

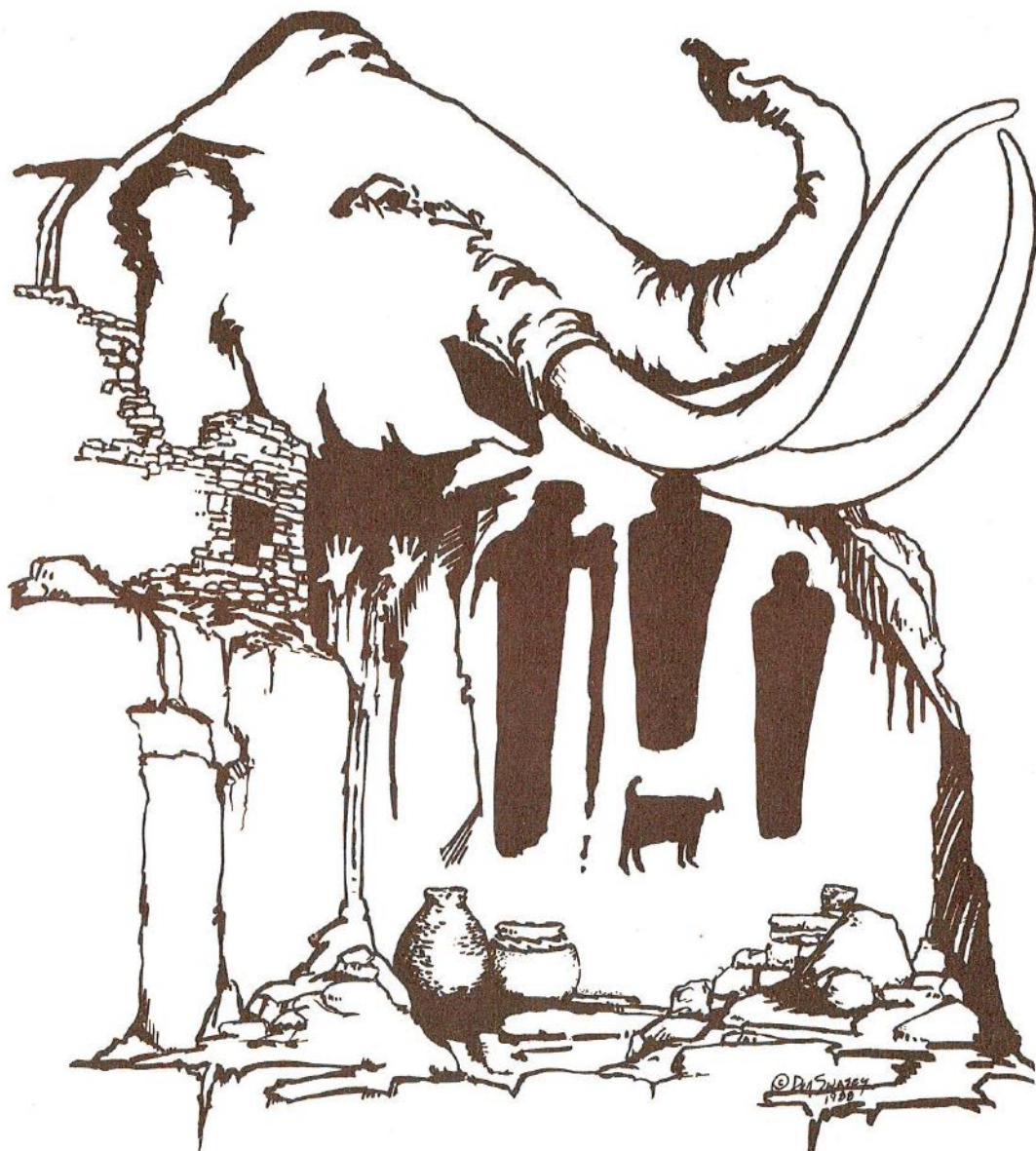
Canyon Legacy

A Journal of the Dan O'Laurie Museum - Moab, Utah

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Survival Through Time In Canyonlands



The Dan O'Laurie Museum

Canyon Legacy

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The Cover: Art Work by Don Swasey

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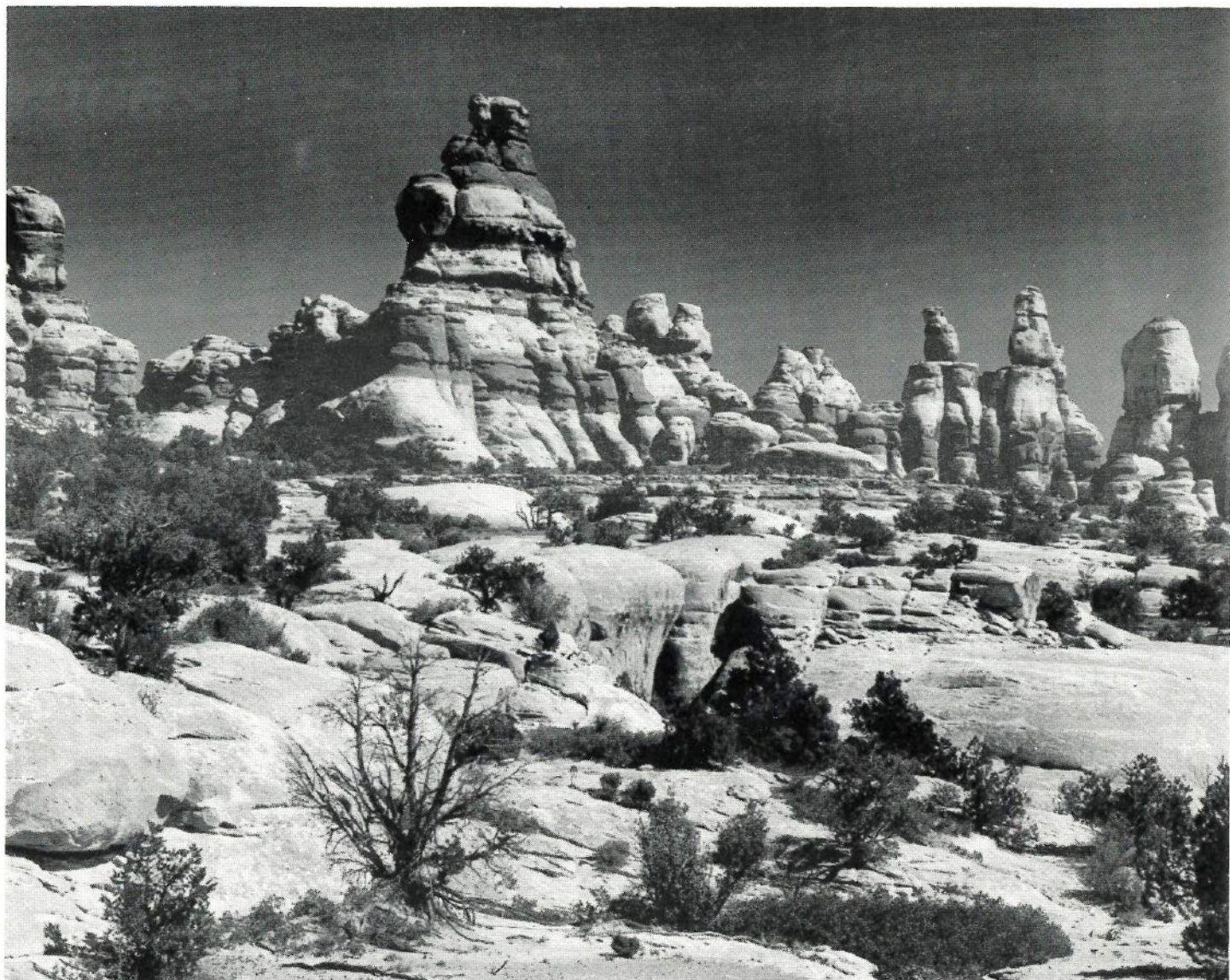


Photo by F.A. Barnes

WITHIN . . .

Down through the ages, the prime concern of all living things has been survival. To subsist in the natural world, especially during times of environmental change, has always been a special challenge for inhabitants of the Colorado Plateau. From the era of the Columbian Mammoth, through the period of the Archaic People, to the time of the Anasazi and Ute, the struggle for survival has been a recurring theme and a problem not always successfully resolved.

The Dan O'Laurie Museum of Moab takes great pride in presenting this premier issue of *Canyon Legacy*, SURVIVAL THROUGH TIME IN CANYONLANDS.

Jean Atkins

The Huntington Mountain Mammoth: The Last Holdout?*

by David D. Gillette, PH.D.

Survival Through Time is a theme that occupies all beings in the universe -- how to stay alive, how to keep putting food on the table, so to speak. It is a fitting theme from the ecological perspective: how do animals, including humans, survive the rigors of the environment in which they live?

I was no more than 3 months on the job in Utah when I got a phone call at 7:00 a.m. on a weekday in August. The phone call came from my predecessor as Utah State Paleontologist, Jim Madsen who, like myself, is interested both in Ice Age or Pleistocene mammals as well as dinosaurs. Jim told me that, at a construction site for a dam near Fairview in Huntington Canyon, some large bones had been discovered, of unspecified form and shape. He then gave me a phone number to contact the construction operators.

I called Ray Nielson of Nielson Construction Company who had the bones. He told me he had a long bone, 4 feet long and 8 inches around. The bone had been found in the Manti-LaSal National Forest at an elevation of 9,000 feet.

When I arrived at the site there was a tremendous confusion of muck and mud and heavy equipment that was going in all directions. The construction company had run into muck that was 20 feet thick, and were trying to replace it with rock fill to stabilize the toe of the dam. In so doing they uncovered twigs, logs and bones. With every scoop of the bucket -- which was nearly large enough to put my pickup truck in -- would come up snags and logs, and as the bucket would pivot and turn over and dump, everything would fall out. It was remarkable that Chris Nielson, the operator, could

recognize a four foot long bone and distinguish it from a four foot long chunk of log. But he did, and he went out to examine it.

When he realized what he had, probably his first thought was: "What do we do now?" If you work for or own a construction company the temptation might be strong to just bury it to avoid being shut down. Such a scientific discovery could be an economic problem if you have a construction company and you schedule your equipment for so many days; to be shut down for an archaeology or paleontology excavation would delay the project. The delay could cost money, and in order to recover that money you would have to negotiate an arrangement with the land owner, which would pay you for the time lost, or find another solution.

Usually, the other solution is to bury the bones, to get rid of the "evidence." But Chris Nielson didn't do that, quite to his credit. He took the bone to his uncle, who realized that it was unusual. Although he didn't know what he had, through a series of phone calls he finally reached me as State Paleontologist, inviting me to the site.

** In this article Dr. David Gillette offers the first written account by one of the researchers of the Huntington Mammoth discovery. For this popular article, he employs a personal narrative style that lends an unusual perspective and captures the flavor of the unique circumstances of the find. Detailed scientific analysis is underway and full, professional reporting is planned.*



Huntington mammoth site, showing control grid over the recovery area and the muddy working conditions.

Even in late August the weather was threatening at this high altitude and the construction people had a short season to work in. It was clear that to be shut down for even a few days or a week would have serious consequences for the project. So when I arrived at the site, I had to walk up to four of the irrigation company supervisors -- it was for this irrigation company that the dam was being repaired - all in their bib overalls, big husky laboring folks, with stone faces like Mount Rushmore. They didn't want to see me or hear what I had to say. And so before shaking hands or offering any business cards or playing the "good old boy" where we kick dirt clods and tell stories, my first words were, "We won't shut you down."

I got four smiles in reply. The four men led me down into the pit where the bones had been discovered, but not before looking at the bones that Nielson company had pulled aside. One was the upper arm bone of an elephant. It was quite a surprise. There was also a fragment of a tusk, which I didn't realize they had found. I had only heard about one bone, but instead they had about a four foot section of tusk from an elephant, and that was a clincher. If I couldn't have recognized the arm bone as elephant, there was no mistaking the tusk.

From the section of tusk found, if complete it would have measured about 10 feet long. The upper arm bone and tusk were in good condition, perfectly preserved. We felt around in the muck and I couldn't see any more

bone, but I had noticed on the humerus -- the upper arm bone -- a peculiar gray color that was different from the color in the peat bog, a different kind of stain. And I saw that same color covering some muck in the pit.

Chris Nielson then maneuvered his bucket into place and I asked him to make a shallow sweep right through the position where the stain was. In doing so, he scraped a four inch deep swath right across the surface and pulled off the cheekbone of the still-buried skull. It was like finding gold with the first spadeful when you go to dig a mine. Of all the bones to find in a mammoth or mastodon, the skull is the best. The fact that we broke the cheek bone off was trivial; that could be repaired. The important thing was locating the skull and, with it, the rest of the skeleton. Once we identified where the bone was, we could feel down in the muck -- we couldn't see anything, it was so black and so sloppy -- and get an overall feel for the size of the skull. And so I went away that day after we had done several more tests, each time striking bone, thinking that we probably had a complete skeleton of a mastodon.

I called it a mastodon because mastodons were known to inhabit forests, with records up to 10,000 feet. It was a rational call on my part: I knew I had elephant; there was tusk, and the arm bone of mastodons and mammoths are not very different. So it was an easy call. Ecologically it should have been mastodon and it would not have been a very great surprise.

The next day as I pulled the muck away from the pallet region of the skull, I exposed a series of plates of one tooth that indicated it was a mammoth. I was quite surprised, because the previous elevation record for mammoths from North America was from a site in New Mexico at an elevation of 7,200 feet. Here we were at 9,000 feet and a great distance farther north, which in New Mexico would have been equivalent to an elevation of around 10,000 feet, considering the difference in elevation and latitude. To find a mammoth at this elevation was astonishing and I was elated at the discovery. We had prospects of a whole skeleton from the work we'd done with the bucket, exploring the limits of the site. In addition, the fact that the skeleton was in place meant that we could get a stratigraphic record, to put it in a proper context. With this introduction to the site, I would like to explain first the differences between a mastodon and a mammoth and then return to the account of the excavation.

Mastodons and mammoths are part of the fauna that lived during the Ice Age in North America. Dinosaurs, on the other hand, became extinct 65 million years ago. The earliest of the Ice Age animals that we recognize in North America were here from roughly two million years ago until about 10,000 years ago. So mastodons and mammoths are not dinosaurs, nor are the saber-tooth cats, which preyed on the Ice Age elephants. These are all mammals, warm-blooded animals like our modern elephants or cats, or whichever group you are looking at. They all have modern counterparts.

There were at least three species of mammoth in North America. They all belonged to the species *Mammuthus*. The mammoth in Utah was not a woolly mammoth but instead was the Columbian mammoth. North American mammoths had high shoulders and a tall domed head with large curved tusks that were at least 10 feet long in mature bulls. They were very tall, maybe a foot taller than our modern elephant, and more slender than the mastodon. The grinding surface of the teeth consists of alternating layers of enamel, cement and dentine, the same composition as human teeth. The difference with mammoth teeth is that the enamel is worn through by the chewing action, exposing dentine. The alternating layers act like a washboard or a grinding mill for chewing grasses.

