UTAH ARCHAEOLOGY
1995

A Publication of

Utah Statewide Archaeological Society
Utah Professional Archaeological Council
Utah Division of State History

UTAH ARCHAEOLOGY 1995

UTAH ARCHAEOLOGY is an annual publication of USAS, UPAC and the Utah Division of State History. The purpose of this publication is to disseminate information relevant to archaeological research, both historic and prehistoric, in the state of Utah. Subscriptions are available through memberships in USAS ($20) or UPAC ($25) or for an annual fee of $15 through: Utah Archaeology, Utah Division of State History, 300 Rio Grande, Salt Lake City, Utah, 84101.

ISSN 1040-6549

UTAH ARCHAEOLOGY 1995

Vol. 8 — 1995 — No. 1

CONTENTS

ARTICLES AND REPORTS

NOTES

REVIEWS

Front Cover: Interior of a Mimbres Bowl (see Shaffer and Gardner this volume).
Inside: Baskets from Leo C. Thorne Collection from DeVed and DeVed (this volume) and detail from the Interior of a Mimbres Bowl from Shaffer and Gardner (this volume).

MESSAGE FROM THE EDITORS

We are pleased to present *Utah Archaeology 95*. This is the eighth volume of the series, which began publication in 1988 under the editorship of Joel Janetski and Steve Manning. We are proud to contribute to *Utah Archaeology* because we believe it is an important avenue for communication about the exceptional archaeological resources of Utah and surrounding states. The articles in this issue are as varied as the archaeological sites in the state: from rabbit drives as depicted in Mimbres pottery to Anasazi hoe manufacture. We hope you will find them to be as interesting and stimulating as we have. As always, we solicit and welcome your comments on any aspect of the publication. Many individuals contributed to *Utah Archaeology 1995*. We thank the authors, the peer reviewers, the Editorial Advisory Board (Kenneth E. Juell, Bill Latady, Dave N. Schmitt, and Kenneth Wintch), and we especially thank Renae Weder and Dave Schmitt for their hard work in getting this issue to press. We can only continue to produce a quality journal if we have good submissions to work with, so we encourage all readers to consider contributing an article, report, note or review. We welcome all manuscripts and are happy to work with authors or discuss ideas at any time. We hope you enjoy the journal.

Kevin T. Jones, UPAC editor
Robert B. Kohl, USAS editor

THE KEYSTONE AZURITE MINE IN SOUTHEASTERN UTAH

Nancy J. Coulam, National Park Service, 2282 South West Resource Blvd, Moab, Utah 84532

Alan R. Schroedl, P-III Associates, Inc., 2759 South 300 West, Salt Lake City, Utah 84115

Over the past 25 years human skeletal remains have been sporadically discovered at the Keystone Azurite Mine in southeastern Utah. These finds have been cited in the popular literature as being 100 million year old human remains. However, an inspection of the mine, a review of the field notes, and interviews with participants, coupled with a review of prehistoric mining in the Greater Southwest, indicate that these finds are the remains of ancestral Puebloan miners dating to about the 6th or 7th century A.D.

INTRODUCTION

Over the past twenty-five years, human skeletal remains of several prehistoric individuals have been discovered in the Keystone Azurite Mine, an azurite collecting and mining area in southeastern Utah. In spring of 1995 the current owner of the mine, Mr. William Harrison, contacted us about these discoveries. Twice before (in 1971 and in 1990), professional archaeologists had been contacted to assess the human remains; however, definitive archeological reports on the finds were never published. Unfortunately, sensationalized stories touting the finds as evidence of modern humans beings living 100 million years ago have been published in popular articles (Barnes 1971, 1975; Barnes and Pendleton 1979; Burdick 1973). After visiting the mine in 1995, we studied the field notes, photographs, and correspondence from these earlier discoveries. We also talked with various participants and reviewed the published popular literature. We believe the human remains from the Keystone Azurite Mine are the remains of ancestral Puebloan miners who were either deliberately interred or were accidentally buried while mining for azurite in the 6th or 7th century A.D.

To provide a formal discussion for Mr. Harrison, Native Americans, the interested public, and the archeological community, we present a chronology of events related to the recovery of human remains in the azurite mine, a brief description of prehistoric mines in the Greater Southwest and discuss possible interpretations derived from these data pending the final report by the excavators and analysts.

BACKGROUND

Keystone-Wallace Resources mined copper in southeastern Utah in the 1960s and early 1970s in the Nevada Patent where the human remains were discovered (*The Times-Independent* 1971). After the company ceased mining, the area continued to be sporadically mined for azurite and malachite. Today, the Keystone Mine is known among rock hounds (Jones 1991; Hampson 1993) for producing collectors' specimens of azurite and malachite, as well as spherical azurite nuggets, little round blue balls (cf. Kunz 1890:55; Silliman 1881:67). Aside from modern uses (jewelry inlay and pigment manufacturing), the blue azurite nuggets from the Keystone Mine are significant because of their association with prehistoric human remains.

UTAH ARCHAEOLOGY, 8(1), 1995,
pp. 1-12

1971 Discoveries

In May of 1971, a tour guide and rock shop owner from Moab, Mr. Lin Ottinger, discovered human skeletal remains while collecting azurite nuggets at the Keystone Mine. He contacted the University of Utah about the finds, and Jack Marwitt, Field Director of the Utah Statewide Archaeological Survey, visited the site and excavated two partial human skeletons stained blue-green from leaching copper minerals. Marwitt recorded the site as 42Sa2133 on May 25, 1971. Marwitt was accompanied by Lin Ottinger, Fran Barnes, free-lance writer from Moab, Utah, and two tourists from Ohio.

Marwitt noted (1971) the human bones appeared fragile and slightly mineralized, but they were not fossilized even though they were stained blue by leaching of the copper minerals. The human remains were obviously not part of the surrounding rock but were situated in unconsolidated sand and rock spalls in an area heavily disturbed by bulldozer activity from previous mining. Photographs of Marwitt's 1971 excavations confirm that any stratigraphic context for the human remains had been cut away by bulldozing before he arrived at the site. Based on the nature and context of the bones, Marwitt believed the human remains were recent in age, possibly Paiute or Ute.

Mr. Ottinger offered the human remains to the University of Utah. Marwitt agreed to take the remains because the blue-green staining was unusual and because the University of Utah was the repository for human remains found under such circumstances. Marwitt returned to the University with the skeletal remains and site form, but no further analysis was conducted because the remains were incomplete, from a disturbed context, and lacked associated cultural artifacts or features.

Shortly after Marwitt's visit, Fran Barnes published a sensationalized story about the remains in *The Times-Independent* (Barnes 1971), southeast Utah's weekly newspaper. Barnes' opening paragraph stated:

> Once again, a resident of Moab, Utah, has made a discovery that has startling scientific implications. Lin Ottinger, Moab back-country tour guide and amateur geologist and archeologist, made a find early last week that could possibly upset all current theories concerning the age of mankind on this planet.

Barnes wrote that because the human remains were found in Dakota Sandstone and because Dakota Sandstone is 100 million years old, the human remains were 100 million years old. Due to Fran Barnes' story, by the end of summer, 1971, Marwitt was already receiving requests for information about the 100 million year old human remains. Later that year, Marwitt left the University of Utah and no further analyses of the bones were conducted.

After learning that the remains were being studied and damaged in human osteology classes, Lin Ottinger reclaimed the skeletal remains from the University of Utah in the fall of 1971. Eventually Ottinger sold them to Reverend Clay Baugh. The bones are curated in Baugh's Creation Evidences Museum in Glen Rose, Texas.

In 1973 based on the stories published by Fran Barnes, and by personal communication from Lin Ottinger, Clifford Burdick published an article in the *Creation Research Society Quarterly* (Burdick 1973) claiming the human bones were 100 million years old. As stated in his publication, the evidence was as follows:

(1) The bones were definitely "in place." There was no evidence of the surrounding rock having been disturbed, as I [Ottinger] dug a foot deep at the site.
(2) The skeleton was pronounced by the University of Utah as definitely *Homo sapiens.*
(3) The deep staining of the bones with malachite attest to their age.
(4) It was evident from the location of the find deep within the man-made pit that the bodies were buried at the time of the emplacement of the sandstone rock.
(5) The type of mineral alteration suggests greater age than 100 years as suggested by the mine superintendent. ... [Burdick 1973].

Burdick twisted the data to support his position. The human remains were indeed *Homo sapiens* and at least 100 years old. The remains, as Marwitt excavated them, were mostly articulated and in situ, that is, not redeposited in the mine after burial elsewhere. Marwitt had made it clear to Mr. Ottinger and Mr. Barnes during the excavations that the human remains were neither mineralized nor fossilized and did not originate 100 million years ago when the Dakota Sandstone was formed. According to Marwitt (1971), the human remains were incorporated into either a natural crevice or collapsed rockshelter in the mine. Given that bulldozers had cut away the stratigraphic context, Marwitt could only speculate on the origin and stratigraphic position of the skeletal remains.

In 1975, Fran Barnes published another account of the "100 million year old" human skeletons (Barnes 1975). Since then, at least five other articles have appeared in creationist literature based on the stories by Fran Barnes and Clifford Burdick. Jack Marwitt continues to receive requests for information and verification about his 1971 discoveries of the "oldest human remains in North America."

1990 Discoveries

Eventually, the Nevada Patent portion of the Keystone-Wallace mine was purchased by Mr. Steve Kosanke. In August of 1990, while mining for azurite, Mr. Kosanke uncovered several human crania about 20 m east of the locus of the 1971 discoveries. Mr. Kosanke immediately contacted the deputy county sheriff, Mr. Bill Pierce, who contacted Bureau of Land Management (BLM) special agent Pam Stuart, who then contacted Julie Howard, archeologist for the Grand Resource Area BLM, about the finds. Ms. Howard asked Susan Miller, archeologist for the Utah Department of Transportation, to confirm that the remains were prehistoric Native Americans. After Miller's confirmation, Mr. Kosanke gave permission to Julie Howard and the Moab Archaeological Society to recover additional skeletal remains from his property with the understanding that all remains would be returned to him upon completion of analyses, that a professional archeologist would supervise all excavations, and that a written report would be prepared and submitted to the Utah State Historic Preservation Office and to Mr. Kosanke after analysis.

Under the supervision of Julie Howard, archeological excavations in the Keystone Mine continued between August and October, 1990 with members of the Moab Archaeological Society. In addition to Ms. Howard, other professional archaeologists who participated in the 1990 excavations included Susan Miller, Nancy Shearin, and Jackie and Keith Montgomery. The excavations uncovered at least two sets of human remains. Field excavation notes were prepared and photographs were taken. Samples of pollen and charcoal as well as a few artifacts were collected.

