the dominant plant if overgrazing occurs (Daubenmire 1959).

In well-watered areas many of the above plants are present, but are larger or fuller. In addition, the following plants are often found: Ponderosa pine (Pinus ponderosa), Douglas fir (Pseudotsuga taxifolia), cottonwood (Populus sp.), willow (Salix sp.), wild rose (Rosa woodsii), mountain maple (Acer glabrum), gooseberry (Ribes setosum), currant (Ribes americanum), chokecherry (Prunus virginiana), serviceberry (Amelanchier sp.), raspberry (Rubus sp.), snowbrush ceanothus (Ceanothus velutinus), Oregon grape (Berberis aquifolium), lupine (Lupinus sp.), vetch (Vicia americana), thistle (Cirsium sp.), spear grass (Poa lucida), wildrye (Elymus sp.) and many other grasses and forbes.

The Canadian Life Zone is found in this area between 7500 and 9000 feet. It includes many of the same genera as the Transition Life Zone such as the Douglas fir, willow, currant, and Mariposa lily. Other plants are more limited to it such as the Englemann spruce (Picea englemanni), aspen (Populus tremuloidea), clover (Trifolium sp.), and many other forbes. Grasses are widespread in the open areas of this life zone. Rye grass (Elymus sp.) is often conspicuous as it is in the Transition Life Zone.

The Hudsonian Life Zone is found in the area of Site 89 on the ridge in the Bighorn National Forest. Most trees in the zone are dwarf such as pine, alpine fir (Abies

lasiocarpa) and the Englemann spruce. Small shrubs such as the currant and a variety of forbes are present: larkspur (Delphinium bicolor), buttercup (Ranunculus sp.), lupine, clover, sedge (Cares sp.) and rush (Juncas balticus).

Most of the sites on the ridge are in the Arctic-Alpine Life Zone above treeline. Only forbes and grasses are found there.

The fauna for both survey areas, Canyon Creek and Cloud Peak, is varied. Mammals, birds, reptiles, amphibians, and fish are represented. Today many of the fish are planted, however, a few native species are present: Cutthroat Trout (Salmo clarki), Rocky Mountain Whitefish (Prosopium williamsoni) and Suckers (Catostomus sp.).

Amphibians were not observed by the writer during field work; however, the Tiger Salamander (Ambystoma tigrinum), toad (Bufo sp.), and Leopard frog (Rana pipiens) are residents of the Transition Life Zone according to Carey (1917). Reptiles found in the area include lizards and snakes. Rattlesnakes (Crotalus confluentus) and bull snakes (Pituophis sayi) are the most common snakes. Horn toad (Phrynosoma crnatissimum), scaly lizard (Sceloporus graciosus) and skinks (Eumeces multivirgatus) were common lizards observed. Birds in the area include ducks, sagegrouse (Centrocercus urophasianus), hawks, eagles, jays, Clark's Nutcracker (Nucifraga columbiana) and many smaller birds.

The mammals include large ungulates such as elk (Cervus canadensis), which frequent the main survey area in the fall, winter and early spring, living in the higher elevations in the late spring and summer, and deer. Bighorn sheep and buffalo at one time were common in the area, the buffalo (Bison bison) in the open areas, the sheep (Ovis canadensis) in the higher elevations. Antelope (Antilocapra americana) are found in the open area of the basin floor to the west. Carnivores in the area include: black bear (Ursus americanus), rare today, coyote (Canis latrans), weasel (Mustela frenata), mink (Mustela vison), ferret (Mustela nigripes), badger (Taxidea taxus), skunk (Mephitis mephitis), fox (Vulpes velox), and bobcat (Lynx rufus). Mountain lion (Felis concolor) and wolf (Canis lupus) once were also found in the area. Small mammals include Insectivores: shrews (Soricidae) and bats (Chiroptera), Rodenta: marmot (Marmota flaviventris), prairie dog (Cynomys sp.), ground squirrel (Citellus sp.), chipmunk (Eutamias sp.), red squirrel (Tamiasciurus hudsonicus), gopher (Thomomys sp.), mice (Peromyscus sp.), kangaroo rat (Dipodomys sp.), beaver (Castor canadensis), bushytail woodrat (Neotoma cinerea), vole (Microtus sp.), muskrat (Ondatra zibethica) and porcupine (Erethizon dorsatum), and Lagomorpha: jackrabbits (Lepus sp.) and cottontails (Sylvilagus sp.)

CHAPTER III GEOLOGY

The geology of the two survey areas, Canyon Creek drainage and the Cloud Peak ridge, is quite different, even though they are both part of the same general uplift. Local activity has affected both areas differently.