Elephants of all kinds are primarily grass eaters. We know that not only from modern elephants as an analogy, but also because in some sites there are stomach contents from mammoth fossils and the dominant portion of these contents is grasses. In addition, mammoth tooth anatomy reflects their diet. Grasses require an efficient grinding surface, because the silica content is abrasive and tough. Mammoth molar teeth were each about 8 inches long, and the surface arrangement was an effective device for grinding food. There is only one tooth in each jaw at a time, or parts of two teeth. The teeth grow forward and the front part of the tooth falls out, as the rear tooth grows in behind it. When the last molar comes in, it continues to grow forward and when it falls out the individual's feeding

ability is lost.

In contrast, there were three molar teeth in place in the mastodon's jaw throughout its life, and each tooth had high cusps and valleys. Human teeth, if they were not worn down through use, would look much the same as mastodon teeth.

When I first saw the skull at Huntington Reservoir, I was looking at the side of a tooth. Because it was an old individual with heavily worn teeth, I just thought that it was an old mastodon. I didn't examine the grinding surface because it was hard to reach in the mud. So when I finally exposed the grinding surface and realized we had a set of parallel plates, rather than the mastodon type of dentition, I was dumbfounded...and delighted.

The habitat near Huntington at 9,000 feet was not much different then, around 10,000 years ago, from what it is today. The only major difference was that up some of the valleys there were active glaciers. Glaciers did not extend down the valley to where the animal died, but the toe of the glacier was probably a mile or so away.

Prior to the death of the mammoth, two glaciers in the valleys above the site came together to form a larger glacier just downhill from this site. But during the time when the sediments of this site collected, the two glaciers had retreated so they were no longer in contact with each other; they were simply supplying sediments by glacial run-off. Water and sediments collected in the lake behind a recessional moraine. Bog conditions developed in this setting, where sediments consisting of mud and a heavy accumulation of plant material were deposited and became saturated by ground water.

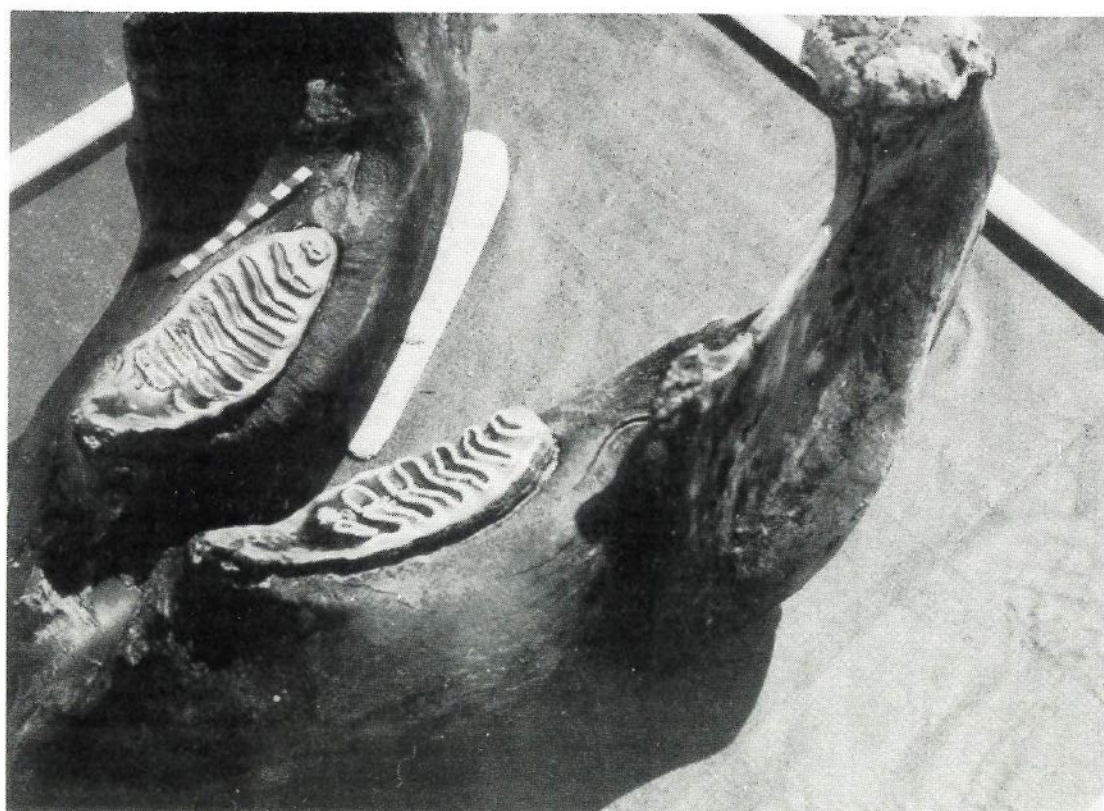
To maintain scientific control, the entire skeleton location was covered by a grid, which was mapped. Then, because the muck was too sticky to use shovels in the excavation, everything had to be done by hand, literally. We had as many as 15 to 20 people in the quarry, using this new technique: "fingertip excavation."

The skull was found lying on its side. Except for the cheekbone torn off by the bucket, it was complete and unbroken. Tusk fragments next to the skull were recovered on the first day, and part of one tusk was still in the tooth socket.

The vertebral column was still articulated. That was quite remarkable preservation, finding the bones still connected. It was also quite remarkable that these bones should still be so fresh, as if they had been simply refrigerated for 10,000 years. And indeed that was the case. The bones had accumulated in the bottom of this bog when the animal got mired and died there. The sediments in the bottom were probably cold, 32°F would be a fair guess at the water temperature, because it was melt water running off from the glaciers. Once the animal's carcass became buried in the muck it went into a stage of refrigeration. At the excavation, it was so



Close-up of Huntington mammoth recovery site showing bones being cleaned prior to wrapping in plastic bags for transport to lab.



Jaw of Huntington mammoth showing excellent preservation and advanced state of wear on molars.

fresh that we thought we could smell rotting meat in one place.

We had to plaster the skull because the bone there is only $\frac{1}{4}$ inch thick and easily damaged. If we had moved the skull out on its own, the muck and moisture that were in the skull would have caused it to crush. Other bones that we removed could be carried without reinforcement, but the skull needed a rigid plastic jacket.

We also had to plaster out the hip bones -- which were more than 6 feet across and still connected at their mid-line -- because they were exceptionally heavy and we were afraid they would also crush under their own weight when moved.

When the animal died, its legs became tangled underneath; one leg buckled so the toes projected upward. In the middle of the pelvis was an upside-down foot of the mammoth. When this animal died, in the settling process, its foot got trapped in this opening in the pelvis. The leg bones, still attached to the hip socket, were lying just below the pelvis.

We had to keep the bones wet during the entire excavation because we found that as soon as they dried at all they began to curl. One of the nightmares of paleontologists working in bog sites is that occasionally bones have lost just enough of their protein material to react to drying by curling into "pretzels." Ribs will turn into coiled, uncontrollable bones that can never be repaired. On the first day, one of the ribs had been broken by the bucket and we had inadvertently let it dry out, not realizing we were going to have this problem. Before our very eyes we saw one edge of the rib begin to curl. So we had a great fear during the entire excavation that the bones were going to be damaged because of drying. One of the reasons we had so many people on the site was just to keep the bones wet; people sprayed the bones constantly during the entire excavation.

We recovered about 95 percent of a complete skeleton, all the way down to the small toe bones, and the bones of the tail. We missed the tip of the tail, and we only got tusk fragments. The tusks might have been removed by the bucket before the site was recognized. Otherwise it is a complete skeleton.

Just underneath the pelvis was a stick that had not been disturbed by the excavation. It got caught between the leg and the pelvis and was deposited at the same time as the mammoth. We sent it off immediately for a radiocarbon date and quite to our surprise, it dated to 9,440 years ago. This is a minimum date, establishing the most recent possible date for the find. Of course we must be cautious because the stick could have been deposited 2,000 years after the animal died and somehow just got caught in the body. Eventually we will get other samples dated from below the skeleton, giving maximum or oldest possible age. Our guess is that we will get a bracketed date similar to 9,440 for the older date.

The dates are very important to us because mammoths

were supposed to have been extinct more than 10,000 years ago. By some calculations, around 10,500 or 10,200 years ago, all the mastodons and mammoths and all the megafauna of the Ice Age were thought to be extinct -- all across North America. But here we have a very tightly calculated radiocarbon date with very small plus or minus factor for possible error.

Apparently at the time this mammoth died it was living in a refugium area in the high mountains, after the major extinction of all the megafauna elsewhere in the continent. If our interpretation is correct, this is the first well-documented record of post-extinction mammoths. If our next date, from a stick below the skeleton, turns out to give us an equally young date, then we have quite a remarkable record: not only was this mammoth living at a high elevation, but it was also a hold-over by maybe 500 to 1000 years at least, compared to all the other mammoths that lived in North America.

Other materials from the site included water-logged sticks and logs, like ones you find in a lake today, mainly from spruce. Sedges and grasses were also found in the bog, as well as what we think is part of the stomach contents of the mammoth. Surprisingly, we found a lot of pine needles in the stomach. Mammoths were not supposed to be browsers, they were supposed to have fed on grasses. Apparently this mammoth had been feeding on pine needles, which were probably very poor in nutrition for mammoths. Perhaps this mammoth was feeding on anything it could find during a heavy winter and became so emaciated that when it got trapped in the bog, it was too weak to get out. That's one scenario we developed for explaining why the animal died. Another idea that can never be substantiated is that it had fallen through ice, during spring melt, and got trapped in the bog.

On the second day of the dig we realized that this was a site that the public could visit. Sometimes in excavations it's not appropriate or even possible to open it to the public, for reasons of safety or to protect the site. In this case, the construction manager and officials from the Forest Service agreed that we should notify the media, thinking maybe a television crew might like to record the excavation. After television coverage the second night, we had several thousand people each day, during the rest of the week.

The story attracted a great deal of attention. We had wonderful response from the public, largely because the Utah State Archaeological Society chapter in Price helped manage the visitors, who required some supervision. The cooperation between several institutions was a nice experience in bringing paleontology to the public.

Upon examination, the mammoth turned out to be an old individual. In almost every bone we see conditions that indicate severe bone disease of some sort, mainly arthritis. For example three vertebrae from the lumbar region in the lower part of the back show a sheath of bone that locked all three of these together. The diseased

sheath of bone rendered these vertebrae totally immobile.

We had trouble with one of the femurs that had been allowed to dry out in handling and began to crack. If the bones dried too fast, we found that they would, indeed, twist and crack. We took the bones back to Salt Lake City wrapped in plastic bags, so that the drying would be slow. We punched holes in the plastic and, using outside atmospheric pressure, allowed the air and with it, the moisture, to move back and forth through those plastic coverings. At this writing, the bones are still wet. We want them to dry slowly, for evenness, rather than drying on the outside and remaining wet on the inside, which causes the cracking and shrinkage problems.

In summary, this mammoth was a large, old bull, maybe 60 years old, that died in the bog. Its carcass settled into the sediments, leaving the skeleton largely undisturbed. It is remarkable for the perfect preservation of the bone, the completeness of the skeleton, and the high elevation of the site. The implications of the early date await further analysis.

Note: Repository designation and mold/casting decisions were still pending by USFS at the time this went to press.

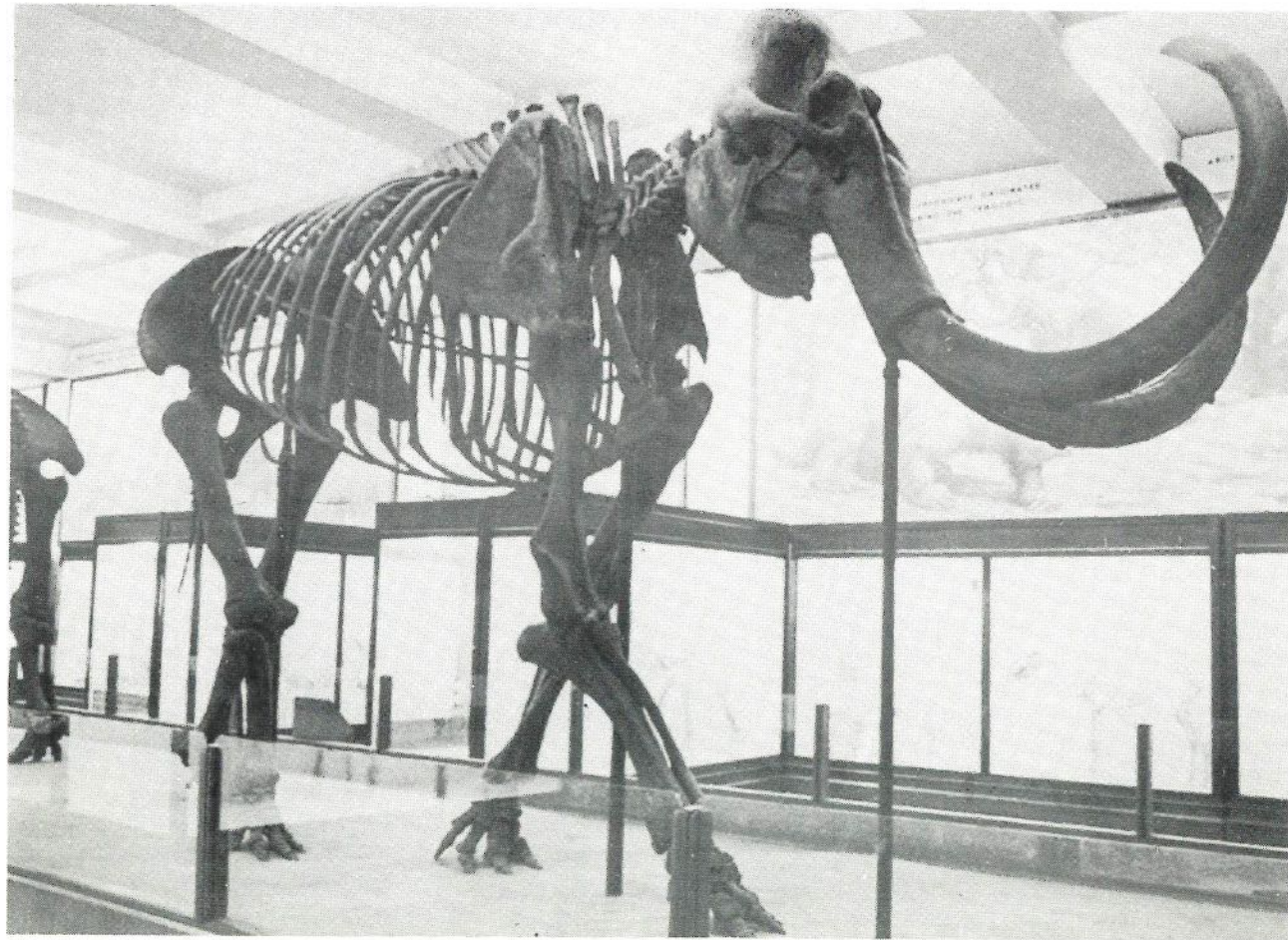
Suggested Reading

Agenbroad, L.D.
1884 *New World Mammoth Distribution* Chapter 3, in: *Quaternary Extinctions, A Prehistoric Revolution*, P.S. Martin and R.G. Klein (editors) University of Arizona Press, Tuscon, p. 90-108

Madsen, D.B., D.R. Currey, and J.H. Madsen, Jr.
1976 *Man, Mammoth, and Lake Fluctuations in Utah* Antiquities Section Selected Papers, v. 2, p. 45-58

Martin, P.S. and R.G. Klein (editors)
1984 *Quaternary Extinctions, A Prehistoric Revolution* University of Arizona, Press, Tuscon

David D. Gillette has a PhD from Southern Methodist University, and is the current Utah State Paleontologist. He is a specialist in vertebrate paleontology, with focus on Pleistocene mammals.