1991 Discoveries

In the summer of 1991, Ms. Howard returned to the site and, assisted by her husband and the land owners (Mr. and Mrs. Kosanke), continued excavations. Two additional sets of human remains were uncovered, but the notes do not mention any cultural or stratigraphic context for these remains. Another Smithsonian site number was obtained (42Sa21479), but this number should be considered void since Marwitt had previously recorded the site as 42Sa2133.

1995 Discoveries

Additional human remains were still being uncovered at the Keystone Mine in 1995. In early 1995, several small bones, possibly phalanges, were discovered by Mr. Harrison in the area of the 1990/1991 excavations. The context of these bones was uncertain.

In the fall of 1995, Mr. Harrison allowed several creationists to dig for additional human remains. They discovered several skeletal fragments in loose unconsolidated fill about 15 m north of the 1971 discoveries. These specimens appear to be some of the missing skeletal parts of the two individuals excavated by Jack Marwitt. They were apparently pushed into this area during the 1971 bulldozer activities that originally uncovered the remains.

Laboratory Analyses

In 1971, Marwitt did not perform any laboratory analyses before the bones were returned to Lin Ottinger. Marwitt felt the lack of context for these remains did not justify the expense of radiocarbon dating the bones. No report was prepared but a site form (42Sa2133) was filed on the 1971 discoveries.

After the 1990 excavations, some preliminary laboratory analyses were conducted. Carol Brandt of the Zuni Archaeology Program processed three flotation samples from the excavations, but only unidentified burned wood and modern floral contaminants were noted in the samples. Susan Miller prepared preliminary descriptions of skeletal remains from the 1990 excavations. Because of the exceptional interest in the age of the site, particularly in light of the Barnes' claim of 100 million year age, the Moab Archaeological Society collected and recycled aluminum to generate enough money to pay for a radiocarbon date on organic matter associated with one of the human skeletons. In January, 1991, Julie Howard submitted a sample of organic material (FS #7) collected by Susan Miller on September 16, 1990 from Burial #2. This sample (Beta-42178) was dated to 1450 +/- 90 radiocarbon years, with a calibrated one-sigma date range of A.D. 540 - A. D. 670.

After the 1991 excavations, Julie Howard also submitted some of the human remains to Paul Nickens, Batelle Laboratories, for analysis. After analysis, the bones were supposed to be returned to Mr. Kosanke for reburial. When Julie Howard left the BLM Grand Resource Area in 1993, she submitted the site field notes and samples in her possession to the Edge of the Cedars Museum for curation. Since 1991 she has apparently been working on the final technical excavation report for the 1990/1991 excavations.

In January, 1995, Bruce Louthan, BLM Moab District archaeologist, decided to prepare an administrative report on the site because he continued to receive requests for information about the site. He assembled various notes and letters about the excavations and contacted Paul Nickens about the human skeletal remains. He also obtained rocks that were salvaged from the excavations by Margaret Patterson and sent them to Dennis Weder, archeologist for Hill Air Force Base, for lithic analysis.

In the summer of 1995, the current land owner asked us to review the history of archeological excavations at the site and prepare a short report because he also continued to receive information requests about the site. He also requested this report because he anticipated a visit by a creationist excavation crew in early fall 1995. Over the summer and fall of 1995, we visited the site on several occasions, reviewed photographs of the excavations and field notes, and talked with various participants including some of those involved with the 1971 discoveries. This paper presents some interim observations about the prehistoric use and occupancy of the site, pending publication of a final technical report.

PREHISTORIC MINES IN THE GREATER SOUTHWEST

While prehistoric mines have not been reported from Utah (Malouf 1950), prehistoric mines are well-known from the rest of the Southwest and northern Mexico, and in fact, from throughout the Americas (Holmes 1919). In Mesoamerica, prehistoric mines are so common that Weigand (1982) created a tripartite typology (Types I-III) to describe them. Weigand's (1982) Type I mines are horizontal adits excavated into the sides or slopes of a hill with spoil dirt from the mine deposited in front of and downslope from the adit entrance.

According to Weigand's typology, Type II prehistoric mines are vertical cuts or shafts. Spoil dirt is piled in a circle around the mine shaft entrance with the spoil dirt pile resembling an inverted cone around the entrance to the shaft. These vertical shaft mines are typical of northern Mexican and Southwestern prehistoric turquoise mines where the tunnels or shafts were cut 15 to 25 feet into veins of turquoise (Johnston 1964). Holmes (1919) provides some of the best available photographs, plans and elevations of prehistoric American mine shafts and tunnels.

Unfortunately, the literature on prehistoric mines is not always clear on whether mine tunnels are vertical shafts (Type II mines) or horizontal adits (Type I mines). For instance, Bartlett (1935:42) describes prehistoric salt mines in Arizona and Nevada as "tunnels burrowing into the hill following strata where salt was plentiful." Cummings (1953:79-80) describes human remains found in either Type I or II salt mines in Arizona as follows:

> Their tunnels were irregular excavations just large enough for a man to work in as he followed a vein of salt into the hill. ...Some broken skeletons found in these old workings doubtless were men caught in cave-ins. Others probably were remains which had been buried there.

Holmes (1919:270) provides a photograph of a model of a hematite miner within such an "irregular excavation". Type I and II mines were connected in the Los Cerrillos Turquoise Mine in New Mexico where prehistoric miners excavated an "L"-shaped tunnel with an 83 foot deep vertical shaft connected to a 110 foot horizontal tunnel (Silliman 1881:69).

Some archaeologists might consider the first two of Weigand's mine types to be the remnants of true mining activities, while the Type III open pit mines result from quarrying. However, following Holmes (1919:155) and Weigand (various), there is no behavioral distinction between mining and quarrying, although quarries are by far the most common means of acquiring minerals or stones in the prehistoric Americas (cf. Holmes 1919:155).

Type III mines range in size from small pit quarries "some no larger than animal burrows" (Weigand, Harbottle and Sayres 1977:20) to the prehistoric open pit mine at Los Cerrillos which was 200 feet in depth, 300 or more feet in width, with the waste from the pit covering 20 acres (Silliman 1881; cf. Kunz 1890). There are numerous archaeological references to pit quarries because they are the most common archaeological type of mine. For example, Hack (1942) describes prehistoric strip mines for obtaining coal by Pueblo III and IV Kayenta Anasazi. Elston and Dugas (1992) describe small open pits for quarrying high quality chert in Nevada. Duffield (1904) describes prehistoric pit quarries for obtaining turquoise in southern Nevada. Bartlett (1935) and Welch and Triadan (1991) summarize reports on prehistoric open pit turquoise and salt mines located in Arizona, New Mexico, southern Colorado, southern Nevada, and southeastern California.

Prehistoric Mine Features

None of the prehistoric mines in the Greater Southwest are timbered or shored; therefore, Type I and II mine tunnels frequently collapsed on the prehistoric miners (cf. Morris 1928:82; Bartlett 1935; Cummings 1953). Within prehistoric Type I and II mines, construction features are limited to occasional retaining walls built from rocks within the mine. As noted by Weigand (1982:107), the retaining walls are simply matrix blocks, rocks or pebbles piled one upon the other, without mortar. The walls serve a dual function of stabilizing the adits or shafts and moving loose waste rocks out of the way.

Perishable Mining Artifacts

Several types of perishable artifacts are associated with prehistoric mines. The most common type of perishable artifacts associated with prehistoric mines are wooden twigs, sticks, or torches used for lighting Type I and II mine interiors. According to Weigand (1982:109), the best light comes from wood which burns quickly, so prehistoric mines often contain immense quantities of burned resinous wooden splints which were tossed aside on spoil piles outside the mine entrances and within the mines. Morris (1928:84) provides a photograph of a juniper bark torch used to light the interior of an Arizona salt mine and one of these prehistoric juniper bark torches is on display at the Arizona State Museum in Tucson.

Another type of perishable artifact found within prehistoric mines is wooden handles from grooved mauls, axes, or sledge hammers (Bartlett 1935:42-43; Silliman 1881:69). Examples of such perishable wooden handles are found in a Cummings (1953:80) photograph of hafted hammers and picks from prehistoric mines in Arizona; in Harrington's (1925) thorough description of hafted stone hammers from salt mines in southern Nevada; as well as in Morris' (1928:87, 89) photographs of wooden hafts from stone tools in Arizona salt mines.

Other perishable artifacts associated with prehistoric mining include picks and scoops of bone and tortoise shell (Jernigan 1978:214), bags or baskets for removing spoil dirt and minerals, and ropes for hauling baskets or bags (Weigand 1982a). Cordage and unworked yucca leaves have been found in prehistoric mines tying dry sticks together to make torches and binding wooden handles to stone tools (Harrington 1925:229; Morris 1928:84).

Water containers are another perishable component of the mining tool kit of prehistoric miners (Weigand 1982a). In Mesoamerican mines, gourds for carrying water have been found, and in Arizona turquoise mines, skin and rawhide water containers have been found (Bartlett 1935:42; Johnston 1964:78). These perishable artifacts are, of course, rarer than nonperishable artifacts in mine sites.

Nonperishable Mining Artifacts

Chipped stone artifacts associated with prehistoric mining range from extremely crude to finely pressure-flaked scrapers, cores, utilized flakes, and hammerstones. Ground stone artifacts include mauls, axes, sledgehammers, and picks (Bartlett 1935:42; Cummings 1953:79-80; Harrington 1927; Holmes 1919:272; Morris 1928; Silliman 1881:69-70; Weigand 1982a; Weigand, Harbottle, and Sayre 1977). The most common extraction tools are massive axes and mauls (Welch and Triadan 1991:149-150). These stone tools were mainly used to crush or fracture and pound the mine matrix to loosen it and to break out the desired stones or minerals. In many of the prehistoric mines, fire was also used to help loosen the matrix. The association of perishable water containers, ash and charcoal in Type I and II mine shafts suggests that the matrix was first heated with fire, then cooled suddenly with water, causing fractures. Further hammering and picking with stone tools released the sought-after minerals and stones from the mine matrix (Bartlett 1935; Johnston 1964; Kunz 1890; Silliman 1881; Weigand 1982a; Weigand, Harbottle and Sayre 1977).

Uses of Blue-Green Stones in the Greater Southwest

Blue-green stones, including malachite, azurite, chrysacola, and chemical or mineral turquoise, were one of the most important of the rare resources mined and exchanged throughout Mesoamerica and the Southwest (Holmes 1919:271-273; Weigand 1982a, 1985; Welch and Triadan 1991). In Mesoamerica, systematic and intensive mining for blue-green stones and copper appears to have begun in the period from A.D. 350 to 500 (Weigand, Harbottle, Sayre 1977:21) and intensified through time.