The Bighorn Mountains are an outlying portion of the Rocky Mountains. The Bighorns are a large anticline due to an uplift of thousands of feet of Paleozoic and Mesozoic sedimentary rock. Deep erosion has exposed a central core of Precambrian granites, with sedimentary rocks flanking the high peaks with front ranges and plateaus. Streams cut through the strata forming steep canyons in most areas (Darton 1906).

The Bighorn uplift is made up of three horst-like crustal blocks mantled with sediments. The central and southern blocks are delineated by the Ten Sleep Fault. It is felt that the Ten Sleep Fault was present before the uplifting of the Bighorns. The central segment of the mountains has a sharp locally thrusting monoclinical fold occurring along the eastern front; the western slope is characterized by gentle westward dips. The southern segment has an oversteeping and westward thrusting of strata on the western front and a gentle eastern dip along the eastern flank (Wilson 1938). Therefore, in the survey area, the northern area is part of the gentle western slope, and the southern area is part of the sharp dipping western flank.

The Ten Sleep Fault runs east-west through the southern part of the survey area. Going west to east the fault runs through sections 19, 20, 21, 22, 23 and 24 of T47N, R87W and sections 19, 20, 21 and 22 of T47N, R86W (Map 4). The north side or upthrown side of the fault is a portion of the central block of the Bighorn anticline, the downthrown block the steeply westward dipping southern block. The combination of the Bighorn anticline and fault structure causes an interesting pattern of strata. The strata next to the fault have been dragged up or toward the fault on the south or downthrown side and down toward the fault on the north or upthrown side. The degree of drag changes along the fault line. The drag seems to be in response to the compression of the southern block against the central block when the region was uplifted (Wilson 1938).

In T47N, R87W the Embar, Ten Sleep and Amsden Formations occur along the south side of the fault. North of the fault are Madison, Amsden, Ten Sleep and Embar Formations in order bottom to top. The Embar is almost completely eroded off in the northern half of section 25 (Fig. 2c). In the extreme eastern part of that section it is completely gone, leaving Ten Sleep Sandstone on the surface (Fig. 2d). At one time the Embar Formation was the base 250 feet of the Chugwater Formation. Now the Chugwater Formation has been divided into the Embar, Chugwater and Gypsum Springs Formations (Trotter 1954).

Canyon Creek in T47N, R87W sections 20, 28 and 29 is meandering over Quaternary deposits (Fig. 2a). In sections 25, 26 and 27 it is cutting Ten Sleep and Amsden

Formations (Fig. 2b). The Ten Sleep Formation forms the canyon walls. In section 27 it is just beginning to cut into Amsden; by section 25 it has cut almost completely through the Amsden. Further upstream in T47N, R86W sections 28 and 29 the canyon is cut into Madison Limestone, with Ten Sleep and Amsden forming the canyon walls above. In sections 9 and 10 north of the fault, Canyon Creek and Onion Gulch are cutting into Bighorn Dolomite with Madison Limestone forming the upper canyon walls. From this it might be assumed that the Canyon Creek Sink is cut into Bighorn Dolomite. The sink is located in the north wall of Canyon Creek in section 9 T47N, R86W. The cutting of Canyon Creek into older and older beds is not due to deeper cutting but to the slope of the strata in the area. As one goes west to east the sedimentary strata are more and more eroded off of the anticline's west slope (Map 4).

Before discussing the Cloud Peak area in detail, a description of the various strata in both survey areas is necessary. The oldest formation exposed in the Canyon Creek area is the Bighorn Dolomite, an Ordovician formation. It is in contact unconformably with the Madison Limestone of Mississippian age. The upper part of the strata is cherty limestone which is less resistant than the tan, massive limestone and dolomite in the lower unit (Trotter 1954). The Madison then is one possible source for chert nodules found throughout the survey area.

Another unconformity separates the Madison Limestone from the Amsden Formation of Pennsylvanian age. The Amsden Formation is divided into three units. The oldest is a sandstone; the middle unit is a red to maroon shale with some red to yellow chert in the upper beds. The youngest unit is gray, very cherty dolomite. The chert is found in nodules and lenticular units of gray and pink alternating bands. Therefore, the Amsden is another possible source of chert nodules. The Ten Sleep Sandstone is also of Pennsylvanian age. The Ten Sleep has seven separate units. The first or oldest unit is sandstone that tends to be quartzitic locally; the second is dolomite which is very cherty; the next three units are sandstone of various colors. The sixth unit is siltstone of a lavender color; the top unit is sandstone. The last formation is the Embar of Permian and possibly late Triassic age. The Embar has eighteen different units. Shale is the primary component; gypsum is the second most common unit. Dolomite, siltstone and marl are less common units. One unit is described as gypsum and cherts. The chert is gray to light green to purple (Trotter 1954). This would be a unit already eroded away in the survey area. Its chert component is possibly part of the chert nodules found on the surface of the interfluves.