Mounted skeleton of a Columbian Mammoth in the Los Angeles County Museum.

So Hungry They Ate The Bark Off A Tree. . .

by Marilyn A. Martorano

Can you imagine being so hungry that you eat the bark off a tree? This may have actually happened to Indians who lived in Colorado and other western states in the seventeen and eighteen hundreds. While we are familiar with other human uses of wood products, the practice of bark eating is not widely known. Yet even though the idea may not sound appealing, one pound of inner bark from the ponderosa pine tree has as much calcium as nine glasses of milk!

Tree bark and bark substances have been utilized by Native American groups for a variety of functions. The four primary uses of bark were: as a raw material for constructing various objects, as building material for housing, for medicinal purposes and, most peculiar, as a food source, either for emergencies of starvation or as a delicacy or sweet. In several parts of Colorado and in other western states, living trees exist today that reflect this native technique of peeling bark from trees.

Among more conventional practices, the outer bark was utilized aboriginally to construct trays, baskets, and cradleboards. Resin and pitch from the peeled areas of trees were also used as adhesives and as waterproofing agents for baskets and other objects. Bark was also used as a building material for roofs and walls of structures. Medicinally, the inner bark and sap were used as a poultice or drink for many types of disorders such as tuberculosis, stomach troubles, cuts, infections, rheumatism, heart problems, gonorrhea, and colds. And the inner bark of most varieties of pine has also been used by Native Americans for food in cases of impending starvation.

The inner bark consists of the phloem (flo-um), a layer of cells just beneath the outer bark that transports the food reserves manufactured by the tree. When the outer bark is removed from a ponderosa pine tree, this layer of phloem is attached but can easily be separated. Nutritional analysis of ponderosa pine inner bark has

shown that, besides calcium, it contains significant amounts of carbohydrates, iron, magnesium, zinc and other potentially nutritional substances.



Peeled tree, Great Sand Dunes National Monument, Colorado. Scar is almost 4 feet wide and 7 feet long. About 5 pounds of inner bark could have been removed from this scarred area.

The inner bark was often prepared by Native Americans for eating by thoroughly pounding, boiling, baking and/or smoking it. In addition to use as an emergency food, bark substances were employed as a regular food source by several Native American groups. Certain Algonquin tribes of Canada were even given the name Adirondack, meaning "they eat trees," because of their custom of eating bark. While on their journey to the Pacific Ocean in 1805, Lewis and Clark were told by Sacagawea that the Shoshone peeled the bark from trees and ate the inner layer as food. William Clark noted the following in his journal of September 12, 1805: "I mad(e) camp at 8 on this road and particularly on this Creek the Indians have peeled a number of Pine for the under bark which they ate at certain Seasons of the year, I am told in the spring they make use of this bark..." So it appears that the practice was widespread among Native Americans. Strangely enough, its only acknowledgment among modern English-speaking Americans is the quaint expression, "I'm so hungry I could eat the bark off a tree!" Yet some aboriginal peoples did just that, regularly...or at least, seasonally.

The most detailed description of inner bark utilization and procurement methods based on information from native informants is a paper by Thain White (1954) entitled "Scarred Trees in Western Montana." White's



Taking a core sample from peeled tree to conduct dendrochronological analysis. This scar dates to 1826.

information was collected from Kutenai Indians who remembered how the inner bark was harvested. According to his informants, the tree peeling process took place as follows: 1) a tree was selected for peeling; 2) bark from a vertical notch 6-8 inches long was removed from the tree and the inner bark was sampled; 3) if it was considered "good," an area was selected for removing a larger section of bark; 4) a horizontal cut was made through the outer bark with an ax; 5) a sharpened branch or pole called a "debarking stick" was inserted under the cut and used to loosen and pry the outer bark from the tree with an upward motion. At times the strips of outer bark were also pulled downward from the trunk as well as upward.

The inner bark was then removed from the outer bark slabs with a scraper. In the early 1900's, the Kutenai reportedly used a scraper shaped from a metal baking-powder can and, prior to that, a scraper was made from a mountain sheep horn. The scraping of the inner bark was completed in the vicinity of the stripped trees because the slabs of outer bark were too bulky and heavy to be taken back to the camp. Once removed from the outer bark, the inner strips were then prepared for storage and consumption. They could be cut into small strips and rolled into balls or tied into knots and packed in green leaves to prevent drying out.

The peeling process was undertaken primarily by women and was usually done near a campsite. The trees were peeled in the spring, usually in May, when the sap in the tree was running and the bark was easiest to remove. Inner bark utilization in this case was apparently a seasonal event and not necessarily an emergency measure. However, late winters and early springs were also the seasons of greatest food shortage among Native Americans, which accounts for bark eating mainly during the spring.

Scars resulting from cultural peeling of trees for the purpose of bark utilization can be distinguished from other types of natural and cultural scars. For example, lightning scars are usually long and thin, often extend the entire height of the tree, and sometimes spiral around the tree trunk. Fires can also cause scarring, but this type of scar usually begins at the base of the tree and is triangular in shape with the wide edge along the bottom. Fire scars are often found on the uphill side of trees on slopes. Many of the culturally peeled trees exhibit evidence of burning also, because the lack of outer bark and the pitch on the scar surface make the tree especially vulnerable to ground fires.

Several species of animals, such as porcupine, bear, elk, and deer produce scars on trees, but these scars are usually irregular in shape, and patchy, and teeth, claw or antler marks are often visible on the scar surface. Trail blazes are human-produced, but are usually small strips and/or patches cut out with an ax. They often occur on two sides of a tree along a trail or road. A survey or witness tree is also culturally produced, but it usually exhibits a rounded or rectangular-shaped scarred area with numbers, dates or other information carved into it.



Replication of the bark peeling process showing the horizontal cut made into the outer bark with an ax and the use of a "debarking stick" to loosen and pry the outer bark from the tree trunk.

In contrast, the scars of trees peeled for cultural use of bark substances vary in size and shape, but have several distinguishing features. They are usually oval or rectangular in shape with one or more points. This would confirm that an initial horizontal cut was made into the bark and the strips were then pulled off in an upward motion. The bottom of the scar is usually above ground and begins at 1-3 feet high. The top of the scar can extend to over 10 feet above the ground. Many of the scars exhibit cut lines which are very even and straight, 3-4 inches in length across the lower end of the scar, suggesting they are the result of ax cuts. Other cut marks are jagged which would indicate perhaps the cutting was done with a sharpened stone rather than a metal tool.

The width and length of scars are quite variable, based on a sample of 84 culturally peeled trees exhibiting 101 scars from the Great Sand Dunes National Monument and Pike and Rio Grande National Forests, Colorado. Scars range from ½ inch to 5 feet in width, the latter extending around the entire circumference of the tree except for a narrow strip. The length of these scars varies from 4 inches to one that is 9 feet in length. Of

this sample, the average-sized scar is 17 inches wide and 4 feet long. A study replicating the bark peeling process indicates that approximately one pound of inner bark would have been available from a scar this size.

Some of the trees exhibit only a single small scar, perhaps a test to sample the inner bark to determine if it was edible. Other trees exhibit two or more large scars, produced at the same time or sometimes years apart, possibly indicating palatability. Studies of the behavior of tassel-eared squirrels, indicate that certain ponderosa pine trees have a taste that is preferable over others to them.

Evidence to tie these culturally peeled trees to historic Utes in Colorado is based from three sources: dendrochronology (tree-ring dating); historical accounts in books, including government records and other documents; and interviews with local informants.

Dating the peeling event is possible by dendrochronology. This is done by comparing core samples from the scarred area of the bark, which has stopped adding growth rings, with a core from the healthy portion of the same tree or other nearby trees. Since unpeeled or healthy bark keeps adding growth rings, the difference in ring numbers between peeled and still-growing sections indicates the time elapsed since peeling. Thus tree-ring analysis is important because it is possible to determine the actual year the bark was peeled from the tree. Further, by examining cross-sections of these trees, it may be possible to determine what season the bark peeling was done. Analysis of 40 culturally peeled trees in three parts of Colorado indicates that the majority of the trees were peeled between 1815 and 1875. One scar dated to 1793 and a few dated to post-1890.

The period from the early to late 1800s was a time of vast changes in many parts of Colorado. As more and more outsiders (miners, ranchers and farmers) entered the state, the Utes, who were the primary inhabitants, were quickly pushed out of their traditional hunting and camping areas and food became scarce. Also, during this time there were several periods of drought, especially during the early 1800s (1805-1810 and the 1820s) and the 1850s through the 1870s. These climatic conditions may have caused additional stresses to the aboriginal populations, especially a decrease in animal and plant resources.

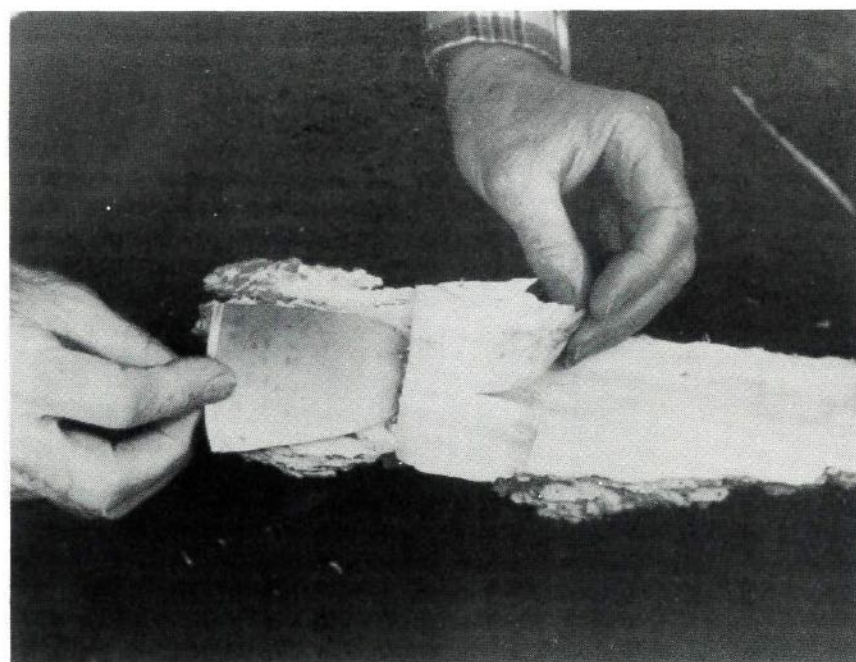
One historical sighting is definitely supportive of this interpretation. In 1853, 40 Ute families living in the San Luis Valley in south-central Colorado were observed eating bark and aspen because of the scarcity of game. It is hypothesized that population dislocations factored with environmental stresses may have stimulated the intensive utilization of bark by Utes in Colorado in the mid to late 1800s.

At times, all major groups of Utes reportedly ate bark substances. They were known to have eaten the sap from aspen trees as a delicacy and the Northern Utes also were reported to have tied small strips of the inner bark

of pine trees into bundles and eaten them with salt. Because bark was already known to the Utes as an edible item, resorting to bark as an emergency food in times of starvation would have been a logical occurrence.

While food shortage is indicated as the reason for inner bark utilization in some references, other documents and informants state that inner bark was harvested by the Utes and utilized for several purposes. Medicinally it was used as a tonic to "clean them out." Other food uses were as a tea, as a thickening agent for meat soups, and to grind with their corn to make a "pitch corn." And we thought that food extenders were a new invention! This information would suggest that, at least at times, inner bark substances were used as part of regular subsistence.

Unfortunately the date source for studying this Native American practice is threatened with obliteration. Because the maximum lifespan of a ponderosa pine tree is 300-600 years, many of the remaining culturally peeled ponderosa pine trees in Colorado and other areas of the west may soon die of natural causes. Undoubtedly, numerous trees have already been cut down during logging activities, and others are being damaged by lightning, ground fires, insects and disease. These trees are important resources for studying the overall interrelationships of subsistence, migration, population fluctuations, environmental stress and cultural adaptation. Identification and documentation of peeled trees is necessary while the evidence is still available. As more archaeologists, land managers, and the interested public become aware of this resource and report suspected sightings, more complete information will emerge. Eventually it is hoped that a better



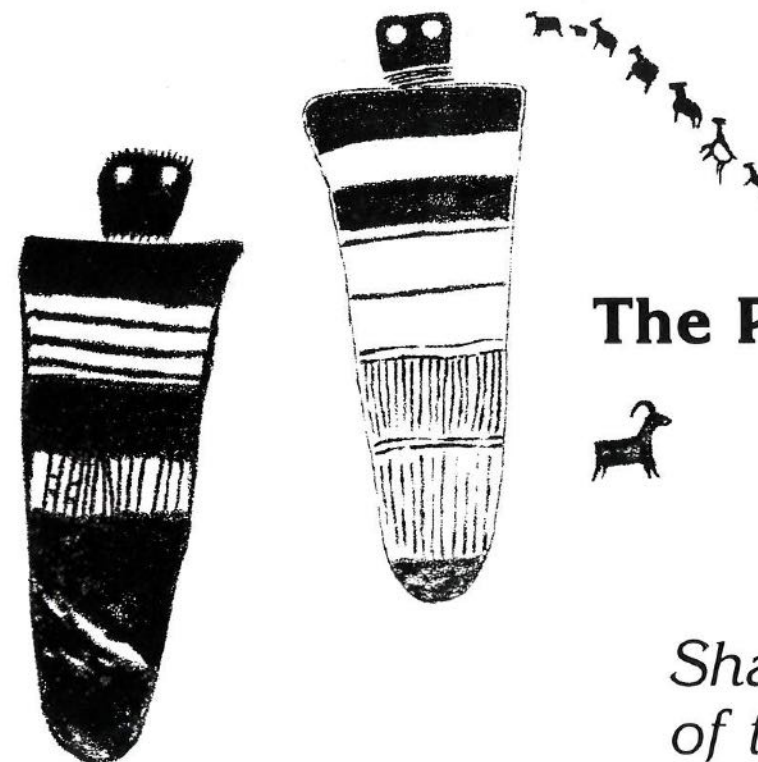
Using a scraper made from a metal baking powder can (see text) to separate the edible inner bark from the outer bark.

understanding of the effects of the white man's invasion of the West on the Native American subsistence systems can be achieved.