In the Southwest, direct dating of prehistoric mines is not possible due to the continuing use of the mines; so, at least for now, the time span for mining blue-green stones in the Southwest is derived from the context of use and discard of the finished pieces and cross-dating with other artifact or architecture classes (Weigand 1982b; Welch and Triadan 1991:156). Whether the finished product was an inlay or mosaic piece, a tab pendant, disc bead, ear or nose plug, or other jewelry (Jernigan 1978), it is clear that turquoise was the most commonly mined blue-green stone, with azurite and the other copper ores being mined and used more rarely.

Jernigan's (1978) discussion of blue-green stone jewelry from the Southwest indicates the same pattern as in Mesoamerica with mining of blue-green stones beginning in the first centuries A.D. and increasing steadily through time. This similarity is unsurprising because the Southwest was supplying Mesoamerica with blue-green stones (Weigand 1985), especially after about A.D. 1000 (Weigand 1982a:120). While chronometric data are extremely limited, at the present time it appears mining of blue-green stones (especially turquoise) peaked in the A.D. 1300s.

In addition to the use of blue-green stones for jewelry and inlay, blue-green stones were ground and used for pigments in the prehistoric Southwest and Mesoamerica. According to Magaloni (1995), the blue and green colors in murals at Teotihuacan were created from azurite and malachite. According to Smith (1952:23-26), blue and green colors on the kiva murals at Awatovi and Kawaika-a were created from ground azurite and malachite. In the region around the Keystone Mine, many pictographs contain blue-green pigment, although these are probably not from azurite or malachite, but from a variety of other blue-green minerals found within local formations.

THE KEYSTONE AZURITE MINE IN RELATION TO OTHER PREHISTORIC MINES

Based on the above discussion of prehistoric mines in relation to our field observations and review of available information, it is clear that the human remains were associated with prehistoric mining activity at the Keystone Azurite Mine. We will now discuss the field evidence for this conclusion.

Evidence for a Prehistoric Adit

When we visited the Keystone Mine in June of 1995, the mine owner, Mr. William Harrison, showed us the end of a small adit or tunnel he believed was about 5-8 m north of the location where the skeletal remains were recovered in 1990. He stated he had not dug the adit. Based on the similarities of this feature with those tunnels, shafts and adits described in the literature on prehistoric mines, we believe this feature represents the end of a small circular prehistoric mine adit, approximately 60 cm in diameter, located on a vertical face of the present azurite mine. The concavity was formed by the removal of all fist-sized or larger rocks and the smoothing and compaction of the naturally soft, sandy matrix.

Since prehistoric mines are generally created by pounding the natural matrix and removing the large rocks, we suggest the compacted concavity we saw in 1995 was indeed the end of an adit prehistoric miners had excavated into the matrix to obtain the same spherical azurite nuggets being mined today. We believe this compacted concavity represents the end of a Type I mine adit, as defined by Weigand (1982). In addition to our 1995 observations of this adit, there are several lines of evidence from 1971 through 1990 that support this interpretation.

In the original newspaper account of the 1971 discovery of human remains, Fran Barnes admitted at the end of his article that the human remains were probably found in a "cave" in the Dakota formation:

> And even though the rock and soil layers originally above the bones were continuous and unbroken as claimed by mine officials, there is still the possibility that the original owners of the bones had simply been using a narrow cave in the Dakota formation, when it collapsed and buried them, then later filled in solid with the sandy soil that surrounded the bones when they were found. With the overburden now irretrievably gone, this point will probably never be resolved, so scientific age-dating of the remains must provide the critical evidence. [Barnes 1971].

In Barnes' next article (Barnes 1975:38) he stated that 15 feet of deposits had been removed above the bones without a trace of a prehistoric mine or a natural cave. We believe the absence of a vertical adit or cave in these overlying deposits supports the idea that the human remains were found in a horizontal adit, one tunneled in from the side of the hill, rather than the top.

We find further confirmation that the remains were found within an horizontal adit from a recent (1995) discussion with Lin Ottinger. Mr. Ottinger firmly believes the remains were not found in an adit, but were found in a "hearth" or occupation area created by prehistoric people living along a cliff face which collapsed and buried the individuals. After Jack Marwitt left the site in 1971, Mr. Ottinger excavated and screened this feature, which he described as a long area (at least 30 meters) of charcoal-stained soil, about 15 or 20 cm thick, and mostly narrow, a couple of meters across, but in at least one place it was as wide as five or six meters. The human remains were within this long thin charcoal-stained organic stain which had been exposed by a horizontal bulldozer cut. Both Marwitt's (1971) and Ottinger's descriptions (personal communication 1995) of the charcoal-stained deposits, coupled with the lack of debris typical of an exposed occupation area, and the literature on other excavations of prehistoric mines (e.g. Morris 1928) suggest this feature was the remnant of a prehistoric mine adit and the charcoal was the result of the prehistoric discard of burned torches lighting the adit.

The 1990 field notes state that the skeletal materials were lying on top of a sloping surface marked by a concentration of large azurite balls or nuggets mixed with charcoal and dark-colored organic material. Fire-cracked and oxidized rocks were piled along at least one side of the burials. The notes suggest the remains may have been within a deep crevice or cavern, however the original topography has been altered so there was no indication of the original cavern.

Moab Archaeological Society members stated to the authors they thought an oval area demarcated by charcoal, burned wood, and rocks represented a prehistoric mine, although they did not have the opportunity to pursue the stratigraphic relationship between this area and the human remains. This oval concentration of charcoal was uncovered by bulldozer activity above the level where the human remains were uncovered. Assuming a slight slope or slant to the adit, the cross-section of the adit would appear as an oval within a horizontal bulldozer cut, whether the cut was above, below, or on the same level where the human remains were found (cf. Holmes 1919:268-269).

In summary, from 1971 through 1995, different individuals have seen or noted a natural cave, crevice, or concavity with charcoal-rich deposits in the area where the human remains and azurite nuggets occur in the Keystone Mine[1]. When these observations are coupled with the literature on prehistoric mines, it is obvious that at least one prehistoric adit was present in the Keystone Azurite Mine. Given the existing ground surface and topography, we believe the prehistoric adit was essentially horizontal, cut in at a slight slope from the side of the original hillside, rather than a vertical tunnel or shaft from the top of the hill. While the prehistoric spoil dirt and adit entrance have long since been bulldozed away, we believe the hillside topography, the location of the adit terminus we observed in 1995, along with the observations of others, demonstrate the adit was a typical Type I mine as defined by Weigand (1982). We believe the burned sticks, charcoal pieces, as well as ash and charcoal-stained matrix observed by multiple individuals from 1971 to the present mark the floor of the prehistoric adit or tunnel. The charcoal stains, plus the charcoal pieces and ash are remnants of prehistoric torches used to light the mine interior and possibly to heat the mine matrix to help loosen and break up the large rocks.

Evidence of Mine Features

Photodocumentation and observations of the 1990 excavation by Moab Archaeological Society members make it clear there were courses of fist-sized rocks dry-laid in alignments associated with some of the human remains. Field notes reference charcoal-stained rocks aligned in a three meter long arc paralleling one set of the human remains and the ash stained area. According to Margaret Patterson and Dennis Weder, some of these rocks were stone tools with crude flake scars, but the majority were unworked local rocks that were burned and oxidized. Some of the rocks were piled on top of each other, while others were in alignments along the burials and outlining the ash and charcoal-stained area. While detailed plan maps of the rocks, the charcoal concentration, and the human remains were unavailable to us, we interpret these rock piles and alignments as the rocks which prehistoric miners placed on the sides of Mine Type I adits to move the rocks out of their way and help stabilize the sides of adits (cf. Weigand 1982a). This interpretation becomes even more compelling when joined with the evidence of perishable artifacts from the mine.

Evidence of Perishable Artifacts in the Keystone Mine

The field notes describe a circular or oval area with burned juniper wood and charcoal fragments. If the archaeologists (or a bulldozer) dug horizontally into a prehistoric mine adit or tunnel, then the plan view of this feature would be roughly circular or oval with the sides of the circle lined with the rocks removed from the matrix by the original miners. Available photographs and plan maps from the 1990 excavation depict a large oval area distinguished by a high concentration of charcoal and burned juniper. Likewise, Marwitt's (1971) site form describes a layer of charcoal in a gray-colored matrix. This layer was observed in a bulldozer cut above the human remains and in association with some of the remains. If the prehistoric miners had used resinous wood for light, or if they had used fire to help loosen the matrix, there would be burned wood and charcoal left in the tunnel or adit and the large rocks would be oxidized or fire cracked.

The excavators and the site records describe how fist-sized or larger rocks were oxidized and fire-cracked, but the rocks did not appear to have been burned in situ. Obviously, if the rocks in the mine matrix were heated to help loosen them, as described for many other prehistoric mines (Holmes 1919, Johnston 1964), then the rocks would be burned, but the matrix would have been removed and discarded outside the mine entrance. Thus the charcoal concentration located in a level above the human remains (uncovered by bulldozer in 1971 and 1990), coupled with the burned juniper wood and organic matter associated with the burials, suggests that juniper was brought into the adit and used as torches to light the mine, and possibly to help loosen the matrix or break up large rocks[2]. Similar burned wood and charcoal are the typical perishable remnants of prehistoric torches used in mining.

Keystone Mine Stone Artifacts

The literature on prehistoric mines is replete with descriptions of stone tools used to mine the minerals and ores, and to sharpen tools and artifacts used in mining. For example, in describing a prehistoric salt mine in Arizona, Cummings (1953:79) said: "Along these channels were found the stone picks and hammers used to secure chunks of precious salt." Holmes (1919) provides photographs and illustrations of numerous varieties of stone tools used in prehistoric mines throughout the Americas. Welch and Triadan (1991) describe mauls, diorite flakes and cryptocrystalline chipped stone debitage in an Arizona turquoise mine. Therefore, we would expect to find stone tools associated with the Keystone Azurite Mine, if it were indeed a prehistoric mine. When Lin Ottinger screened the charcoal-stained feature where the human remains were found in 1971, he found no evidence of stone tools or chipped stone debitage. However, based on photographs taken by Jean Akens during the 1990 excavations, at least one large quartzite flake tool was found associated with the human remains. The field specimen logs also indicate that at least three lots of chert or "soapstone" artifacts were recovered. Likewise, some of the large rocks located in the alignments close to the human remains had flake scars indicative of crude chopping or pounding tools (Dennis Weder, personal communication, 1995). A full lithic analysis of the salvaged artifacts would clarify these issues.