Suitable cherts for tool making can also be found in the stream beds of the Canyon Creek drainage. The further upstream one goes, chert material is found more frequently and in larger chunks. Therefore, the area provided raw material for stone tool making in two general locations: on the interfluves where small nodules of chert are found and in the larger stream beds. This was not, however, the only source for raw materials in the area. Leigh Creek Vee contains several chert quarries in the Madison Limestone. One known site is in section 25 of T48N, R87W along Tepee Creek just

before it enters Ten Sleep Creek (Frison, Personal Communication). Several quarry sites are known for a gray chert in the badlands west of Ten Sleep (Frison, Personal Communication). This is probably from the Cloverly Formation of Cretaceous age.

The probable source of quartzite which is occasionally found as a utilized raw material in the survey area is the central and southern Bighorn Mountains. Two strata in addition to the ones already mentioned are found in the area. The Flathead Quartzite Formation, Cambrian in age, is found in several areas in the central Bighorns. Its color is reddish to maroon to brown (Trotter 1954). The other formation is the Precambrian granite. The Flathead Formation can be found as outcroppings around Meadowlark Lake, six miles north of the northern border of the southern survey area, as well as other locations (Trotter 1954). In T47N, R85W and R84W the Flathead Formation is noticeable as strata on both sides of the Ten Sleep Fault (Wilson 1938). Large quartzite boulders can also be observed on the ridge near Site 89 (Map 3).

The geology of the Cloud Peak area is tied to the glacial history of the area. Only the most recent glacial epoch is represented in the main glacial features. Older features have been almost completely destroyed by the most recent glacial activity (Fig. 3) (Darton 1906).

The ridge where the sites were found was a non-glaciated area. The large Ten Sleep Glacier was on the east and the smaller Buckskin Ed Glacier was on the northwest. The ridge was undoubtedly covered with snow during glacial periods (Fig. 3). The ridge itself is of Precambrian granites. The southern part of the ridge is partly covered by the Flathead Quartzite Formation. There are also a few small areas of Tertiary deposits. These include sands, sandstone, clay, gravels and boulders. Much of the ridge has a thin layer of soil with boulders and small ridges of granite found primarily in the northwest area (Fig. 4) (Darton 1906).