To summarize then, based on existing dendrochronological data, written historic evidence and oral history accounts, it appears likely that Utes were responsible for the cultural peeling of ponderosa pine trees in Colorado from the late 1700s to the early 1900s. The exact reasons for each instance of bark peeling are not known and, in fact, it is likely that bark utilization reasons may have varied geographically and through time. Some evidence suggests that starvation was the major factor that influenced most bark utilization while other information indicates that bark substances were utilized medicinally or as part of normal subsistence. Further research on these culturally scarred trees will allow a more accurate interpretation of peeled trees as cultural resources and will increase our knowledge of the role of bark utilization in Native American subsistence, especially during the post-contact to reservation period.

References Cited

- Martorano, Marilyn A.
1981 Scarred Ponderosa Pine Trees Reflecting Cultural Utilization of Bark. Unpublished M.A. thesis, Colorado State University, Fort Collins.
- Smith, Anne M.
1974 Ethnography of the Northern Utes. *Museum of New Mexico Press, Papers in Anthropology*, No. 17.
- Swetnam, Thomas W.
1984 Peeled Ponderosa Pine Trees: A Record of Inner Bark Utilization by Native Americans. *Journal of Ethnobiology* 4(2):177-190.
- White, Thain
1954 Scarred Trees in Western Montana. *Bulletin* No. 8. Flathead Lake Lookout Museum, Lakeside, Montana.
- Marilyn Martorano is Manager of the Cultural Resources Division of Goodson and Associates, Inc., consulting engineers in Denver, Colorado. She has written and presented several papers on the little-known subject of scarred trees as cultural resources and continues her research on the topic. Persons with suspected sightings of peeled trees are asked to send photos to her at 11949 West Colfax, Denver, CO 80215.



Barrier Canyon Style rock art

(from Castleton, 1979)

The Power and The Glory:

Shamanistic Arts of the Archaic Period

by Alan R. Schroedl

For over a hundred years, Americans have been intrigued by their ancient prehistoric predecessors in the Greater Southwest. By the turn of the century archaeologists knew that the haunting cliff dwellings were left by the Anasazi farmers who lived in the region 700 to 900 years ago. But it was only in the 1930's and 1940's that archaeologists discovered evidence of the first people in the southwest, the Big Game Hunters. These Big Game Hunters manufactured the unique fluted Clovis and Folsom points and hunted mammoth and now-extinct bison from about 8000 to 11000 years ago. Still, as recently as twenty years ago almost nothing was known about the people who occupied the canyon country after the Big Game Hunters, but before the Anasazi cliff dwellers. As they became known, they would emerge as some of the most artistically creative people of ancient times.

Through several archaeology projects in the mid-1970's, our knowledge of the time period from about 2000 years to 8000 years ago blossomed. These excavations opened a view to a lifeway during this period that archaeologists call the "Archaic." The Archaic people were nomads, hunting large and small

game animals, and collecting and processing wild plants. It appears they did not build permanent habitation structures, but lived in caves and in small brush shelters built in the open. They occupied the Colorado Plateau until the introduction of corn agriculture about 2000 years ago.

In the late 1970's, archaeologists generally believed that Archaic peoples lived in the upland forested areas and large open parklands. The resources in the narrow canyons of the region were thought to be too sparse and limited to attract the Archaic peoples. Recent research in Canyonlands National Park and Glen Canyon National Recreation Area has shown that this is not the case. Archaeologists have found camps belonging to the Archaic people in many of the canyons. Some date back almost 8000 years.

Ancient environmental evidence from about 6000 to 8000 years ago shows that when the Archaic people were living in these canyons, the rainfall in the summer was much more frequent and run-off from winter snow was much greater. In several of the narrow canyons, small lakes, ponds or marshes were formed. These well-

watered areas provided a rich environment in the canyon for both the wild plants and animals that Archaic people collected and hunted.

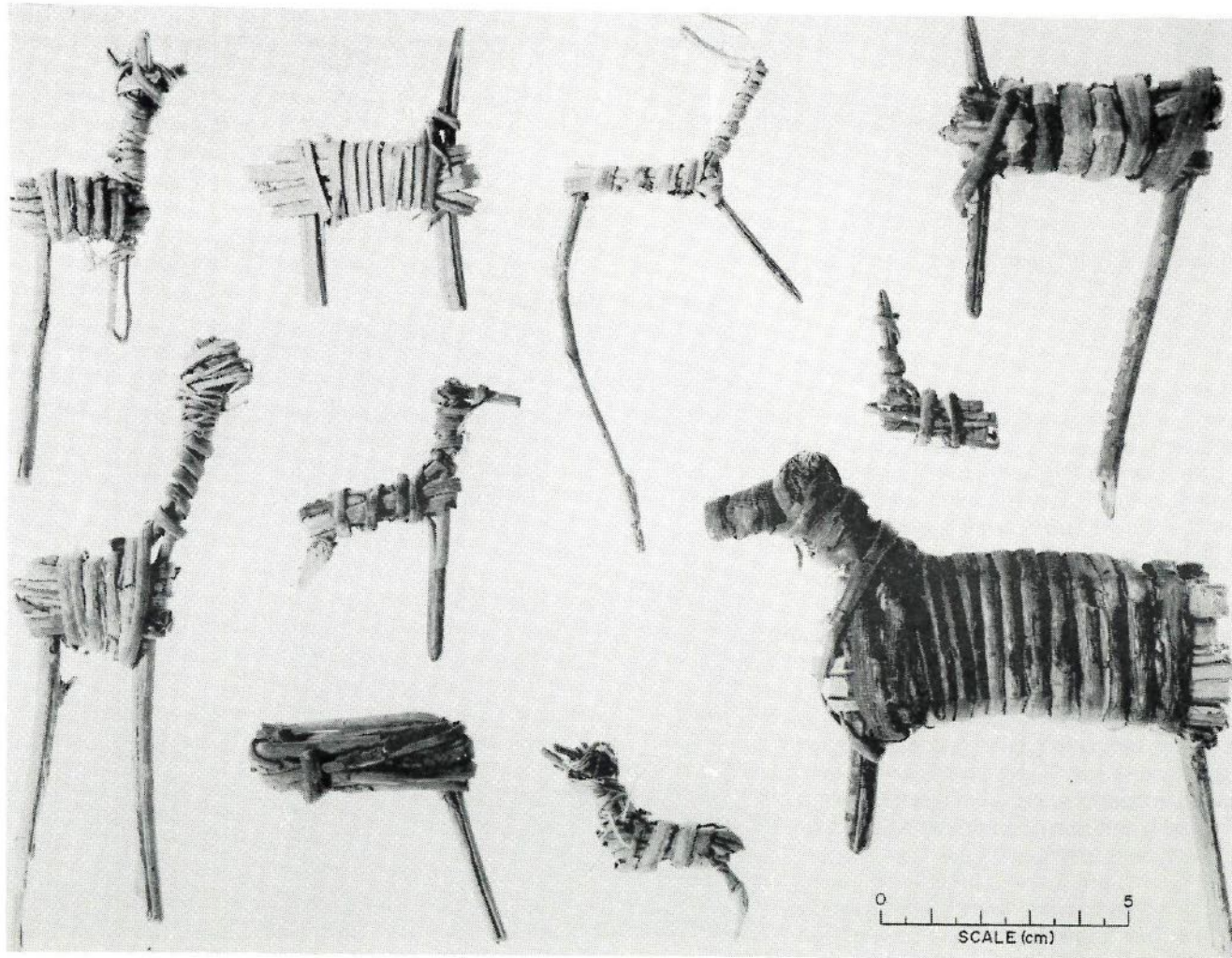
But over the years, the environment changed: rainfall decreased, temperatures rose slightly, and these people had to adapt to new ways. Archaeologists find evidence that Archaic people started manufacturing new varieties of stone tools and probably hunted smaller game such as rabbits more intensively, and when the game became harder to hunt, they started eating more wild plants and grasses.

Recent research has shown that about 3000 to 4000 years ago there was a significant change in the climatic regime of the area. This environmental shift may have affected the populations of large game animals, forcing prehistoric Archaic people to face the problem of dwindling food resources. Perhaps it was during such times of stress that Archaic peoples turned to religion and shamanistic activities to try to magically increase the number of plants and animals. Shamanism is a form of religion in which certain individuals thought to be

endowed with supernatural powers perform rituals revealed in a trance or dream. While archaeologists find it very difficult to identify religious or ritual activities of people who are long gone, split-twig figurines and Barrier Canyon rock art may be prime artistic expressions of this kind of magico-religious activity.

In dry caves, primarily in the Grand Canyon area and along tributaries to the Green and Colorado rivers in southern Utah, many small animal effigies have been recovered. These figurines are usually constructed from a single thin branch, such as willow, that has been split, bent, folded and wrapped into the shape of an animal. Generally these forms are suggestive of deer and mountain sheep, but dogs too, might also be represented. Radiocarbon dating on figurines and associated twigs has produced seven dates, five of which range between 3500 and 4000 years ago.

In caves in the Grand Canyon region, split-twig figures are found in a context that clearly implies their ritual function. They are recovered in very high, almost inaccessible caves, caves that are not suitable for



Split-twig figures from Cowboy Cave.



"Ghost Panel" in Horseshoe Canyon, Canyonlands National Park.

everyday living. It is a rugged climb into the caves. There is no water nearby, nor is there a wide variety of plants or animals available in the immediate area.

The placement of the figurines within these caves is a clear indication of magical use of these items. At least three cave sites in the Grand Canyon area, Tse'an Kaetan Cave, Tse'an Sha Cave and Shrine Cave, have split-twig figurines associated with rock cairns. At other sites, such as Stanton's Cave in the same area, the figurines are found in small caches under boulders. At none of these sites is there trash and debris of everyday Archaic life. These caves were not used for habitation, but for rituals.

The utilization of Shrine Cave for religious activity by Archaic people is very intriguing. On the northwest side of the first alcove, a large limestone block was identified as a shrine. This block had a small cairn of limestone rocks placed on top. Surrounding this shrine were a series of 13 other small rock cairns. A single split-twig figurine was found under one of the cairns.

On a ledge behind the shrine was a series of six other cairns, each with 2 to 5 limestone rocks. Squawbush twigs that had not been shaped or formed were found under four of the piles. One room, located off a passageway from the main alcove, lies in the dark zone

of the cave. Seven rock cairns and one partial figurine were found in this room.

The use of these figurines in some form of magico-religious activity is further demonstrated by the fact that several of these figurines from Luka Cave, Stanton's Cave and Tse'an Kaetan Cave were found with fecal pellets of artiodactyls (the family that includes deer, mountain sheep and mountain goats) inserted within the body cavity. Perhaps these were meant to represent the animals that the Archaic people were hunting. In fact, at least one of the split-twig figurines was found with a "miniature spear" piercing the chest of the animal.

This evidence suggests that local Archaic people would journey to these caves for a kind of ritual activity called imitative magic by anthropologists. The figurines were constructed as representations of the big game animals. Perhaps after some chants or other rituals, the figurines were speared in an effort to increase the chance of hunting success. At the end of the ceremony, the figurines were buried or left on the surface of the cave. While much of this scenario is speculation, it is consistent with the careful observations made about these figurines and their context by archaeologists.

Understanding and interpreting the elusive nature of religious activities of Archaic and other ancient peoples

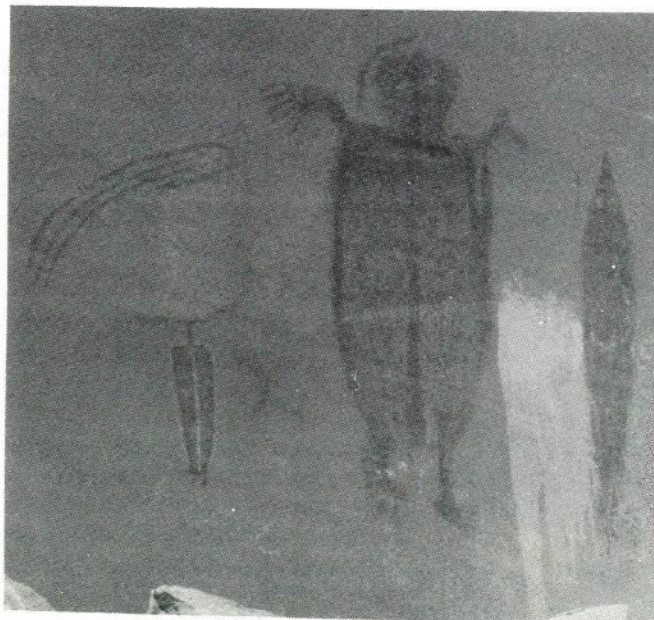
is difficult at best. But due to its uniqueness, rock art has also been traditionally interpreted as part of the religion or ideology of prehistoric peoples.

Some of the most spectacular examples of rock art in the Greater Southwest and canyon country are attributed to Archaic people. This rock art, the Barrier Canyon Style, usually consists of larger-than-life-size anthropomorphic (manlike) forms, as well as stylized animals such as birds and dogs and other objects. The identifying characteristic of these figures is vacant-looking or missing eyes, the frequent absence of arms and legs, and the presence of vertical body markings. The "ghost-like" appearance led Polly Schaafsma, a rock art specialist, to suggest that this colorful style represents shamanistic art associated with ritual activities of the Archaic people. Generally, these powerful figures occur in a series of humanlike forms on rock faces protected from the elements in deep, narrow canyons in the Canyonlands region of Utah.

Studying rock art is a slow, discouraging process: its meaning is subject to interpretation, it often cannot be assigned to a particular prehistoric group, and it cannot be dated directly. At one time much of the Barrier Canyon rock art was attributed to the Anasazi farmers of the region and their horticultural cousins to the north west, the Fremont. However, extensive study in the past several decades has allowed researchers to better estimate dates for this and other rock art styles in the Southwest.

Polly Schaafsma was the first to suggest that the style did not originate with agriculturalists who lived in Utah between A.D. 700 and 1200, but rather was painted by people who predated them. There were a number of lines of evidence that suggested that these were older

Hellroaring Canyon Anthropomorph. Figures from two to seven feet are painted with deep red-brown pigment. In contrast, the "comet" on the left is yellow ochre. Photo by Don Swasey



pictographs. For example, none of the Barrier Canyon Style rock art showed human forms using a bow and arrow. The bow and arrow was introduced into the Canyonlands area around A.D. 400, and numerous rock art panels after this date depict people using a bow and arrow. However, these are absent from Barrier Canyon rock art, while some panels show people using the spear thrower, the principal weapon before the bow and arrow.

Additionally, at some rock art panels, Fremont and Anasazi art has been painted or pecked over Barrier Canyon forms. This, of course, indicates that the Barrier Canyon forms had to have been painted before the other images. Finally, several of the Barrier Canyon panels are on benches or shelves that are inaccessible today. This suggests that sufficient time has passed since they were painted for the ledges and the handholds to have weathered or fallen away from these panels.

Based on these various lines of evidence, Polly Schaafsma believes that Late Archaic people painted the Barrier Canyon Style between 2500 and 1500 years ago. Archaeologists today question that date range for this rock art style. However, in the early 1970's when Schaafsma first suggested that this rock art was created by hunters and gatherers who preceded the Fremont and Anasazi people in southeastern Utah, almost nothing was known about the Archaic occupation in this area of Utah. Some archaeologists even believed that the area was unoccupied until Basketmaker people entered the region about 2000 years ago.