Evidence of the Human Remains

The field notes are not sufficient to describe the human remains recovered at the site from 1971 through 1991. As far as we can tell from notes available to us, there were at least six human individuals represented at the site: two recovered in 1971, and at least two in 1990, and two in 1991. A full analysis of the human skeletal remains at the site would shed light on the number of prehistoric individuals at the site and a full morphometric analysis would assist the mine owner in discussions with creationists.

Photographs of the 1971 human remains suggest at least one of the individuals was placed in a standard flexed interment with the lower legs bent under the femurs. Photographs and plan maps of the 1990 excavations indicate widely scattered bones, with only the leg bones articulated. The leg bones exposed in 1990, like those in 1971, are bent, suggestive of a flexed inhumation. However, such a body position might also result from an individual crawling in a narrow cavity or a mine adit such as that depicted by Holmes (1919:270). While it is most likely that the adit caved in on miners extracting the azurite nuggets, it is also possible that the bones represent deliberate interments. The radiocarbon date of A.D. 540-670 corresponds temporally with the Basketmaker period when burials are characteristically flexed, placed in pits and cists, often found in caves, and tend to be multiple interments

(Martin and Plog 1973:89). While suggestive, we must await the final report on the analysis of the skeletal remains as well as an interpretation of the context of their discovery to deduce whether the remains were those of miners caught in a cave-in, or were deliberate flexed inhumations typical of ancestral Puebloan practices of the 6th and 7th centuries A.D.

SUMMARY AND CONCLUSIONS

In the summer of 1995, we visited the Keystone Azurite Mine at the request of the mine owner, Mr. William Harrison, to make some professional observations relevant to the six (or more) sets of prehistoric human remains uncovered within his mine since 1971. Pending a final report by the archaeologists who excavated the site, the most likely explanation is that the Keystone Azurite Mine served as an azurite mine for ancestral Puebloan peoples. The human remains uncovered during modern mining operations are the remains of prehistoric miners either deliberately buried in flexed inhumations or were accidentally crushed when the excavated adits collapsed with the miners inside.

A comparison of Marwitt's photographs from the 1971 and the terrain and topography of the mine in 1995 show substantial ground disturbance. Much of the overburden has been removed by mining over the years. In 1971, by the time a professional archeologist arrived on the site, the vertical context had been cut away from the human skeletal remains. Marwitt could only speculate about the origin of the skeletons in the sandstone stratum.

During the excavations in 1990 and 1991, the archaeologists focused primarily on the retrieval of the human remains. The archaeologists also recovered two chipped stone tools and collected samples of pollen and organic material from around the bones.

Even though the archaeologists excavating at the site in the past apparently did not develop testable research expectations about prehistoric mining, our field observations in 1995, coupled with the available site records and recollections of site excavators, suggest the human remains recovered from the Keystone Azurite Mine were either deliberate flexed burials located within prehistoric mine adits, or they were the remains of prehistoric miners caught in a cave-in within the adits. We expect the final technical excavation report by the excavators and analysts will clarify many of these issues.

We submit that the Keystone Azurite Mine is not at all unusual, but in fact, because of mine accidents and burial practices, the interment of prehistoric human remains in mines is a relatively common occurrence in Mesoamerica and the Southwest beginning with systematic and intensive mining for blue-green stones in the first centuries A.D. The radiocarbon date of A.D. 540 - A. D. 670 from Keystone mine places the human remains within a time when blue-green stones were increasingly sought and traded. In sum, we conclude that ancestral Puebloan Indians excavated one or more adits into the side of a hill to obtain the precious blue-green stones. The human remains recovered from the Keystone Azurite Mine were the remains of Anasazi miners trapped in a collapsing adit, or they were remains of Anasazi who had been buried in a Type I mine adit. Whether deliberately buried or trapped, these are the ancestors of the modern Pueblo people, and not 100,000 million year old fossils.

ACKNOWLEDGEMENTS

First and foremost, we thank mine owners William Harrison and Steve Kosanke for allowing archaeologists to examine the site on their private land. We thank Jean Akens, Claudia and Michael Berry, Kevin Jones, Steve Kosanke, Bruce Louthan, David Madsen, Margaret Patterson, and Betsy Tipps, for reviewing earlier drafts of this paper. We especially thank Jean Akens, Steve Kosanke, Bruce Louthan, Margaret Patterson, Lin Ottinger, and Dennis Weder, for discussing their observations about the site and the artifacts with us. We appreciate Bruce Louthan's effort in gathering all available field notes and data from the earlier investigations. We thank the Edge of the Cedars Museum and Todd Prince for allowing us to access the collections.

NOTES

[1]Mr. Kosanke, the landowner during the 1990/1991 excavations believes the humans were burials associated with a kiva built inside a cave in the Dakota Formation. He does not agree that the charcoal-stained area represented a prehistoric adit.

[2]Mr. Kosanke stated in a telephone conversation that he did not think the juniper represented torches, rather he suggested the wood was from a prehistoric ladder.

REFERENCES CITED

Barnes, Fran A.

1971 Mine Operation Uncovers Puzzling Remains of Ancient Man. *The Times-Independent*. Vol 76, #22, Section B, Page 6. Thursday June 3, 1971.

1975 The Case of the Bones in Stone. *Desert Magazine* 38(2):36-39.

Barnes, Fran A. and Michaelene Pendleton

1979 *Canyon Country Prehistoric Indians: their Cultures, Ruins, Artifacts and Rock Art*. Wasatch Publishing Company, Salt Lake City.

Bartlett, Katherine

1935 Prehistoric Mining in the Southwest. *Museum Notes* 7(10):41-44. Museum of Northern Arizona, Flagstaff.

Cummings, Byron

1953 *First Inhabitants of Arizona and the Southwest*. Cummings Publication Council, Tucson, AZ. Press of McGrew Printery, Phoenix, AZ.

Duffield, M.S.

1904 Aboriginal Remains in Nevada and Utah. *American Anthropologist* 6:148-150.

Elston, R.G. and Daniel P. Dugas

1992 *Creation and Transformation of Toolstone Extraction and Processing Features in Archaeological Investigations at Tosawihi, A Great Basin Quarry, Part I: The Periphery*. Edited by R.G. Elston and Christopher Raven, pp. 655-677. Report submitted to Bureau of Land Management, Elko, NV.

Hack, John T.

1942 Prehistoric Coal Mining in the Jeddito Valley, Arizona. Reports of the Awatovi Expedition, Peabody Museum, Harvard University, Report No. 2., Cambridge.

Hampson, Arnold G.

1993 Minerals of the Big Indian Copper Mine, San Juan County, Utah. *Rocks and Minerals: Special Utah Issue* 68(6):372-380.

Harrington, Mark R.

1925 Ancient Salt Mine Near St. Thomas, Nevada. Indian Notes 2(3):227-231, Heye Foundation, Museum of the American Indian.

1927 A Hafted Stone Hammer from Nevada. *Indian Notes* 14(2):127-131, Heye Foundation, Museum of the American Indian, New York.

Holmes, William H.

1919 *Handbook of Aboriginal American Antiquities Part I: Introductory, The Lithic Industries.* Bureau of American Ethnology Bulletin No. 60. Smithsonian Institution, Washington, D.C.

Jernigan, E. Wesley

1978 *Jewelry of the Prehistoric Southwest.* University of New Mexico Press, Albuquerque.

Johnston, Bernice

1964 A Newly Discovered Turquoise Mine of Prehistory, Mohave County, Arizona. *The Kiva* 29:76-83.

Jones, Bob

1991 Azurite: It's the Star of this Year's Tucson Show. *Rock and Gem* March, pp. 33-39.

Kunz, G.F.

1890 *Gems and Precious Stones of North America: A Popular Description of their Occurrence, Value, History, Archaeology, and of the Collections in Which They Exist.* Dover Publications, Inc., New York, a reprint of the 2nd edition (1968).

Magaloni, Diana

1995 Técnicas de la pintura mural en Mesoamerica. *Arqueología Mexicana* 3(16):16-23).

Malouf, Carling

1950 *Prehistoric Exchange in Utah.* University of Utah Anthropological Papers No. 1. Salt Lake City.

Marwitt, Jack

1971 Archaeological Site Form for 42Sa2133. Unpublished site form on file, Bureau of Land Management, Monticello, Utah.

Martin, Paul S. and Fred Plog

1973 *The Archaeology of Arizona: A Study of the Southwest Region.* American Museum of Natural History, Doubleday, Natural History Press, Garden City, New York.

Morris, Earl H.

1928 *An Aboriginal Salt Mine at Camp Verde, Arizona.* American Museum of Natural History Anthropological Papers Vol. 30, Part III:74-97. New York.

Silliman, B.

1881 Turquois of New Mexico. The American Journal of Science Third Series Vol. XXII (Whole No. CXXII), No. 1027-132, pp. 67-71.

Smith, Watson

1952 *Kiva Mural Decorations at Awatovi and Kawaika-a With a Survey of Other Wall Paintings in the Pueblo Southwest.* Papers of the Peabody Museum of American Archaeology and Ethnology vol. XXXVII. Reports of the Awatovi Expedition No. 5. Cambridge.

The Times-Independent, "New President Named by Keystone-Wallace," 9 December 1971, Vol. 76, No. 49, sec. A, p.1.

Weigand, Phil C.

1982a Mining and Mineral Trade in Prehispanic Zacatecas. In *Mining and Mining Techniques in Ancient Mesoamerica,* special issue of *Anthropology*, edited by Phil C. Weigand and Gretchen Gwynne, pp. 175-188. Vol. VI (Nos. 1 and 2).

1982b Sherds Associated with Turquoise Mines in the Southwestern U.S.A. Pottery Southwest 9(2):4-6.

1985 Evidence for Complex Societies During the Western Mesoamerican Classic Period. In *The Archaeology of West and Northwest Mesoamerica*, ed. Michael S. Foster and Phil C. Weigand, pp. 47-91. Westview Press, Boulder.

Weigand, Phil C., G. Harbottle, and E.V. Sayre

1977 Turquoise Sources and Source Analysis: Mesoamerica and the Southwestern U.S.A. In *Exchange Systems in Prehistory*, by T. K. Earle and J.E. Erickson eds., pp. 15-34. Academic Press, New York.