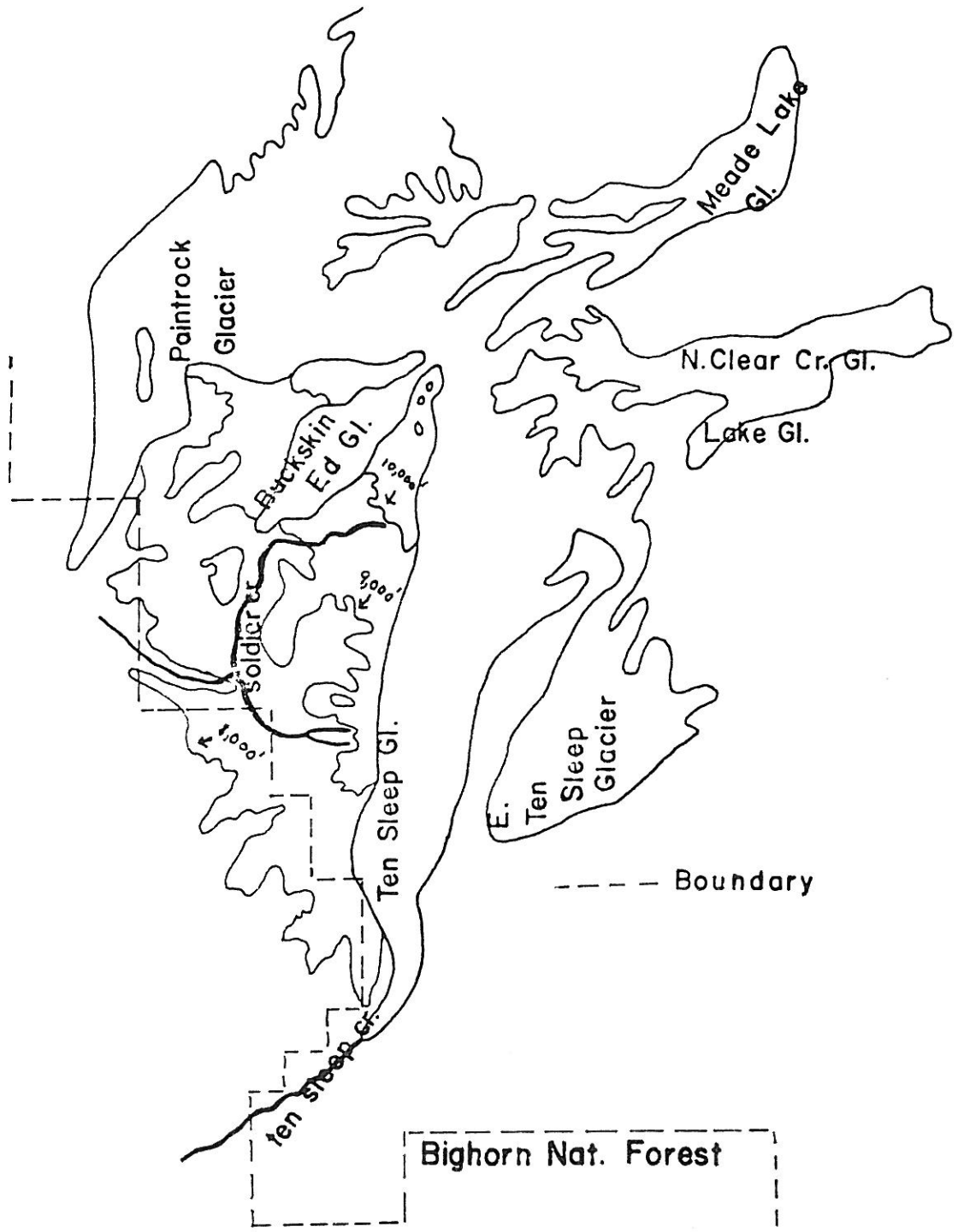
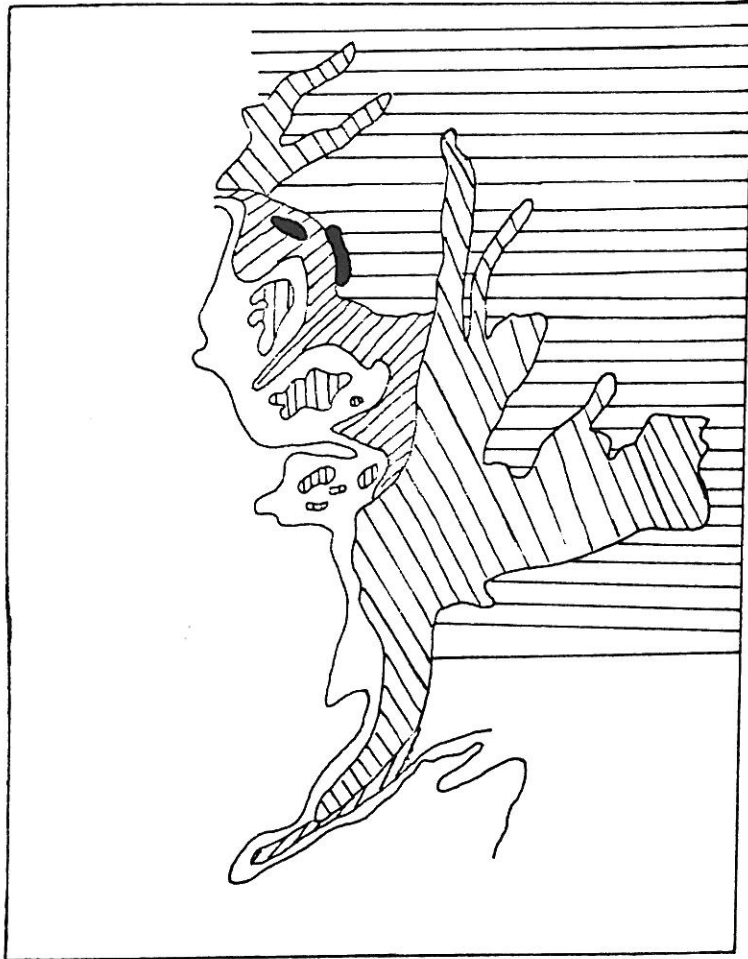


FIG. 3 GLACIERS IN THE BIGHORNS
 (DARTON 1906)



Tertiary
 Bighorn Dolomite
 Granite

Cambrian-Flathead
 Madison

BIGHORN GEOLOGIC FORMATIONS

FIG. 4 (From Darton 1906)

Archaeological Investigations in the Big Horn Basin, Wyoming
will be continued in September, 1971 issue of the Wyoming
Archaeologist.