Over the past several years, as researchers recognized the distinctive nature of this style, many more of these panels have been recorded in the general Canyonlands



Sevenmile Canyon. These 2-4 foot figures have blue eyes, and the large figure has a blue snake in its mouth. Photo by Julie Howard

region of central and southeastern Utah. To date, there is no evidence at any of these recently recorded panels to suggest that they were made by anyone other than Archaic people.

Recently, in Canyonlands National Park, a prehistoric hearth below one of these panels was radiocarbon dated to about 3000 years ago. However, there is no way of knowing whether the panel was manufactured before the hearth was used, whether the hearth was used before the panel had been painted, or whether they were contemporaneous. This radiocarbon date suggests that the Barrier Canyon Style might be as much as 500 years earlier than hypothesized by Schaafsma. And, in fact, there is other evidence to suggest that the style is even older than 3000 years.

A growing mass of data indicates that there was extensive Archaic occupation in the Canyonlands region between 5000 and 8000 years ago. At one site, Cowboy Cave, clay figurines of human form were found with tapering torsos lacking arms, identical in shape to the body forms of Barrier Canyon pictographs. In fact, one of the figurines had a series of parallel lines down the torso similar to those found on many of the Barrier Canyon anthropomorphs. These figurines were found in a layer dated to about 6000 years old. They were also found associated with a series of incised and painted sandstone slabs. These small slabs had unusual etch marks on them and red and black pigment in various geometric forms.

Clearly, these items were not used to hunt animals, process plants or manufacture tools. They probably represented some kind of non-utilitarian object, possibly even a religious symbol. The date of the analogous clay figurines and the painted rocks, as well as the rather intense Archaic occupation in the Canyonlands region about 6000 years ago, suggests that Barrier Canyon rock art could be much older than Polly Schaafsma hypothesized. Perhaps it could be the oldest rock art in the Southwest, dating to as early as 6000 to 8000 years ago.

If Barrier Canyon rock art is actually that old, how do we explain the radiocarbon date from the hearth in Canyonlands that is only 3000 years old? One can certainly speculate that, if Barrier Canyon rock art was painted 6000 years ago, by 3000 years later the origins of the rock art would have been long lost in the past. By that time the panels would have been ancient, and perhaps a sacred site for the worship of ancestors. Such speculations are interesting but only future research and work by professional archaeologists will answer these questions, providing these rock art sites are maintained and not damaged by vandalism or illicit activity.

Whether Barrier Canyon Style rock art was made 6000 years ago or 3000 years ago or only 1500 years ago, it is clear that during Archaic times people living in the Canyonlands area had sufficient time to pursue non-subsistence activities. These resulted in examples of mobile and mural art that even today have the power to

awe us. Whatever the motivation and regardless of their age, Barrier Canyon rock art, especially, is a glorious part of the prehistoric heritage of Canyonlands.

Additionally, the split-twig figurine finds suggest that Archaic people were interested in manipulating their environment through imitative magic. Exact interpretation of the Barrier Canyon rock art is uncertain, although Schaafsma suggested that it represents shamanistic art associated with ritual activities of the Archaic people.

Although these people lived for over 6000 years in the Canyonlands section of the Colorado Plateau essentially unchanged, we now recognize that they did not simply live in caves, hunt animals and collect wild plants. They also participated in a full cultural lifestyle, social events with friends and neighbors, and possibly, when times got bad and resources were scarce, they tried to improve their lot by shamanistic activities or imitative magic to help them cope with the changing environment. The results have left us forever in their debt.

Suggested Reading

Castleton, Kenneth B.

1979 *Petroglyphs and Pictographs of Utah. Volume 2: The South, Central, West and Northwest.* Utah Museum of Natural History, Salt Lake City

Emslie, Steven D.

1987 *A Desert Culture Shrine in Grand Canyon, Arizona, and the Role of Split-Twig Figurines.* *National Geographic Research* 3(4):511-516

Euler, Robert C. (editor)

1984 *The Archaeology, Geology, and Paleobiology of Stanton's Cave, Grand Canyon National Park, Arizona.* Monograph 6. Grand Canyon Natural History Association, Grand Canyon National Park.

Schaafsma, Polly

1971 *The Rock Art of Utah from the Donald Scott Collection.* Papers of the Peabody Museum of Archaeology and Ethnology 65. Harvard University, Cambridge

1980 *Indian Rock Art of the Southwest.* School of American Research, Santa Fe, and University of New Mexico Press, Albuquerque

Schroedl, Alan R.

1977 *The Grand Canyon Figurine Complex.* *American Antiquity* 42(2):255-65.

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Badger Cave Ruin, Grand Gulch Primitive Area, southeastern Utah. Rich in archaeological remains, Grand Gulch is managed by the Bureau of Land Management as an outdoor museum. Its protective alcoves contain the haunting remains of this vanished culture.

AT LAST!

Why The Anasazi Left

The Four Corners Region

by Kenneth Lee Petersen

Just before A.D. 1300, thousands of Anasazi cliff dwellers mysteriously vanished, leaving behind their homes, weapons, clothing, tools, and other artifacts. Why they left is the most puzzling mystery surrounding the ancient culture. They did not destroy their villages upon abandonment. They simply closed the doors off with rock slabs and left. From all indications, they probably planned to return. The mystery of their disappearance has since led to considerable romantic speculation and the formulation of exotic theories.

Many scientists have long maintained that drought forced the Anasazi from the Four Corners. However, those same scientists have been at a loss to explain why the drought of the late A.D. 1200s caused the Anasazi to abandon the region, when there had been other droughts before that were just as serious. This question has persisted for 100 years, though not from lack of study. How -- and where -- could this problem be solved?

Near the northern edge of the ancient Anasazi territory, the flanks of the La Plata Mountains in southwest Colorado are surrounded by vast areas containing evidence of the "Ancient Ones" occupation, the most famous being preserved in the boundaries of Mesa Verde National Park. Archaeologists have found that earliest evidence of the Anasazi dates to before the time of Christ. Originally hunters of game and gatherers of edible wild plants, the Anasazi had by A.D. 750 developed an advanced and flourishing society. They farmed corn, beans and squash, and had domesticated the turkey. Their diet was supplemented by what they hunted and gathered. But by A.D. 1300, long before any Europeans -- or even Navajo Indians -- arrived in the

region, the Anasazi had abandoned much of their homeland. They had left their stone pueblo houses and moved farther south and east, becoming ancestors of the Hopi, Zuni, and other modern Pueblo Indians.

Recent work with the Dolores Archaeological Program in the Dolores River Valley -- in the extreme southwest corner of Colorado -- has added an important piece to the puzzle. This archaeological mitigation effort was necessitated by the U.S. Bureau of Reclamation's construction of the McPhee Dam and Reservoir on the Dolores River. The project was carried out by the University of Colorado and Washington State University between 1978 and 1985. As a result of this extensive undertaking, 1600 archaeological sites were recorded and some 101 sites were excavated with over 2.4 million items collected for study. The Bureau of Land Management's Anasazi Heritage Center, a 40,000 square foot research center and museum, houses the artifacts and graphically displays the findings of the \$16 million archaeological project, one of the largest of its kind to date.

The findings from this project indicate that it was not simply a drought that forced the Anasazi to leave, but an extended drought coupled with changing weather patterns and a colder climate. This long-term change in traditional weather patterns made dry-farming -- the source of a majority of Anasazi food -- virtually impossible. Easily said, but what is the evidence?

Modern dry-farming practices in the Dolores River valley indicate that at present the dry-farming belt ranges from 6600 feet to 7600/7800 feet. It is characterized by

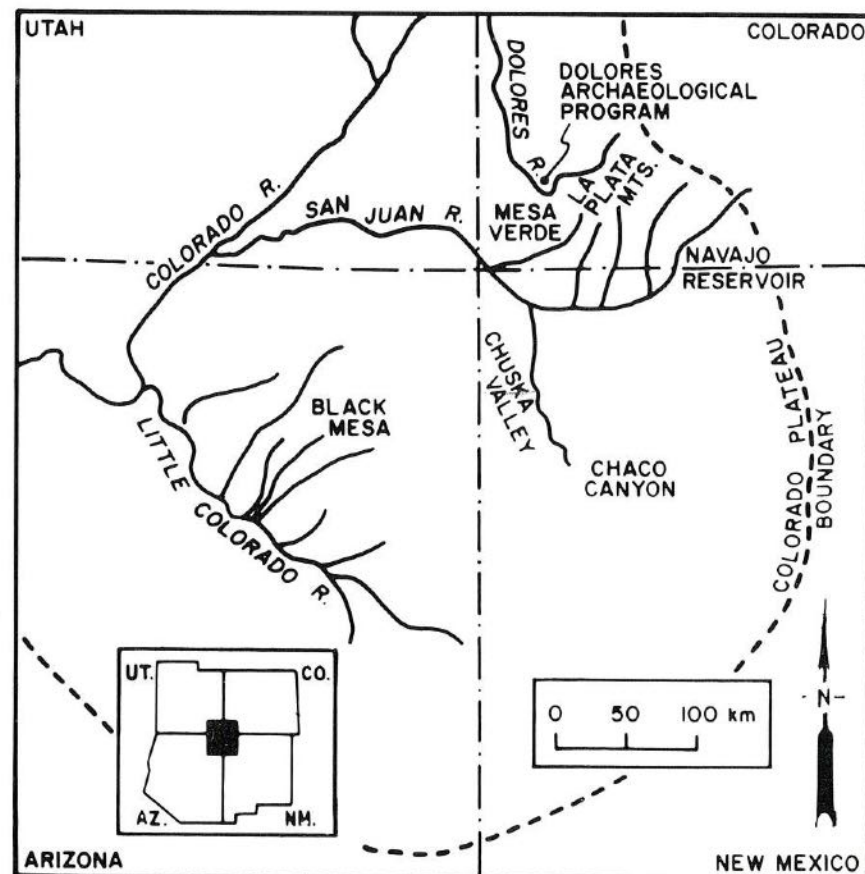
at least 14 inches of annual precipitation -- of which four inches fall during the warm season as part of the summer monsoon that brings moisture-laden air from the Gulfs of Mexico and California -- and about 120 days of frost-free growing season. Modern changes in either of these two factors -- moisture or summer warmth -- could affect the width or the elevational range of the potential dry-farming. This would have been just as true in prehistoric times.

Reconstruction of the prehistoric elevation and width of the dry-farming belt is aided by the fact that the climatic factors that can affect horticulture are the same factors, generally speaking, that affect natural plant community composition and distribution. These native plant communities are also spread out in broad belts, according to elevation, soil, precipitation, and other climatic factors. To reconstruct the history of the potential dry-farm belt in the region, dated records from prehistoric contexts outside of archaeological sites had to be examined and used as an independent test of the archaeological record. These records needed to be detailed enough and dated with enough precision to be directly comparable with the archaeological record. This would then allow the archaeological chronology to act as a general framework for integrating the many different lines of evidence used for climatic reconstruction. These independent records included such things as pollen deposition in alluvium, caves, lakes, and marshes or bogs; accumulations of plant remains in packrat nests and middens; tree-ring growth in both low and high

elevations; and cut and fill alluvial sequences. One new approach, not used before, was the study of the changing width of the region's spruce forests. This was accomplished by taking pollen samples from sites in the La Plata Mountains and studying the fluctuations in the region's timberline, which reflect summer temperature changes.

Based on reconstruction of the climatic conditions of the past, it was found that both local shifting of Anasazi homesites and the final abandonment of the region ultimately may have been keyed to the changing width of the prehistoric dry-farm belt. Recent research shows clear evidence of drastic weather changes during the 800 years of Anasazi occupation (about A.D. 500 to 1300). During periods of reliable winter precipitation, strong summer monsoons and moderate temperatures, the dry-farm belt became much broader, at times twice what it is today. During times of drought or cold, it narrowed significantly, sometimes shrinking almost to nothing.

As the climate changed and the agricultural zone narrowed or widened, the Anasazi adapted. During times of drought, the Anasazi would move their farms to higher elevations where rainfall was more predictable. During times of cold, the top of the farming zone would retreat downward and higher elevation farms would have to be abandoned. During times of abundant winter and summer rainfall and adequate summer warmth, the farming belt expanded at its lower elevational limit into the more temperate areas, sometimes as low as 5200 feet.



The location of the Dolores Archaeological Program, in relation to the Four Corners area of the southwestern United States. The region where the four states meet was abandoned by Anasazi farmers by the late A.D. 1200s.

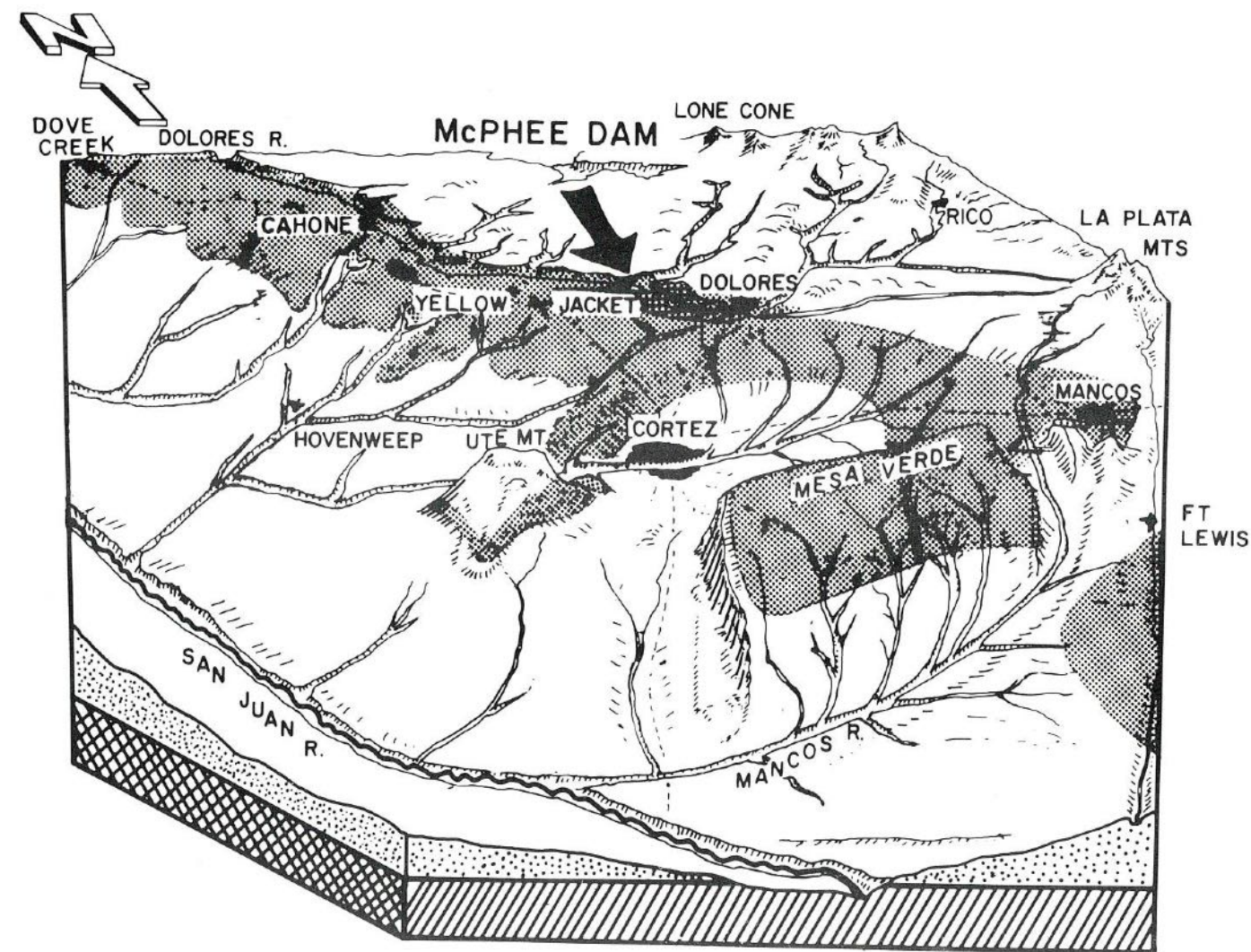


Figure 3. Bird's-eye view of potential dry-farming belt (stippled), southwestern Colorado during modern times and the reconstructed width for A.D. 575-800.