Welch, John R. And Daniela Triadan

1991 The Canyon Creek Turquoise Mine, Arizona. *Kiva* 56(2):145-164.

THE RABBIT DRIVE THROUGH TIME: ANALYSIS OF THE NORTH AMERICAN ETHNOGRAPHIC AND PREHISTORIC EVIDENCE

Brian S. Shaffer, Zooarchaeology Laboratory, Institute of Applied Sciences, University of North Texas, P. O. Box 13078, Denton, Texas 76023-6078

Karen M. Gardner, Prewitt and Associates, Inc. 7701 North Lamar, Suite 104, Austin, Texas 78752-1012

For Native American Indians living in desolate areas of the Great Basin and the Southwest, the rabbit drive was an important method for obtaining leporid (jackrabbit and cottontail) resources. Archaeologists infer that the rabbit drive was in use prehistorically, based primarily on ethnographic analogy and the recovery of game nets thought to be used in rabbit drives. No definitive archaeological rabbit drive sites have been identified, however, and most game nets were only recovered from storage contexts. Additional prehistoric rabbit drive data comes from an eleventh century Classic Mimbres Style III bowl from New Mexico. The bowl's motif clearly depicts a rabbit drive in progress. Comparison of the archaeological and ethnographic evidence indicates that rabbit drives were practiced over both a wide geographic area and long period of time using the same technology and basic group tactics as were recorded historically.

INTRODUCTION

Based on ethnographic data from the Great Basin and southwestern United States, the rabbit drive was a communal hunting technique that provided numerous animals in a single episode (e.g., Beals 1933; Castetter and Underhill 1935; Driver 1936; Du Bois 1935; Egan 1917; Hill 1982; Kroeber 1925; McLendon 1977; Spier 1928; Steward 1938; White 1932). In this activity, a group of human hunters fanned out across the open landscape and drove leporids (primarily jackrabbits (*Lepus)*, but also cottontail rabbits (*Sylvilagus)*) and other small game toward a specific location. At this location, a net was used to entrap the fleeing animals which were subsequently dispatched.

Unlike communal animal drives focussed on larger species such as bison or pronghorn, the rabbit drive usually did not result in thick midden accumulations of associated bones and artifacts characteristic of large animal drive sites (e.g., Dibble and Lorrain 1968; Frison 1970, 1974, 1987). The small size of the rabbits made it possible for rabbits to be transported whole, away from the drive site. Whereas, larger animals were usually butchered at the drive site and unwanted portions left behind, resulting in the characteristic bone and tool assemblages associated with large game drive sites. Substantiating communal hunting in the archaeological record has proven difficult for large game (Davis and Fisher 1990; Driver 1990; Frison 1987), however, and it has proven more difficult for small game. While little archaeological evidence exists for the rabbit drive, historical records show it as an important subsistence activity in the regions where it was practiced.

UTAH ARCHAEOLOGY, 8(1), 1995,
pp. 13-25

ECONOMIC MOTIVES FOR THE RABBIT DRIVE

Rabbit drives were economically important in many arid habitats of the Great Basin and Southwest where leporids and other small game represented much of the available animal biomass. While these animals are not large, they do reproduce multiple times per year with several individuals per litter (Davis 1978:236-244; Hoffmeister 1986:126-146). For example, population densities of up to 400 individuals per square mile have been recorded for jackrabbits (Davis 1978). Egan (1917) reported jackrabbits in the Great Basin so thick and coyotes so full from eating them that the coyotes did not bother to chase them anymore. With such reproductive proficiency, leporid populations can withstand intensive predation by humans and nonhumans and can recover from population crashes. Since this resource continually renews itself, it is not easily extirpated or exterminated.

The advantage of the rabbit drive was that it provided a bounty of animals that were not conducive to predation by singular hunting techniques such as with bow and arrow (Downs 1966; Steward 1938). This is not to suggest that bow and arrow were not used, but may not have been as productive. When sufficient jackrabbits and people were present, numerous animals were procured efficiently with rabbit drives (Simms 1987). For the peoples of the Great Basin who normally had low population densities, sufficient numbers of people were not present to conduct rabbit drives until family groups came together for seasonal activities. These activities included the harvesting of concentrated resources such as pine nuts and leporids, and the socializing and ceremonial activities associated with these harvests (Steward 1938). For sedentary groups, such as Puebloan peoples, the human resources needed for rabbit drives were probably always present due to sedentary village lifeways. Rabbit drives were held in conjunction with major ceremonies (White 1932) or seasonal activities (Kennard 1979).

In many of these arid areas, big game was fairly uncommon and it was the small game that provided the bulk of animal resources for humans (e.g., Sanchez 1996; Shaffer and Schick 1995; Simms 1987; Steward 1938; Szuter 1991a, 1991b). While the meat was always consumed and was a significant dietary component, another very important impetus for the rabbit drive was the procurement of skins. In the Great Basin, the Paiute and Washo depended on rabbit skin clothing for warmth during the winter months (Downs 1966; Wheat 1967). The Shoshoni rabbit drive in the fall was conducted primarily to obtain the large numbers of skins required for the manufacture of twined robes and blankets (Fowler 1989, 1992; Palmer 1878; Steward 1938). According to Wheat (1967), an adult's rabbit skin blanket required 100 skins; a child's blanket required 40. With so many skins required for manufacturing these blankets, the rabbit drive provided much of the needed supply.

ARCHAEOLOGY AND THE RABBIT DRIVE

Archaeologists often inferred that prehistoric peoples of the Great Basin and Southwest obtained large numbers of leporids through rabbit drives (e.g., Hockett 1993; Hudson 1994; Lang and Harris 1984; Olsen 1990; Shafer 1986; Shaffer 1991; Szuter 1991a, 1991b; Szuter and Bayham 1989). This interpretation was based on both ethnographic analogy (see above), recovery of leporid bones, and the recovery of large game nets. These game nets were homogenous through time, generally matching in size, shape, and basic construction between historic and prehistoric examples.

Game nets were usually long and narrow, resembling tennis nets (Amsden 1949; Wormington 1956), and constructed of plant fiber or hair (e.g., Aikens 1993, Figure 2.19; Guernsey and Kidder 1921; Kaemlein 1971; Lambert and Ambler 1961; Martin 1933). One prehistoric net recovered from U-Bar Cave in New Mexico measured approximately 46 m x 1.6 m and was constructed of human hair (Lambert and Ambler 1961). A historic

Gosiute rabbit drive net measured 137-183 m x .76 m and was made of twisted grass string (Egan 1917). Fowler (1989, 1992) noted that nets measured as much as 1.2 km long and 1.2 m wide. The great length of these nets was made possible by connecting individual shorter nets together.

Prehistoric game nets are most often recovered from cave contexts, apparently where they were cached or stored (Guernsey and Kidder 1921; Kaemlein 1971; Lambert and Ambler 1961,). Due to manufacture out of perishable materials and aboriginal storage practices, no nets have been recovered from the open fields where rabbit drives occurred. Thus, the prehistoric nets were not recovered from a context that was illustrative of their use. Additionally, studies of game nets recovered from prehistoric cave contexts in New Mexico and Arizona revealed no residual materials adhering to the cordage, such as fur, blood, bone, or other material that would indicate specifically what animals were caught in the nets (Kaemlein 1971; Lambert and Ambler 1961).

It is the use of the net that distinguishes this type of rabbit drive from rabbit surrounds or other types of communal rabbit hunts. In these other rabbit hunts, similar techniques were used for flushing rabbits with noise and commotion by a group of hunters, but the rabbits are killed as soon as they were spotted (Kennedy 1932; Ritzenthaler 1967; Speck and Schaeffer 1950).

More recently, other archaeological evidence was used to try to identify prehistoric rabbit drives. At Hogup Cave in the Great Basin, Aikens and Madsen (1986) correlated the presence of netting and cordage with leporid frequency data. In this sample, cordage and netting were more common in levels with high frequencies of leporid remains and vice versa, suggesting the use of nets in capturing these animals.

Excavations at Buffalo Flat, Oregon, revealed two sites with leporid remains hypothesized to be the result of the earliest identified rabbit drives (Aikens 1993). Sites 35LK1881 and 35LK2076 contained burned shallow pit features with faunal material dominated by jackrabbit and some cottontail remains dating to the Late Paleoindian Period (~8000-9000 B.P.). Based on the amount of leporid remains and burned features, Oetting (1994) suggested that these features were evidence of rabbit drives where leporids were taken *en masse*, possibly over several episodes. The evidence for rabbit drives is compelling, although accumulation of large amounts of rabbit remains possibly could be the result of animals killed over hundreds of years (as noted by Oetting 1994), but with methods other than rabbit drives (Hudson 1994). For example, predatory strategies can vary in the technologies used, numbers of hunters, and the pattern of killing being singular, sequential, or mass (Steele and Baker 1993).

Building on the correlation of large amounts of leporid remains and artifactual materials as the primary factors for identifying rabbit drives, Hudson (1994) also analyzed leporid body part representation (element frequencies) from a series of sites in California. The most commonly identified taxon beyond the level of Class was leporid, with jackrabbits dominating the leporids. At site KER-526, Hudson noted that the minimum number of elements displayed a marked discrepancy between cranial elements and limb elements. In fact, Hudson found crania recovered at twice the expected frequency of limbs. Based on this evidence and supported by ethnographic analogy, Hudson hypothesized that the over-abundance of crania was due to the surplus produced during rabbit drive activities. While some animals may have been consumed at KER-526, Hudson argued that surplus animals were butchered and extraneous low yield portions, such as skulls, were discarded at the site as the carcass was prepared for transport elsewhere.

One important aspect of these archaeological sites with identified rabbit drives is the dominance of jackrabbit remains. Based on ethnographic, ecological, and animal behavioral evidence, Szuter (1991a, 1991b) concluded that jackrabbits were most effectively procured with drives and cottontails through individual hunting. Concomitantly, from a Great Basin site dominated by cottontail rabbit remains, Hockett (1992) argued the animals were probably caught in traps, snares, or during encounter hunting, but were not the result of rabbit drives. The ecology and behavior of cottontails limits the possibility of driving many animals into nets, a technique more conducive for obtaining jackrabbits (Hockett 1992:73). Jackrabbits prefer open habitats and use speed to elude predators whereas cottontails prefer areas with significant cover for hiding from predators (Hall and Kelson 1959:256). Since the ethnographically described rabbit drives occurred in open habitats, it is apparently the larger jackrabbits that were the primary intended prey of the rabbit drive and not cottontails. Ethnographic documentation supports this deduction as well (Egan 1917:235-237; Fowler 1989, 1992).

With the few exceptions of research identifying prehistoric rabbit drives, all in the past 10 years, the rabbit drive has remained obscure in the archaeological record. The reason for this obscurity is that there are no diagnostic attributes that archaeologists recognize as definitive rabbit drive evidence. The most diagnostic artifact is the net, which was only one of the tools used in the rabbit drive. Thus, the actual rabbit drive is archaeologically an inconspicuous event. The rabbit drive, however, was recorded prehistorically in a diagnostic manner (Figure 1).

PREHISTORIC DOCUMENTATION OF THE RABBIT DRIVE

Unlike many other hunting activities involving big game, such as deer or bison, the depiction of small game hunting in prehistoric Native American art is uncommon. Examples of leporid exploitation portrayed in rock art show rabbits shot with arrows (e.g., Meighan 1966, Figures 12 and 13) and in Mimbres pottery motifs showing killed rabbits carried by humans (e.g., Mimbres Archive no. 5644 and 5645, Maxwell Museum of Anthropology, University of New Mexico).

More rare is the singular example of a rabbit drive portrayed in a prehistoric Classic Mimbres Style III bowl (Figure 1). To illustrate the rareness, this is the only rabbit drive depicted in the more than 6000 Mimbres pottery records housed in the Mimbres Archive at the Maxwell Museum of Anthropology (Archive no. 4117). More importantly, this depiction shows several characteristics typical of rabbit drives described in ethnographies from the Great Basin and Southwest nearly 900 years after its manufacture.

The vessel depicted in Figure 1 was first reported by Brody (1977, Figure 115) and used as an example of the three-dimensional aspect of some Mimbres naturalistic pottery motifs (Brody 1977). Brody identified the scene as a "rabbit hunt" but did not elaborate on the significance of the motif. The motif was painted on the inside bowl surface and has an approximate diameter of 25 cm (Brody 1977). Based on the characteristics of the naturalistic motif and multiple wide framing lines, this bowl dates to approximately A.D. 1050-1100 (Anyon and LeBlanc 1984, Lekson 1990, Shafer and Brewington 1995; Shafer and Taylor 1986).

The motif depicts four people, two leporids, three stands of grass-like plants, and a game net. The leporids resemble jackrabbits based on the morphology and coloring of the ears. Jackrabbits, such as the California or black-tailed jackrabbit (*Lepus californicus*) that is common in the Southwest, typically have much longer ears tipped in black. Cottontails possess shorter ears that are not as distinctively colored (Burt and Grossenheider 1976:201-212; Hall and Kelson 1959; Hoffmeister 1986).

Starting from the top of Figure 1 and proceeding clockwise, the first person is carrying two banana-shaped objects that appear to be throwing sticks or rabbit sticks (see Figure 2). The second person is carrying a throwing stick and a crooked pole that is apparently decorated by a tassel. Below this is a third person carrying both a throwing stick and an undecorated crooked pole (see Figure 3). The last person is carrying a crooked pole. Dotted lines across the bowl are footprints, although it is not clear if they represent human or leporid prints. The irregular figure in the center is a "kill" hole that indicates the bowl was ritually punctured before interment as an offering with a human burial (Brody 1977). This bowl, however, was documented from a private collection and no other burial data were available.

Figure 1. Interior of a Mimbres Bowl Depicting a Rabbit Drive in Progress. This Bowl is Redrawn from Mimbres Archive No. 4117 and from Brody (1977, Figure 115).

COMPARISON OF ETHNOGRAPHIC RABBIT DRIVES AND THE RABBIT DRIVE MOTIF

One particularly unique aspect of Figure 1 is the correspondence between what was documented in the motif approximately 900 years ago and ethnographic records of rabbit drives from the Great Basin and Southwest. In fact, several characteristics of ethnographic rabbit drives are represented in Figure 1. As noted above, the rabbit drive is a communal event involving several individuals to procure multiple prey. This motif shows four humans involved in the driving of two jackrabbits.

The one artifact previously used to identify possible rabbit drives in prehistory is the game net. The humans in this figure are driving the jackrabbits toward a net (see left side of Figure 1) which matches long and narrow ethnographic and archaeological game nets. Note that this net is staked to the ground. This is indicated by the straight lines that run perpendicular to the length, and protrude below the net (toward the human and rabbit figures). The use of stakes to support game drive nets was described ethnographically (Downs 1966:27; Egan 1917:236; Fowler 1989; Kroeber 1925; Steward 1938; Underhill 1941) and nets with stakes have been recovered archaeologically from cave contexts (Guernsey and Kidder 1921; Jackson 1937, Plate 33, 3; Kaemlein 1971; Martin 1933:53). Thus, the portrayal of the staked net in conjunction with the rabbit drive coincides with both ethnographic and other archaeological data.

Other tools portrayed include throwing sticks and crooked poles. The throwing stick (Figure 2) is also commonly described as a rabbit stick by researchers, but other terms used include throwing club (Judd 1954:246, Plate 12), boomerang stick (Stephen 1936), fending stick (Lambert and Ambler 1961), or missile stick (Oswalt 1976). This device was constructed from wood, usually curved, often decorated (Geib 1990; Goddard 1931; Guernsey and Kidder 1921; Haury 1950; Heizer 1942; Hudson and Blackburn 1979; Jackson 1937; Judd 1926; Kennard 1979, Figure 4; Kennedy 1832; Lambert and Ambler 1961; Parry 1872; Ritzenthaler 1967; Shafer 1986; Simpson 1961; Underhill 1944; Wormington 1956), and varied between 0.4 and 1.0 m in length (Heizer 1942; Hudson and Blackburn 1982 and references therein; Morris 1980; Ritzenthaler 1967; Wormington 1956).

The rabbit stick served both as a missile to throw at leporids or as a club to hit leporids caught in the net (Goddard 1931; Heizer 1942 and references therein; Hudson and Blackburn 1979 and references therein; Martin 1933; Palmer 1878; Shafer 1986). Numerous ethnographies described the use of clubs or sticks during rabbit drives

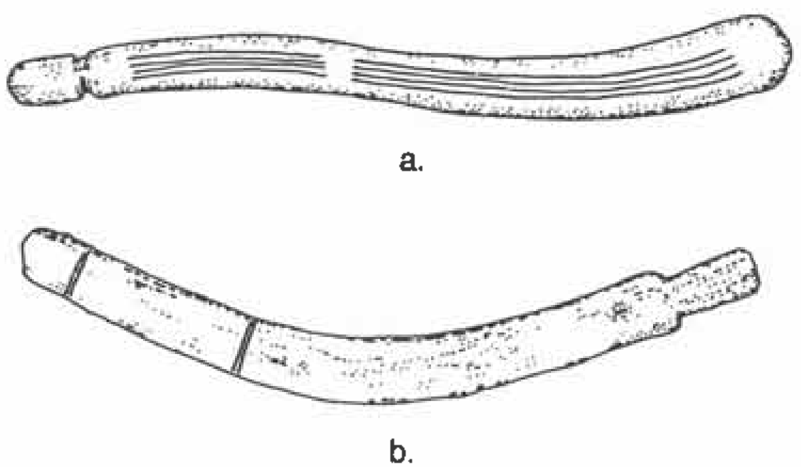

Figure 2. Throwing or Rabbit Sticks. a. is Redrawn from Wormington (1956, Figure 9e) and b. from Goddard (1931:84).

Figure 3. Examples of Hunting Crooks Redrawn from Morris (1980, Figure 90**b** and d).

(Beals 1933; Fowler 1989; Kroeber 1925; Steward 1938; Underhill 1941, 1944) and these probably were the same items described as rabbit sticks. Archaeologically, rabbit sticks have been recovered from several localities throughout the Great Basin and Southwest (e.g., Geib 1990; Heizer 1942; Hudson and Blackburn 1979; Jackson 1937; Lambert and Ambler 1961; Martin 1933; Morris 1980; Shafer 1986).

The second tool being carried by the humans is the crooked pole. Such crooked poles were referred to as "crookneck wooden staffs" by Shearin (1990) and "hunting crooks" by Mohr (1951). Similar staffs functioned historically in several manners as symbolic elements, agricultural tools (See Shearin 1990 for symbolic and agricultural uses), or as hunting tools. For hunting, the crook was described as a specialized implement used in the "low subsistence value" areas of the Southwest to exploit the limited animal resources (Mohr 1951:145). This implement, however, is not described in any of the ethnographic rabbit drives listed above. Hunting crooks consist of a branch bent in the shape of a cane or crook, ranging from approximately 0.6-2.5 m in length (Figure 3) (Hudson and Blackburn 1979; Mohr 1951).

Uses of the crook in hunting were numerous (Mohr [1951] and references therein). The curved end was used to pull apart rats' nests, to dig out rabbits, and to hook an animal and extract it from a burrow. The straight end could be used to poke the animals out of burrows, or it was entangled in the animal's hair by wetting the tip of the straight end and twisting it into the fur. Once entangled, the animal was pulled from the burrow. Lastly, the crook could be used to throw at escaping animals. Several crooks have been recovered from archaeological contexts (Guernsey and Kidder 1921, Plate 37; Kidder and Guernsey 1919; Mohr 1951; Morris 1980; Shearin 1990), but none are from Mimbres contexts. While the descriptions of crooks are infrequent in ethnographies and archaeological reports, its portrayal in Figure 1 is not unexpected. In fact, such a tool would be especially useful for extracting animals from burrows or holes during a rabbit drive.

Aside from the communal behavior, multiple prey, and use of tools, one other aspect of the rabbit drive appears to be depicted (Figure 1). The second human from the top has one hand raised to the mouth as if calling or shouting. Such behavior would be expected for flushing and driving rabbits. White (1932) described rabbit drive hunters shouting to drive rabbits. "Again the hunt chief calls out; the hunters shout; the rabbits will start up from everywhere, running blindly." This behavior would be difficult to substantiate with most archaeological evidence unless graphically portrayed, as with Figure 1.

CONCLUSIONS

In the arid regions of the Great Basin and southwestern United States where many game animals are smaller species, the rabbit drive was an important method for procuring large amounts of these small animals in a single episode. Ethnographers first recognized the economic value of this event, followed by archaeologists who often attributed archaeological leporid remains to this practice. There are few documented prehistoric archaeological examples, however, to corroborate these claims. The recovery of prehistoric game nets throughout the Great Basin and Southwest supported the hypothesis that rabbit drives were common in prehistory. These nets, however, were recovered from places of storage that provided little contextual information for net use. It is interesting to note that the arid environment of the Great Basin and Southwest that created the conditions in which rabbit drives became common, was also conducive to the preservation of biodegradable prehistoric nets undoubtedly used in rabbit drives.

Other archaeological research inferred that the rabbit drive was practiced prehistorically. The correlations between leporid frequencies and netting material from Hogup Cave (Aikens and Madsen 1986:155), high frequencies of leporid remains in burned pit features from Oregon (Aikens 1993:29; Oetting 1994), and discrepancies in element representation of leporids in California (Hudson 1994) were all used to identify prehistoric rabbit drives. What is clear from these works is that the prehistoric rabbit drive has been difficult to identify in the archaeological record. Direct prehistoric evidence for the rabbit drive is scarce, although it was documented historically as an important method for obtaining meat and hides.