Using regional pollen samples and tree-ring data, the climate has been reconstructed over about a 1500 year period. At about A.D. 550, the time the Anasazi began appearing in large numbers, the region was just emerging from the grip of a cold cycle. Weather quickly warmed and from A.D. 600 until about A.D. 750 the climate had moderated and the agricultural zone widened to much the same size it is today (Figure 3). Populations grew and the Anasazi thrived.

About A.D. 750, drought moved into the area and the agricultural zone narrowed by about half (figure 4). The Anasazi survived by moving their fields to higher elevations and exploiting the narrowed farm-belt. Here precipitation was more predictable. Studies show that the drought continued for about 200 years, but it was offset somewhat by abundant summer convective storms that more commonly discharged their precious moisture near the elevation of the potential dry-farm belt, rather than at lower elevations.

By A.D. 1000, the climate had shifted to the point

that moderate temperature, more abundant winter precipitation, and continued strong summer monsoons expanded the farming belt greatly. This dropped the lower limit of the farm-belt to about 5,200 feet elevation, more than doubling the amount of farmland available compared to that of today (figure 5). In fact, the period from A.D. 1000 to A.D. 1100 was the zenith of the Anasazi culture. Population increased dramatically. The Ancient Ones dispersed through the Four Corners region and developed complex social, economic, and political structures.

But this period of flowering was not to last. A drought began to move into the region by the mid A.D. 1100s, narrowing the potential dry-farm belt from the bottom. Figure 3 shows the configuration of the farm belt at that time. As before, the Anasazi began to adapt, but unlike the drought of the A.D. 800s, summer rain was not as plentiful. This time the Anasazi compensated by using a number of water control strategies. Check dams, canals, and an occasional reservoir were constructed to maximize the benefits of limited rainfall.

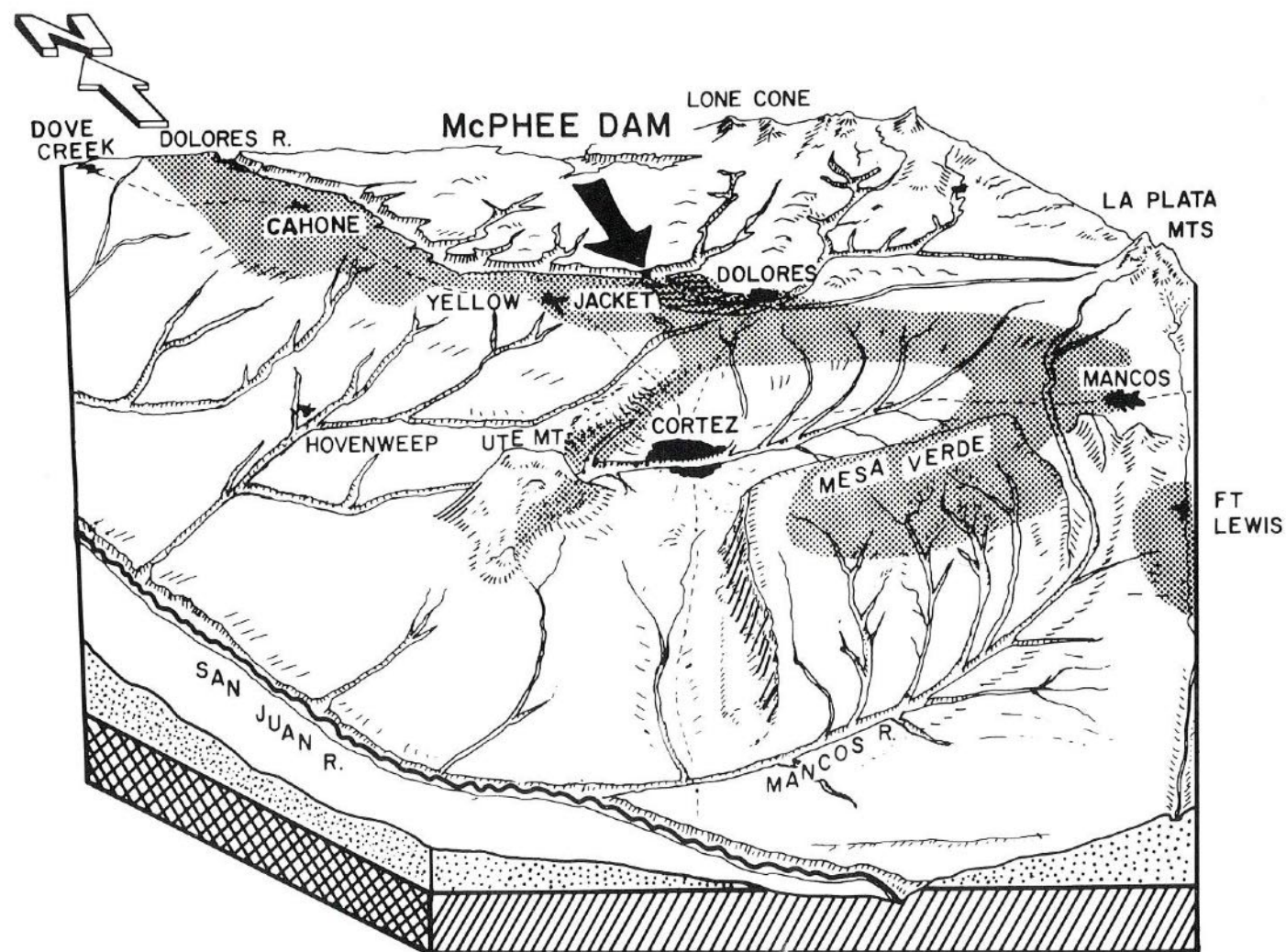


Figure 4. Reconstructed potential dry-farming belt, A.D. 800-1000, and 1100-1275, which is narrower than that of modern times.

Then severe, dry cold started to move into the region about A.D. 1200, making farming risky at higher elevations. As the summer and winter drought pinched the farming belt from the bottom, cold pinched it from the top. Since high populations meant that the maximum farming area was needed under cultivation to sustain the culture, any shrinking of the farm belt caused nutritional stress and hunger. By A.D. 1200 the Anasazi began leaving the area. The most severe impact of the combined climate changes was felt late in the A.D. 1200s, when the dry-farming belt was squeezed to a point that it disappeared (figure 6). This combination of climatic conditions is undoubtedly what made the drought of the A.D. 1200s different from any earlier droughts affecting the Anasazi. By A.D. 1300 when the last remnant of the Ancient Ones had gone, there was no longer a farm-belt in the region.

Where did they go? It is believed that the Anasazi simply left the higher elevations of the Four Corners region and headed south, seeking more dependable summer monsoons, sufficient winter precipitation, and longer growing seasons. Such a move is not

unprecedented. It was seen during the 1930s when farmers abandoned Oklahoma and went to California to escape the effects of the drought. One can well imagine the social trauma and adjustments that must have occurred to the Anasazi with their similar exodus.

Evidence at Bandelier National Monument in the Rio Grande Valley of New Mexico reveals that several large bands of Indians began moving into the valley in the A.D. 1100s. The Rio Grande Valley had a small population from about A.D. 500 to 1100, after which it began to experience a tremendous population growth. There is little question the influx was due to Anasazi immigration.

The population of the Rio Grande Valley continued to grow until about A.D. 1300 when it peaked. Other Anasazi groups migrated to parts of Arizona and New Mexico and were probably assimilated by the Hopi, Zuni and Acoma. The Ancient Ones of the Four Corners didn't disappear, they simply merged into other native Pueblo cultures, some of which are still with us today.

So why didn't they return? Because regional weather stations were established only recently, our modern weather records give little hint of the severity of conditions during the earlier period. Now, reconstruction of climatic conditions for the interval from A.D. 1300 to 1860 is possible, just as for the Anasazi period. Called the "little ice age," it was a time of renewed glacial activity, expanding snowfields, and reduced summer monsoons in many parts of the world.

In southwest Colorado, too, the cold, dry conditions that began in the A.D. 1200s lasted for hundreds of years -- up through at least the A.D. 1850s. A military expedition into the region in 1859 reported seeing snow covering the San Miguel Mountains in early August and observed that it was too cold to grow corn and other crops in the area. But 20 to 30 years later, as white settlers moved into the area in the late 1870's, the peaks were clear in late summer -- a sign that temperatures had warmed and the farming belt had rebounded in the interim. These new settlers found ideal dry-farming conditions with abundant summer and winter precipitation and an adequate growing season, and the region now successfully supports modern-day bean and

wheat farmers. In an incredible turnaround, the climate had changed back to what it had been during prehistoric occupation; modern farms are located exactly where the Anasazi farms were located several centuries earlier.

The findings during the Dolores Archaeological Program not only reconstructed past events but could have important implications for modern dry-farming, part of the \$20 million a year agricultural mainstay of southwest Colorado's economy. The evidence shows a precarious dry-farming belt that continually shrinks, expands -- and sometimes disappears altogether. This method of farming could be severely hampered or even wiped out entirely by only slight changes in temperature and precipitation.

White Americans have lived in the area for only about 100 years, but even in that short time the region's potential dry-farm belt has fluctuated dramatically. During the 1930s more than half of the farmland in the area was abandoned because of drought. Significantly, changes in the past came every few centuries. Any future long-term changes in the amount of summer monsoon rain, winter snows, or growing season could vastly

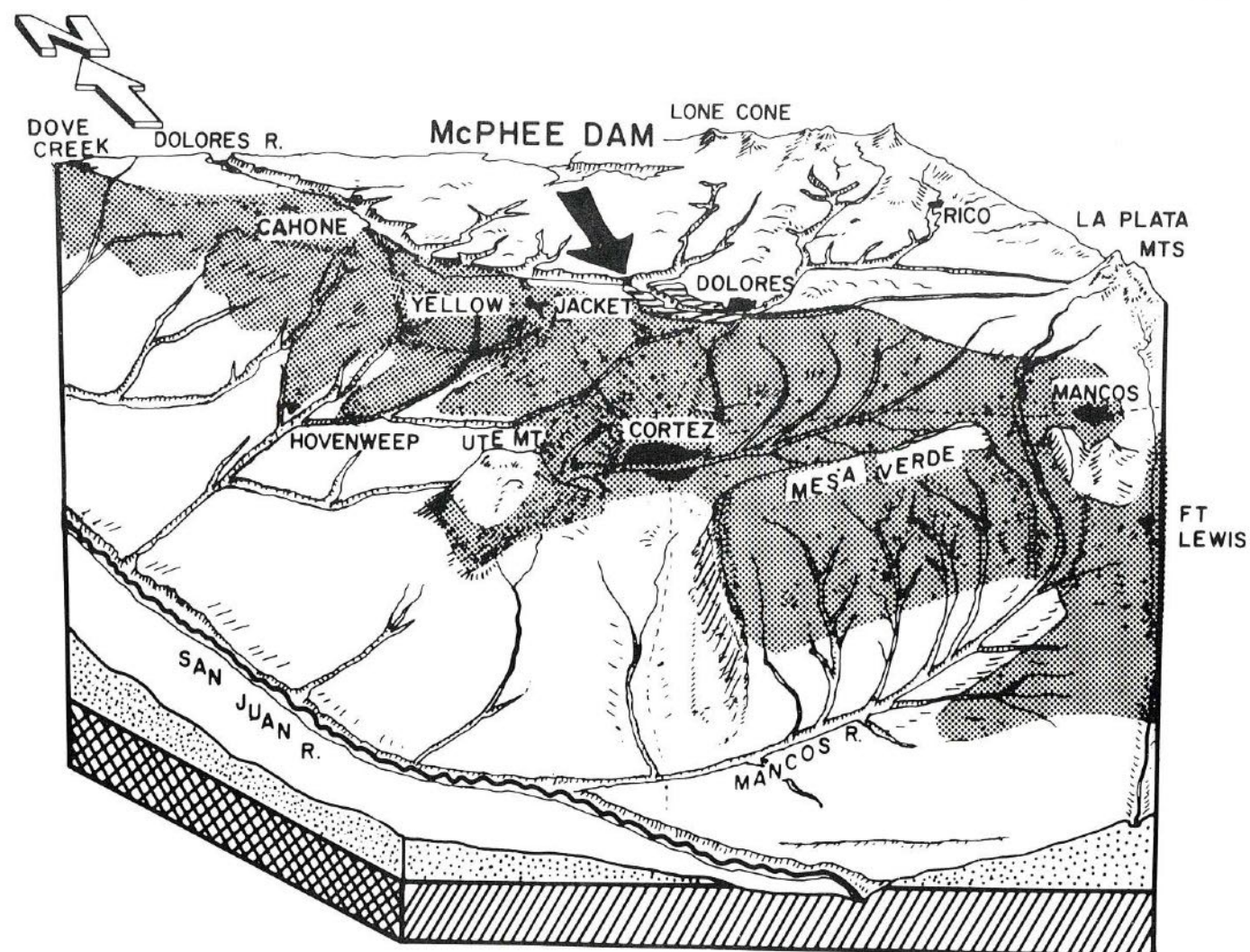


Figure 5. Reconstructed dry-farming belt, A.D. 1000-1100, which is nearly twice as wide as that of modern times.

reduce the farming potential, or actually improve it to the point that the dry-farming belt could again be twice as wide as it is today.

This scenario was pieced together using results from the Dolores Archaeological Project and the author's own research in the area that goes back to 1972. These findings were possible because many of the archaeological sites in the project area remained undisturbed. These undisturbed site conditions allowed the use of sophisticated dating techniques along with analysis of soil, wood, other vegetable material, and pollen. Future revelations will also depend upon good site preservation.

The U.S. Bureau of Reclamation's archaeological mitigation effort on the Dolores River was done to preserve our cultural heritage. The results have had surprising implications both for understanding the past and coping with the future in this region. The museum and research facilities at the Anasazi Heritage Center, as well as a set of 15 hefty volumes, preserve a wealth of information for the public and scientists alike to enjoy and examine for years to come.