Graphic prehistoric evidence for the rabbit drive comes from the Mimbres region of southwestern New Mexico (Figure 1). This Classic Mimbres bowl motif depicts a rabbit drive in progress. The explicit detail of this motif shows that the Mimbres-documented rabbit drive correlates with ethnographically documented rabbit drives of both Great Basin and Puebloan peoples. Behavioral correlations include the communal basis of the drive, the attempted procurement of multiple prey, and shouting to drive leporids. These human behaviors would be difficult to substantiate archaeologically unless they were portrayed in art work such as Figure 1. Technological correlations include the use of a long, narrow, staked game net into which the leporids were driven, the use of rabbit or throwing sticks, and the use of hunting crooks.

Although the rabbit drive has remained fairly obscure in the archaeological record, enough evidence has been gathered to document that the rabbit drive was practiced both historically and prehistorically over a wide geographic area, using essentially the same basic organizational behaviors and technologies. The 900 year-old Mimbres motif (Figure 1) clearly shows that Late Prehistoric rabbit drive tactics closely resemble historic tactics documented ethnographically for both Great Basin and southwestern peoples. Other archaeological evidence suggests that the rabbit drive used the same technologies (game nets and rabbit sticks) over a long period of time. In fact, the rabbit drive may date to as early as 8000-9000 B.P. (Aikens 1993; Oetting 1994).

ACKNOWLEDGEMENTS

Several individuals have contributed comments or provided useful information that aided in the completion of this paper. These people include Robbie Brewington, Johnny Byers, Helen Danzeiser Dockall, John E. Dockall, Jonathan C. Driver, C. Reid Ferring, Karen D. Lupo, Susan Monteleone, Julia L. J. Sanchez, Dave N. Schmitt, Harry J. Shafer, and Tom Waller. Special thanks goes to Barry W. Baker, Bryan Scott Hockett, and Jean Hudson for their timely discussions on leporid exploitation. Krisztina Kosse, who passed away unexpectantly in 1995, graciously provided assistance with the Mimbres Archives at the Maxwell Museum of Anthropology, University of New Mexico. Gerald Blow provided Figures 2 and 3.

REFERENCES CITED

Aikens, C. Melvin

1993 *Archaeology of Oregon*. U.S. Department of the Interior, Bureau of Land Management, Portland.

Aikens, C. Melvin, and David B. Madsen

1986 Prehistory of the Eastern Area. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 149-160. Handbook of North American Indians, vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Amsden, Charles Avery

1949 *Prehistoric Southwesterners from Basketmaker to Pueblo*. Southwest Museum, Los Angeles.

Anyon, Roger, and Steven A. LeBlanc

1984 *The Galaz Ruin*. Maxwell Museum of Anthropology and the University of New Mexico Press, Albuquerque.

Beals, Ralph L.

1933 Ethnology of the Nisenan. *University of California Publications in American Archaeology and Ethnography* 31:335-414.

Brody, J. J.

1977 *Mimbres Painted Pottery*. University of New Mexico Press, Albuquerque.

Burt, William H., and Richard P. Grossenheider

1976 *Peterson Field Guides Mammals*. Houghton Mifflin Company, Boston.

Castetter, Edward Franklin and Ruth M. Underhill

1935 *Ethnobiological Studies in the American Southwest: II. The Ethnobiology of the Papago Indians*. The University of New Mexico Bulletin, Albuquerque, New Mexico.

Davis, Leslie B., and John W. Fisher, Jr.

1990 A Late Prehistoric Model for Communal Utilization of Pronghorn Antelope in the Northwestern Plains Region, North America. In *Hunters of the Recent Past*, edited by Leslie B. Davis, and Brian O. K. Reeves, pp. 241-275. Unwin Hyman, Boston.

Davis, William B.

1978 *The Mammals of Texas*. Bulletin no. 41, Texas Parks and Wildlife, Austin.

Dibble, David S., and Dessamae Lorrain

1968 *Bonfire Shelter: A Stratified Bison Kill Site, Val Verde County, Texas*. Texas Memorial Museum, Miscellaneous Papers No. 1, Austin.

Downs, James F.

1966 *The Two Worlds of the Washo: An Indian Tribe of California and Nevada*. Holt, Rinehart and Winston, New York.

Driver, H. E.

1936 *Wappo Ethnography*. University of California Publications in Archaeology and Ethnology 36:179-220.

Driver, Jonathan C.

1990 Meat in Due Season: The Timing of Communal Hunts. In *Hunters of the Recent Past*, edited by Leslie B. Davis and Brian O. K. Reeves, pp. 11-33. Unwin Hyman, Boston.

Du Bois, C.

1935 *Wintu Ethnography*. University of California Publications in American Archaeology and Ethnography 36:1-148.

Egan, Howard R.

1917 *Pioneering the West, 1846-1878: Major Howard Egan's Diary*. Edited by William M. Egan. Howard R. Egan Estate, Salt Lake City.

Fowler, Catherine S.

1989 *Willard Z. Park's Ethnographic Notes on the Northern Paiute of Western Nevada, 1933-1940*, Volume 1. University of Utah Anthropological Papers No. 114 1989, University of Utah Press, Salt Lake City.

1992 *In the Shadow of Fox Peak: An Ethnography of the Cattail-Eater Northern Paiute People of Stillwater Marsh*. U.S. Department of the Interior, Fish and Wildlife Service, Cultural Resource Series No. 5. Stillwater National Wildlife Refuge, Fallon, Nevada.

Frison, George C.

1970 The Glenrock Buffalo Jump, 48CO304: Late Prehistoric Period Buffalo Procurement and Butchering. *Plains Anthropologist Memoir No. 7.*

1974 *The Casper Site: A Hell Gap Bison Kill on the High Plains*. Academic Press, New York.

1987 Prehistoric, Plains-Mountain, Large-Mammal, Communal Hunting Strategies. In *The Evolution of Human Hunting*, edited by Matthew H. Nitecki and Doris V. Nitecki, pp. 177-223. Plenum Press, New York.

Geib, Phil R.

1990 A Basketmaker II Wooden Tool Cache from Lower Glen Canyon. *Kiva* 55:265-277.

Goddard, Pliny Earle

1931 *Indians of the Southwest*. American Museum of Natural History, Handbook Series No. 2, New York.

Guernsey, Samuel James, and Alfred Vincent Kidder
1921 Basket-Maker Caves of Northeastern Arizona. *Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University*, Vol. 8, No. 2. Cambridge.
Hall, E. Raymond, and Keith R. Kelson
1959 *The Mammals of North America*, Volume I. Rold Press Company, New York.
Haury, Emil W.
1950 *The Stratigraphy and Archaeology of Ventana Cave Arizona*. University of Arizona Press, Tucson.
Heizer, Robert F.
1942 Ancient Grooved Clubs and Modern Rabbit-Sticks. *American Antiquity* 8:41-56.
Hill, W. W.
1982 *An Ethnography of Santa Clara Pueblo New Mexico*. University of New Mexico Press, Albuquerque.
Hockett, Bryan Scott
1992 Faunal Remains. In *A Gabled Wooden Lodge in an Archaeological Context: Archaeological Investigations at Sample Unit U19adPL, Nevada Test Site, Nye County, Nevada*, by Anne DuBarton, pp. 67-75. Desert Research Institute, Las Vegas.
1993 *Taphonomy of the Leporid Bones from Hogup Cave, Utah: Implication for Cultural Continuity in the Eastern Great Basin*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Nevada, Reno.
Hoffmeister, Donald F.
1986 *Mammals of Arizona*. University of Arizona Press, Tucson.
Hudson, Jean
1994 Vertebrate Remains from KER-526, KER-533, KER-1180, KER-1765, KER-3337, and KER-3339. In *Prehistoric Settlement Along the Eastern Margin of Rogers Dry Lake, Western Mohave Desert, CA*, by Brian F. Byrd, Drew Pallette, and Carol Serr, pp. 153-174. Brian F. Mooney Associates Anthropological Papers 2, San Diego.
Hudson, Travis, and Thomas C. Blackburn
1979 *The Material culture of the Chumash Interaction Sphere Volume I: Food Procurement and Transportation*. Ballena Press Anthropological Papers No. 25. Los Altos, California.
Jackson, A. T.
1937 Exploration of Certain Sites in Culberson County, Texas. *Bulletin of the Texas Archeological and Paleontological Society* 9:146-192.
Judd, Neil M.
1926 *Archeological Observations North of Rio Colorado*. Bureau of American Ethnology, Bulletin 82 Smithsonian Institution, Washington, D. C.
1954 *The Material Culture of Pueblo Bonito*. Smithsonian Miscellaneous Collections, Volume 123, Publication 4172, City of Washington.
Kaemlein, Wilma
1971 Large Hunting Nets in the Collections of the Arizona State Museum. *Kiva* 36(3):20-52.
Kennard, Edward A.
1979 Hopi Economy and Subsistence. In *Handbook of North American Indians: Southwest*, Volume 9, edited by Alfonso Ortiz, pp. 554-563. Smithsonian Institution, Washington, D. C.
Kennedy, Keith
1932 An American Indian Rabbit Stick. *Mankind* 1:136-137.
Kidder, Alfred Vincent, and Samuel J. Guernsey
1919 *Archeological Explorations in Northeastern Arizona*. Bureau of American Ethnology, Bulletin 65. Smithsonian Institution, Washington, D. C.
Kroeber, A. L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78. Smithsonian Institution, Washington, D. C.