Suggested Reading

Petersen, K.L.

1988 *Climate and the Dolores River Anasazi: A Paleoenvironmental Reconstruction from a 10,000 Year Pollen Record, La Plata Mountains, Southwestern Colorado*, University of Utah Anthropological Papers 113. University of Utah Press, Salt Lake City.

Breternitz, D.A., C.K. Robinson, and G.T. Gross

1986 *Dolores Archaeological Program: Final Synthetic Report*, U.S. Department of Interior, Bureau of Reclamation, Engineering and Research Center, Denver.

Kenneth Lee Petersen is a paleo-climatologist with Westinghouse Laboratories in Richland, Washington. With a PhD in Anthropology from the University of Washington, he specializes in reconstructing ancient environments through pollen analysis, tree-ring records, and other related methods.

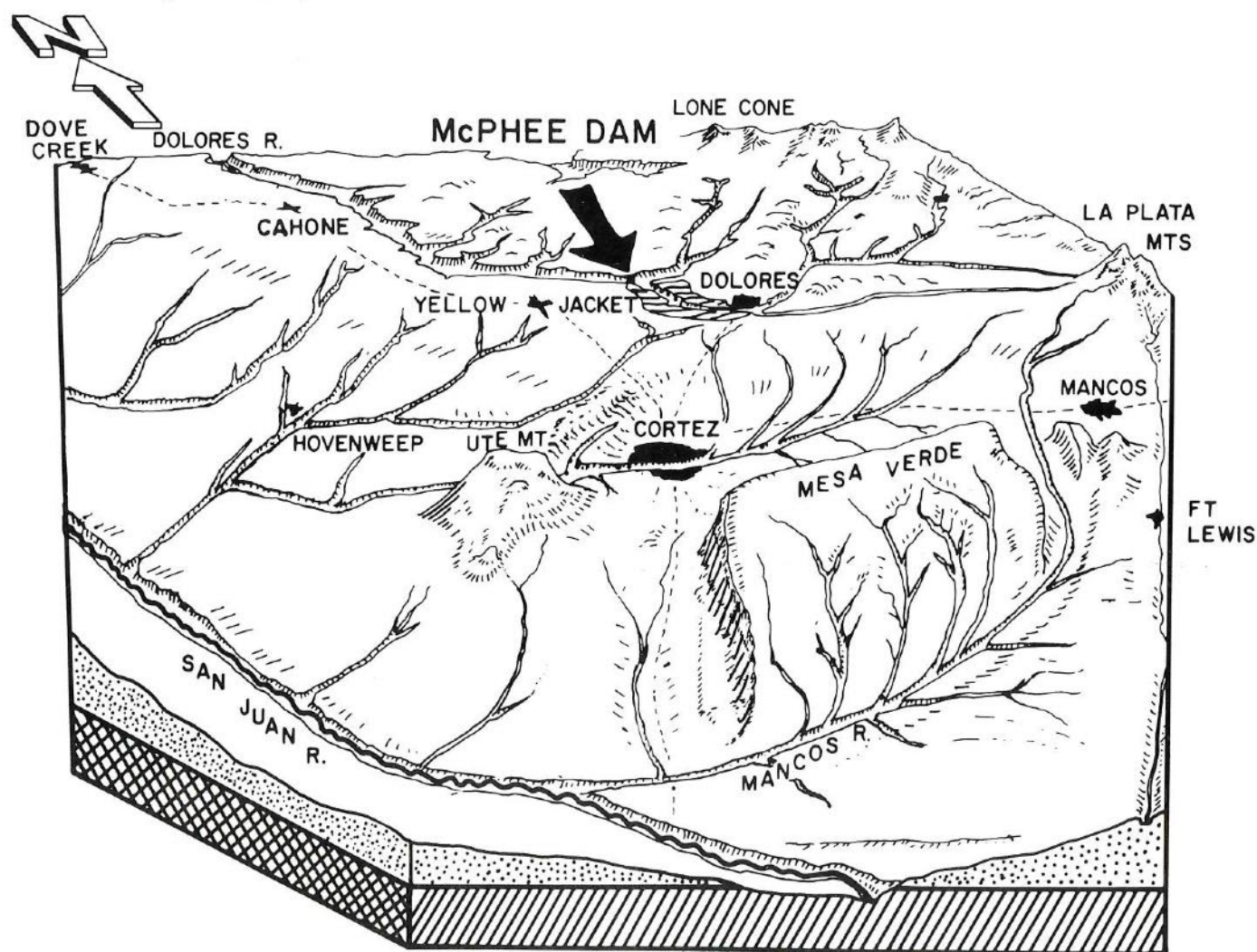


Figure 6. Dolores Project Area, A.D. 1275-1300. Little or no potential dry-farming belt is believed to be present in southwestern Colorado due to changing climatic conditions.



The first Moab Museum - 1958.

THE MOAB MUSEUM 1957-1988¹

by Lloyd M. Pierson

Moab boomed during the 1950s after Charlie Steen's uranium strike brought thousands of new people into town. The population of Moab soared from a mere 1250 to nearly 8,000 as prospectors, miners, promoters, stock salesmen and opportunists moved in to pursue and capture the American Dream of becoming rich. Many of these people were well-educated movers and shakers, itching to accomplish something in this postwar period. It was said at the time that any two individuals with the same interest soon became friends; if a third was added they formed a club.

The original inhabitants of Moab had long cherished the idea of a museum to promote tourism through the fascinating human and natural history of the area. Interest of old residents and new finally brought the idea into reality in the fall of 1957.

At a meeting in the city hall on November 13, 1957, representatives of civic organizations gathered together to

initiate the museum movement. These included Ray West of the Rotary Club, Essie White of the Daughters of Utah Pioneers, L.A. Painter of the Chamber of Commerce, Alvin E. Nash of the American Institute of Mining, Metallurgical and Petroleum Engineers, Bea Maynard of the Points and Pebbles Club, Ross Musselman of the Gem and Mineral Society, Donna Nelson of Beta Sigma Phi Sorority, Moab Mayor Ken McDougald, Betty Jacobs of the Newcomers Club, Lloyd Pierson of the Lions Club (who became the first curator), and Gussie Loveridge of Epsilon Sigma Alpha Sorority. Elenore Simons, President of the Women's Literary Club, presided over the meeting.

At the first meeting, plans for exhibits and types of cases were discussed along with sources of display items. These included the Dr. J.S. Williams' archaeological collection, artifacts from Ross Musselman's collection of prehistoric materials, and Ila (Mrs. Jack) Corbin's telephone history collection. Obtaining assistance from the American Institute of Mining, Metallurgical and

Petroleum Engineers for geological and mineral displays from the various mines in the region was also suggested. All of these have since become incorporated within the museum's collections.

At the second meeting on November 20, 1957, 15 civic club representatives were established as a temporary Board of Directors and plans were made to form a nonprofit organization with the proposed bylaws of the organization to be submitted to a lawyer before being brought to a vote.

At a meeting on December 4, 1957, officers were elected to preside over the temporary Board of Directors until after the annual meeting set for January 15, 1958. The temporary officers were L.A. Painter, President; Elenore Simons, Vice-President; Sally Painter, Secretary; Ray West, Treasurer. The name selected for the organization to sponsor the Grand County Museum was the "Southeastern Utah Society of Arts and Sciences, Incorporated." By the February, 1958 meeting this had been boiled down, at least in the minutes, to the Moab Museum Association. The Moab Museum name stuck, but eventually the organization was incorporated as the Southeastern Utah Society of Arts and Sciences.

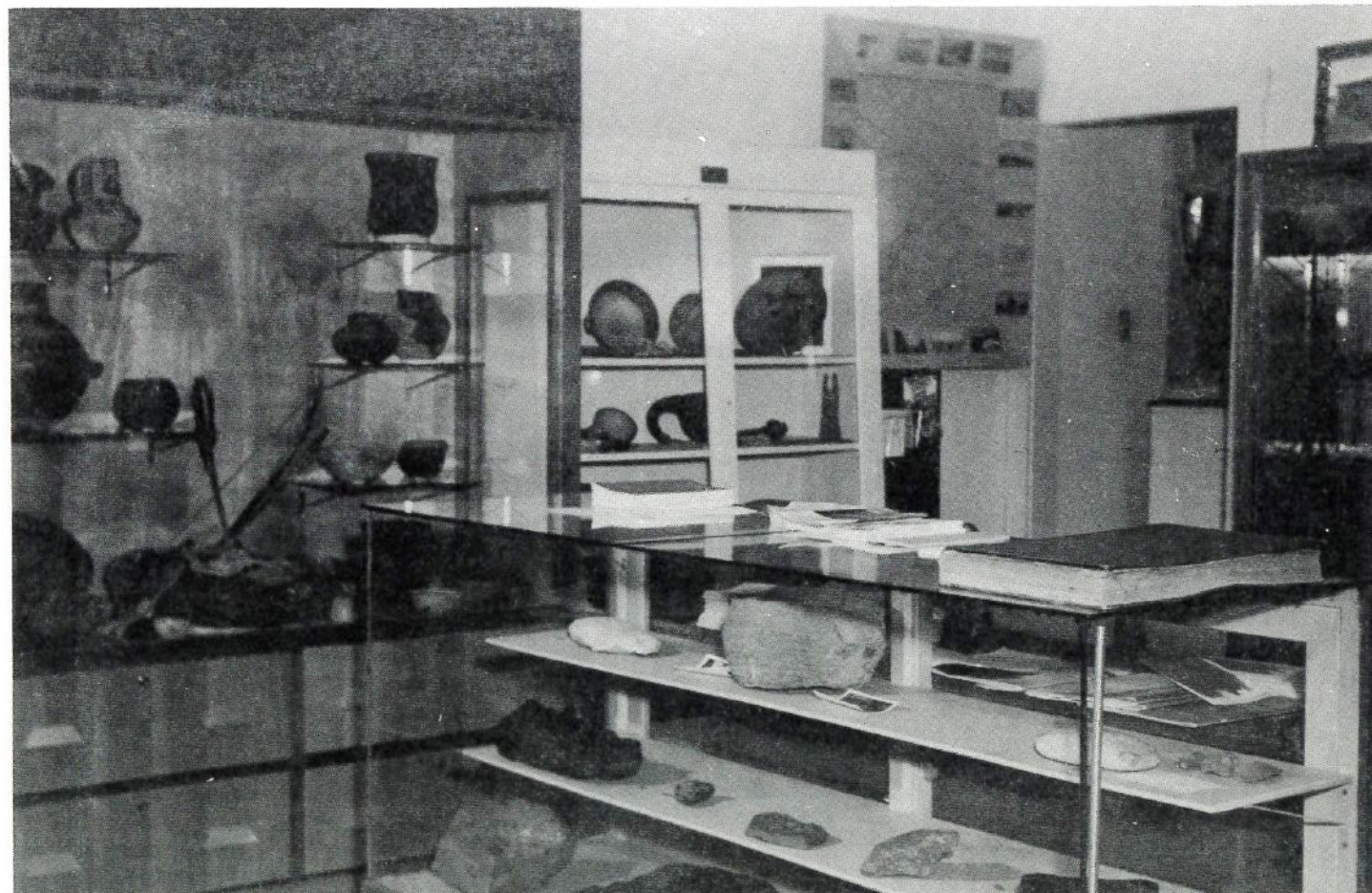
At the last meeting in 1957 it was decided to have permanent appointments to the Board of Directors from Grand County, Moab City, the National Park Service,

Grand County Schools and Texas Technological College of Lubbock, Texas. Texas Tech was involved in starting a field school in Moab at the time. The author was appointed curator "to co-ordinate the work of the exhibit and the museum committees." Finance, building and publicity committees were also formed. So in the short space of a month and only three meetings the society and the museum were launched. There was no lack of enthusiasm; all that was needed was a building, exhibits and money!

The year 1958 was a busy one for the museum. At the February monthly meeting the temporary president and treasurer were reinstalled. The temporary secretary was replaced by Betty Jacobs. Ross Musselman was made vice-president and Elenore Simons was put in the new office of 2nd Vice-President.

Some advice on exhibits and museum work was given at the April meeting by David Jones, regional interpreter of the National Park Service in Santa Fe, New Mexico and Ed Ferdon, curator of the International Folkart Museum in the same city.

Robert Norman, Moab geologist, is given credit for bringing the idea of a "national" museum to the Women's Literary Club and requested that it "not be a regular museum just for old relics or just for Grand County."² The club women entered the museum concept in the



Archaeology Room - Moab Museum - 1965-86



History Room - Moab Museum 1965-86

Sears and Roebuck Foundation's Community Improvement Project Contest. The committee to spearhead the project consisted of Marian Pierson, Chairperson, Elenore Simons, Ila Corbin, Sally Painter, and Lavinia Waldstein. In May, 1958, with the project complete and the museum underway, the club was presented with a check for \$300.00 at the state convention.³ The money was then presented to the Moab Museum to further its work. By March, use of a "temporary" home for the museum -- which was to last for seven years -- was donated by Grand County. This was a small, four-room adobe brick house located at 150 East Center where the city offices are today. It was May before the occupants were able to find other lodging and allow the museum crews to begin interior work, although planning and acquisitions had proceeded at a fairly rapid pace.

The roof of the old house was badly in need of repair and the county budget was already over-extended so the local Lions Club generously provided a new shingle job. Not to be outdone, the Moab Rotary Club painted the interior of the building. That summer it was decided that enough exhibits has been completed to open the building on the 22nd of August in conjunction with a museum ice cream social on the courthouse lawn and the dedication out in Arches National Monument of a new road. Photo files show that the museum contained two cases of archaeological materials, a panel showing the flow chart

of the Uranium Reduction Company uranium mill, panels on early settlement and exploration, a large flat wall display on the geology of the region and several old donated "candy" cases with historic artifacts and uranium minerals. Three of the rooms in the small house were used for exhibition purposes. The fourth room, a kitchen, was used for workroom and storage.

By the end of the year a series of local and outside traveling exhibits had been programmed along with a few guest speakers. Volunteers, including the Girl Scouts, kept the museum open on weekends. An accession and catalog system, borrowed from the National Park Service, was established. Monthly movies were being shown to the school children on Saturdays, and a case for uranium minerals was donated by the American Institute of Mining, Metallurgical and Petroleum Engineers.

The directors report for the first 14 months of operation said some 6,000 people had been through the museum and 125 "interested and spirited Moab citizens donated their time" to keep the museum open when it wasn't feasible to hire someone -- meaning lack of funds. A major lecture by Ed Ferdon on Easter Island archaeology and several movies both for children and adults had been given. Several portable exhibits for the schools had been made. For the coming year a lecture on outer space and another on geology were planned. Traveling exhibits were to come in the form of Ute Baskets from the University of Utah, artwork from the Museum of New Mexico and a display from the American Museum of Atomic Energy.

With a few additions these early generative years set the stage and direction for the operation of the Moab museum. Improvements in facilities, cases and exhibits were made as time, money and need dictated. Spin-offs like the Great Books Program occurred. A summer arts program was co-sponsored with the University of Utah and the Moab Chamber of Commerce in 1960. Virginia Fossey, after working only part time in previous years, was hired to work regular hours in June, 1960 as the only permanent employee.

1961-62 saw a change in curators as the author transferred, in June, 1961, to another National Park Service job in Virginia. Billie (Mrs. Harold) Provonsha, a long time member and supporter of the museum, took over the responsibilities in May, 1962. She kept the museum going in a professional manner and with her connections as a long-time resident of Moab added many items to the collections for the betterment of the displays. The move into the old city office building at 118 East Center Street in April of 1965 almost doubled the space for exhibits and storage.

The Provonsha era ended when she moved to Arizona in July, 1969, but others took up the banner and the museum continued to function. Much of the day to day continuity fell to Virginia Fossey, with her thorough knowledge about operations and past events that had occurred while she was working there. During the period

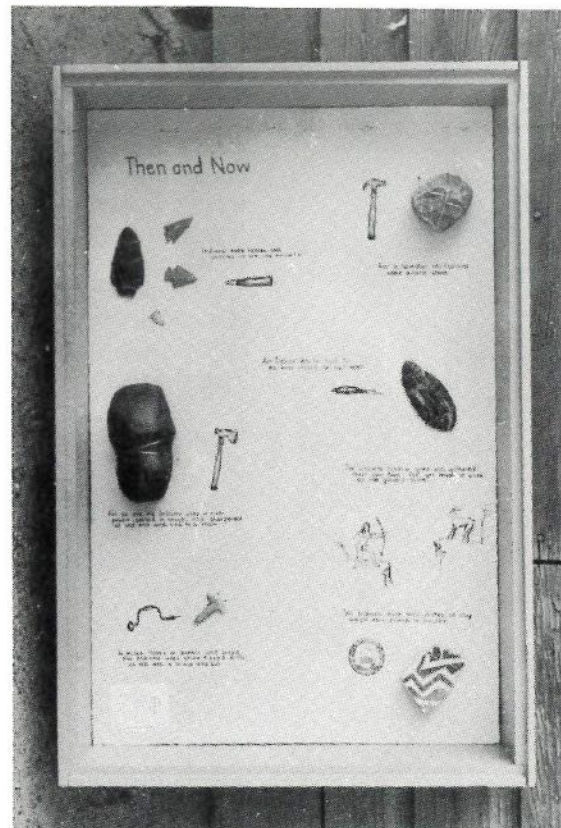
1969-1977 many large collections were added to the museum including the telephone exhibit from Jack and Ila Corbin and various minerals and fossils from members of the Points and Pebbles Club and Jack and Krug Walker. A conservation reading room and library were set up for a time. In the front room, courtesy of Dave May and Carl Davis, a banana plant was ensconced for a while -- no bananas ever appeared, however.

During the late 1970's and into the 1980's the museum was stimulated into greater activity, spurred by increased public interest in the past, and in antique collecting and the preservation of these nostalgic items. With the addition of retirees and some younger members to the Board of Directors, the museum entered into a flurry of educational and social programs.

An annual ice cream social was started in 1979 on Utah Pioneer Day. The museum also participated in the Pioneer Parade. A symposium on Southeastern Utah Archaeology with archaeologists pre-eminent in the field was held. A lecture on the Old Spanish Trail by noted historian C. Gregory Crampton of the University of Utah was given in conjunction with an exhibit on Spanish Colonial Trade Materials from the Museum of New Mexico. Many of the movies made in Moab were obtained and screened for the traveling public and local citizens. Grants from the Utah Endowment for the Humanities and the Institute for Museum Services were obtained for some of these projects, and also to place the large pieces of equipment behind the museum under cover and to get a few metal cabinets and shelves for storage of the museum collection. During the same period an increase in the use by local and outside writers and researchers

became apparent as old photographs from the museum and photos of museum artifacts appeared in many publications both popular and academic and on various types of television shows. The museum continued, as it had in the past, to provide curatorial service for some of the salvage excavations of prehistoric materials in the region and to allow research investigators to study them.

In 1979 and 1980 Dan O'Laurie made sizable contributions to the museum with instructions that a "building fund" be set up. Dan was a local philanthropist who had come to Moab in the 1950's. At that time he was associated with the uranium pioneer and "king," Charlie Steen. After reaching financial security, Dan stayed on in Moab and became a silent but steady supporter of many civic projects. He was especially generous with the Girl Scouts and Boy Scouts,



the golf course and many other organizations including, fortunately, the Moab Museum.⁴ He was the first life member of the museum. He also served on the Board of Directors and at one time during the early 60's kept it open by personally paying the salary of the hostess.

In 1983 the fund established by Dan O'Laurie had become large enough to undertake the building of a relatively inexpensive addition to the rear of the old city building. The 30 by 33 foot structure was to house the historical exhibits and, upon completion in 1986, was dedicated as the Dan O'Laurie History Hall. Dan knew of the plans to name the hall for him and became very much interested in its progress. He also became concerned that the new addition made the old building look rather shabby and was considering how he and the museum could up-grade it. When it was suggested by the author that it might be best to tear the old building down and start over it did not take Dan long to consider and agree to financing this idea. At the Board of Directors meeting in December, 1986, it was unanimously voted to name the entire museum complex after him. Little did the board members know he had terminal cancer at the time.

The old museum building was torn down in early 1987. Groundbreaking for the new structure took place on July 24th of the same year. Despite inclement weather, a large crowd attended the grand opening of the modern Dan O'Laurie Museum on August 20, 1988.

Footnotes

1. This history is based primarily on minutes of meetings of the museum Board of Directors and personal recollections unless otherwise indicated.
2. Daughters of Utah Pioneers, Phyllis Cortes ed., "Grand Memories", Utah Printing Co., Salt Lake City, p. 171; Times-Independent 10/31/57
3. Op. cit. p. 171
4. Times-Independent, 1/15/87.

The author was the first curator of the museum from 1957 to 1961 as an unpaid calling while he was employed as Chief Ranger at Arches National Monument. After retirement from 27 years of federal service in 1975, he returned to Moab and in 1977 became the museum curator once again, a position held until January 1, 1989. He and his wife Marian both remain active in all aspects of the museum.



Demolition of the old museum - 1987 - Photo by Kent Dalton



Dan O'Laurie Museum - 1988

Museum News

by Keith Montgomery

The Dan O'Laurie Museum was able to offer the public a variety of special exhibits during 1988. In celebration of its grand opening on August 20, 1988, an exhibit entitled *Canyon Graphics and Graffiti* was showcased in the newly constructed building. Circulated by the University of Utah, the exhibit featured depictions of rock art, inscriptions and graffiti recorded from the canyons now flooded by the Glen Canyon Dam in southeastern Utah. This slice of history and prehistory was displayed in plaster casts, line drawings and enlarged photographs. The exhibit was featured through the first part of November, 1988 and was reviewed favorably by visitors and locals alike.

In conjunction with the Grand Opening in August, the "History Hall" housed in the annex to the old museum building was reopened to the public. Highlighted are well-executed displays featuring Moab's historical past. Topics include the Old Spanish Trail, outlining the route of early explorers, trappers and missionaries. Included in the hall is a display on "Early to Modern Transportation" featuring roads, rivers and rails. A variety of artifacts from the early farming and ranching days of Grand County are handsomely displayed. A 1907 "Typical Kitchen of Moab" is a popular showcase depicting domestic life at the turn of the century. Themes of other exhibits in the History Hall include Early Settlers, Communication, Education, Government, Health, and Movies Made in Moab.

The new year opened with the museum offering two richly illustrated exhibits on World War I posters and exotic insects of the world. On loan from the Utah State History Division was an evocative collection of posters produced during the Great War by the nation's foremost

illustrators to sell American patriotism and Liberty Bonds. In sharp contrast, the insect and butterfly display provided by John Hetzler of Parachute, Colorado delighted school children and older museum patrons alike. Different rare and unusual insects from Asia, Africa, North and South America and the South Pacific were included in this exhibit. Both exhibits ran through mid-February.

Next on the calendar is an interim exhibition featuring the artifacts from the museum's permanent collections. This exhibit will include aspects of natural history, geology, prehistory, and early history of the canyonlands. The exhibits will highlight various unique artifacts in scaled-down format, employing enlarged photographs and models that will capture the interest of everyone. This interim show is scheduled to open April 8, 1989. In conjunction with this opening will be the re-dedication of the History Hall. In honor of Lloyd and Marian Pierson, it will be re-named the Pierson History Hall.

The current goal of the new Dan O'Laurie Museum is the completion of the permanent exhibits, which will showcase our unique and spectacular artifacts, many donated to the museum by our patrons and friends. These permanent exhibits will be housed in the new portion of the museum and will focus on local geology, mining, natural history, and prehistoric lifeways from our area. The display format will include a variety of dioramas, scale models and life-size replications. The museum is committed to providing the public with high quality displays as well as educational activities to learn about themselves and explore the environment around them.



Book Notices

by Yvonne Pierson

ENEMY ANCESTORS: The Anasazi World With a Guide to Sites

Gary Matlock
Photos by Scott Warren
Northland Press
Flagstaff, AZ
1988, 128 pages
\$19.95

The continued popular interest in Anasazi stone-age culture has resulted in several books, termed "guide books" by their authors, intended to lead the traveler to Anasazi sites scattered throughout the Four Corners area. While this book carries the term "guide" in its title, it should not be confused with those other publications that are primarily descriptions of ruins and the means by which to arrive at them.

Gary Matlock has included in his work most of the contemporary research findings on the Anasazi, and done so in such a manner that this knowledge is made available to those who do not hold a degree in Archaeology or Anthropology. The "guide book" portion of the book is secondary to this main theme.

The book is well worth the purchase price if only to obtain the beautiful photographs of Anasazi sites by Scott Warren.

SIGNS FROM THE ANCESTORS, Zuni Cultural Symbolism and Perceptions of Rock Art

M. Jane Young
University of New Mexico Press
Albuquerque, NM
1988, 308 pages
\$14.95

Those interested in prehistoric rock art are often faced with a dilemma; no interpretation of the symbols found throughout the Colorado Plateau can either be proven or accepted by the scientific community. M. Jane Young has used both ancient and contemporary Zuni rock art, found in proximity to Zuni Pueblo, as the basis for a work that explains the meaning of some rock art, using the interpretation of the culture that created the art. While this does not necessarily lead to an interpretation of all prehistoric art, the parallels and similarities may be drawn by the reader and applied, if so desired, to the further appreciation of rock art in the Colorado Plateau.

HOW TO DEEP FREEZE A MAMMOTH

Bjorn Kurten
Translated by Erik J. Friis
Columbia University Press
New York, NY
1986, 121 pages
\$16.95

The ability of a scientist to explain his field of endeavor to the general audience in a way that is entertaining and expresses his joy of study with humor, accuracy, and detail is a rare gift. Bjorn Kurten manages to do this on a multitude of subjects ranging from European cave art to the Piltdown Man fraud. While this book is based on the European Ice Age, there are enough similarities to the same time period in America to make this book interesting and applicable to those who seek general knowledge and information on this time period.

ON THE TRACK OF ICE AGE MAMMALS by Jacki Montgomery

Anthony J. Sutcliffe
Harvard University Press
1985, 309 pages
Cloth, \$25.00. Paper, \$12.95

This well-produced book presents a rare and diverse body of data about the Quaternary studies of Ice Age Mammals. The format is descriptive, as opposed to analytic, providing a non-technical review of Old World and New World Pleistocene fauna, and is accompanied by a wealth of illustrations.

The introduction section recounts a history of Ice Age mammal discoveries and describes how the mammalogist collaborates today with other scientists. Topics include: What was the Ice Age?; Preservation of Pleistocene Fauna; and Dating Methods. A significant portion of the text describes fossils from cave sites, the use of Paleolithic cave art as a tool in reconstructing extinct mammals' appearance, and frozen mammoth remains from Eurasia and Siberia. Various New World sites such as the La Brea asphalt pits are highlighted with diagrams and photographs. In conclusion, Sutcliffe outlines thought-provoking theories on Ice Age fauna extinctions that are best viewed as hypotheses for future testing. Superb illustrations, a glossary, further reading list and an index contributes to the book's excellence.

NEXT ISSUE . . .

40 Years in the "Reel" World **Moab Movie-Making History, 1949-1989**

Quiet on the set!

Lights!

Camera!

Action!

These commands often echo between the high canyon walls surrounding Moab. From the days of John Wayne and John Ford to "Indiana Jones" and Steven Spielberg, from westerns to science fiction, Moab has repeatedly played host to Hollywood. Credited with this achievement are the dedicated volunteers of the Moab Film Commission, the longest continuous movie promotion group in the world.

Join with *Canyon Legacy* in celebrating the 40th anniversary of Movie Making in Moab, as the SUMMER, 1989 issue focuses on this fascinating subject.



Warlock, 1958, in Arches National Park.

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This first edition has been funded in part by a matching grant from the Utah Endowment for the Humanities.

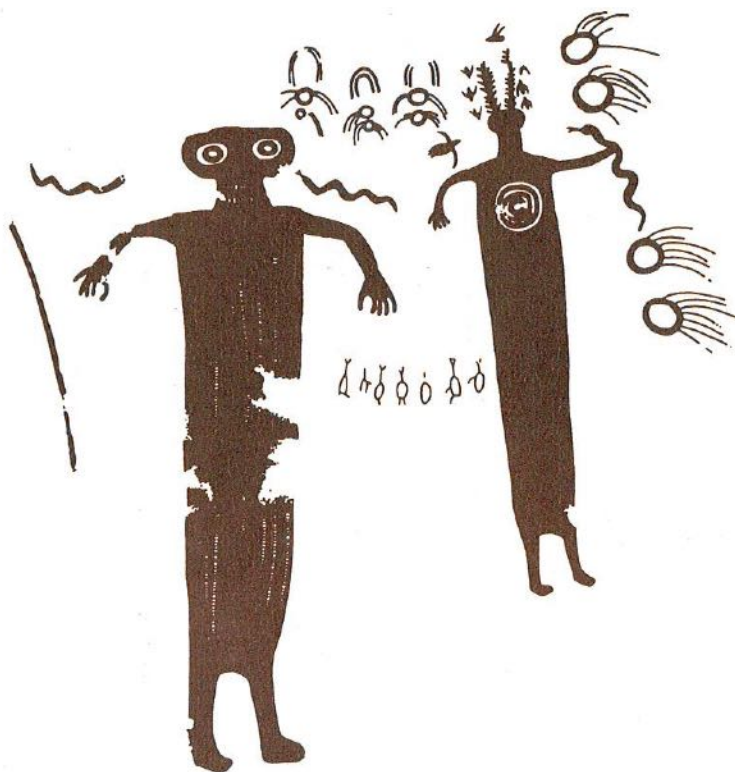
Back Cover: Barrier Canyon Style pictographs, San Rafael Swell area, central Utah (from Schaafsma, 1980).

Canyon Legacy ISSN: 0897-3423

Dan O'Laurie Museum

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Was the Huntington Mammoth the last holdout?

How old are the Barrier Canyon Style pictographs?

What forced the Anasazi to leave the Four Corners region?

Who ate tree bark for survival?