Lambert, Marjorie F., and J. Richard Ambler
1961 *A Survey and Excavation of Caves in Hidalgo County, New Mexico*. School of American Research, Monograph No. 25, Sante Fe, New Mexico.
Lang, Richard W., and Arthur H. Harris
1984 *The Faunal Remains from Arroyo Hondo Pueblo, New Mexico: A Study in Short-Term Subsistence Change*. Arroyo Hondo Archaeological Series, Volume 5. School of American Research Press, Sante Fe.
Lekson, Stephen H.
1990 *Mimbres Archaeology of the Upper Gila, New Mexico*. The University of Arizona Press, Tucson.
Martin, George C.
1933 The Big Bend Basket Maker. In *Southwest Texas Archaeological Society, Big Bend Basket Maker Papers*, Bulletin 3. Witte Memorial Museum, San Antonio.
McLendon, Sally
1977 *Ethnographic and Historical Sketch of the Eastern Pomo and Their Neighbors, the Southeastern Pomo*. Contributions of the University of California Archaeological Research Facility, No. 37, Berkeley.
Meighan, Clement W.
1966 Prehistoric Rock Paintings in Baja California. *American Antiquity* 31:372-392.
Mohr, Albert
1951 The Hunting Crook: Its Use and Distribution in the Southwest. *The Masterkey* 25:145-154.
Morris, Elizabeth Ann
1980 *Basketmaker Caves in the Prayer Rock District, Northeastern Arizona*. Anthropological Papers of the University of Arizona, No. 35. University of Arizona Press, Tucson.
Oetting, Albert C.
1994 Early Holocene Rabbit Drives and Prehistoric Land Use Patterns on Buffalo Flat, Christmas Lake Valley, Oregon. In *Archaeological Researches in the Northern Great Basin: Fort Rock Archaeology Since Cressman*, edited by C. Melvin Aikens and Dennis L. Jenkins, pp. 155-169. University of Oregon Anthropological Papers No. 50, Eugene.
Olsen, John W.
1990 *Vertebrate Faunal Remains from Grasshopper Pueblo Arizona*. Anthropological Papers No 83. Museum of Anthropology, University of Michigan, Ann Arbor.
Oswalt, Wendell H.
1976 *An Anthropological Analysis of Food-Getting Technology*. John Wiley & Sons, New York.
Palmer, Edward
1878 Notes on Indian Manners and Customs. *American Naturalist* 12:308-313.
Parry, C. C.
1872 On a Form of the Boomerrang in Use Among the Mogui-Pueblo Indians of North America. *American Association for the Advancement of Science* 20:397-400.
Ritzenthaler, Robert E.
1967 Hopi Rabbit Hunt. *Lore* 17:100-104.
Sanchez, Julia L. J.
1996 A New View of Mimbres Faunal Subsistence. *Kiva* 61:295-307.
Shafer, Harry J.
1986 *Ancient Texans: Rock Art & Lifeways Along the Lower Pecos*. Gulf Publishing Co., Houston.
Shafer, Harry J., and Robbie L. Brewington
1995 Microstylistic Changes in Mimbres Black-On-White Pottery: Examples from the NAN Ruin, Grant County, New Mexico. *Kiva* 61:5-29.
Shafer, Harry J., and Anna J. Taylor
1986 Mimbres Mogollon Pueblo Dynamics and Ceramic Style Change. *Journal of Field Archaeology* 13:43-68.

Shaffer, Brian Sawyer
1991 *The Economic Importance of the Vertebrate Faunal Remains from the NAN Ruin (LA 15049), A Classic Mimbres Site, Grant County, New Mexico.* Unpublished M.A. thesis, Department of Anthropology, Texas A&M University, College Station.

Shaffer, Brian S., and Christopher P. Schick
1995 Environment and Animal Procurement by the Mogollon of Southwest. *North American Archaeologist* 16:117-132.

Shearin, Nancy L.
1990 A Crookneck Wooden Staff from San Juan County, Utah. *Utah Archaeology* 3:111-122.

Simms, Steven R.
1987 *Behavioral Ecology and Hunter-Gatherer Foraging: An Example from the Great Basin.* BAR International Series 381, Great Britain.

Simpson, Lesley, ed.
1961 *Journal of Jose Longinos Martinez: Notes and Observations of the Naturalist of the Botanical Expedition in Old and New California and the South Coast 1791-1792.* John Howell Books, San Francisco.

Speck, Frank G., and Claude E. Schaeffer
1950 The Deer and the Rabbit Hunting Drive in Virginia and the Southeast. *Southern Indian Studies* 2:3-20.

Spier, Leslie
1928 *Havasupai Ethnography.* Anthropological Papers of the American Museum of Natural History 29:83-392.

Steele, D. Gentry, and Barry W. Baker
1993 Multiple Predation: A Definitive Human Hunting Strategy. In *From Bones to Behavior: Ethnoarchaeological and Experimental Contributions to the Interpretation of Faunal Remains*, edited by Jean Hudson, pp. 9-37. Center for Archaeological Investigations, Occasional Paper No. 21. Southern Illinois University, Carbondale.

Stephen, Alexander M.
1936 *Hopi Journal of Alexander M. Stephen*, edited by Elsie Clews Parsons, Part I. Columbia University Press, New York.

Steward, Julian H.
1938 *Basin-Plateau Aboriginal Sociopolitical Groups.* Bureau of American Ethnology, Bulletin 120. Smithsonian Institution, Washington, D. C.

Szuter, Christine R.
1991a Hunting by Hohokam Desert Farmers. *Kiva* 56:277-289.
1991b *Hunting by Prehistoric Horticulturalists in the American Southwest.* Garland Publishing Company, New York.

Szuter, Christine R., and Frank E. Bayham
1989 Sedentism and Prehistoric Animal Procurement Among Desert Horticulturalists of the North American Southwest. In *Farmers as Hunters: The Implications of Sedentism*, edited by Susan Kent, pp. 80-95. Cambridge University Press, New York.

Underhill, Ruth
1941 *The Northern Paiute Indians of California and Nevada.* Sherman Pamphlets No. 1. Haskell Institute Printing Department, Lawrence, Kansas.

Underhill, Ruth
1944 *Pueblo Crafts.* U.S. Bureau of Indian Affairs.

Wheat, Margaret M.
1967 *Survival Arts of the Primitive Paiutes.* University of Nevada Press, Reno.

White, Leslie A.
1932 The Acoma Indians. *Forty-seventh Annual Report of the Bureau of American Ethnology.* Smithsonian Institution, Washington, D.C.

Wormington, H. M.
1956 *Prehistoric Indians of the Southwest*, 3rd edition. Denver Museum of Natural History, Popular Series No. 7, Denver.

Figure 11 from DeVed and DeVed article, this volume.

SITE 42SA22396: A PREHISTORIC HOE PROCUREMENT SITE ON BIG BENCH, SOUTHERN SAN JUAN COUNTY, UTAH

William E. Davis, Abajo Archaeology, P.O. Box 100, Bluff, Utah 84512

Keith R. Montgomery, Archaeological Consultant, P.O. Box 147, Moab, Utah 84532

Investigations have been conducted on the lithic technology and geological chemical composition and distribution of a particular artifact assemblage located on Big Bench, southern San Juan County, Utah. Current research at Site 42Sa22396 demonstrates that a tuffaceous silty claystone with accretionary lapilli, occurring in the Jurassic Morrison Formation, was the preferred material for the production of an specialized type of prehistoric hoe.

INTRODUCTION

Site 42Sa22396 is located on Big Bench, in southeastern San Juan County, approximately 11 miles north of Bluff, Utah. The area known as Big Bench is a broad erosional bench, the caprock of which is the uppermost sandstone in the Westwater Member of the Morrison Formation. Big Bench is relatively flat, occurs immediately south of White Mesa Hill, and is separated from the Bluff Bench to the south by a narrow erosional "neck." In this locality, previous researchers have documented prehistoric quarries that contain a particular hard rock that appeared to be well-suited for the manufacture of large unifacial and bifacial tools (Berge 1983, Bond 1993, and Westfall 1989). Tool types manufactured from this stone have been described as large convex end scrapers and cores (Berge 1983:86,93, Figures 38 and 39b,c), large bifacial choppers (Harden 1984:18) and test cores (Bond 1993:59). Furthermore, past researchers on Big Bench describe the quarrystone as basalt (Berge 1983:238), grayish green oolitic silicified siltstone (Bond 1993:59) or chert-like siliceous greenish-gray mudstone (Montgomery 1994:23-24).

Current archaeological research at Site 42Sa22396, supplemented by on-going geological investigations at a nearby prehistoric quarry site (42Sa20971) has revealed new data on the aboriginal use and procurement strategy, along with the geological chemical makeup and distribution, of this lithic tool source. Technological and morphological analyses of the artifact assemblage at Site 42Sa22396 indicate that this particular lithic tool source on Big Bench was selected for the manufacture of hoes. The analyses also recognize that the hoes were being manufactured through a four stage production sequence. This production data suggests that the unifacial and bifacial tools described by past researchers on Big Bench are, for the most part, hoes reflecting different stages of production. Formerly described end scrapers exhibit, besides their large size (+16 cm. in length), initial notch concavities and a beveled distal working edge comparable to the blade of a hoe. Likewise, the large bifacial choppers and cores display similar technological attributes analogous to different hoe production stages.

UTAH ARCHAEOLOGY, 8(1), 1995,
pp. 27-39

Geological investigations of the mineralogy of the quarrystone indicates that the lithic tool source is a tuff, or more precisely, a tuffaceous silty claystone with accretionary lapilli. This rock unit commonly exhibits rather large (2-6 mm. in diameter) circular to elliptical sedimentary structures that have been misidentified as "oolitic" in origin (Stevenson, In Westfall et al., 1996).

GEOLOGICAL INVESTIGATION

In conjunction with a highway data recovery project on Big Bench, sponsored by the Utah Department of Transportation (Westfall et al., 1996), geological investigations are presently in progress on an archaeological quarry site located approximately one kilometer southeast of Site 42Sa22396. The purpose and scope of this investigation was to identify the nature of the lithic materials available at the prehistoric quarry site 42Sa20971, and to compare to other probable source outcrops in the vicinity (Westfall and Davis 1994:31-32). The work is being conducted by Gene M. Stevenson, a private consulting geologist from Bluff, Utah. His preliminary findings are as follows...

> Stratigraphically, the lithic quarrystone found on Big Bench occurs near the base of the Brushy Basin Member of the Morrison Formation, overlying the uppermost sandstone of the Westwater Member by three to four meters. The quarry bed is thin, averaging only 10-12 cm. in thickness, and forms a pavement of highly fractured, rectangular blocks, ranging from 30 to 60 cm. in length and width.
>
> Thin section petrographic analyses, as well as bulk and clay mineralogy through X-Ray Diffractometry of the quarrystone at Site 42Sa20971 reveals the lithic source material is a tuffaceous silty claystone with accretionary lapilli. Accretionary lapilli are defined as small spherical masses between 2-10 mm. in diameter, composed of concentrically layered volcanic ash or fine rock fragments. They are formed chiefly through accretion by condensed moisture, and accumulating only in shallow water (Williams and McBirney 1979:131).
>
> The tuffaceous silty claystone commonly exhibits a nonlusterous, light to medium gray-green color on a fresh surface, and weathers to a dark green, brown, or black. Accretionary lapilli typically weather such that the "inner core" of the ellipse is darker that the "outer ring," giving the rock a very distinctive "spotted" texture and thus quite recognizable.
>
> In an attempt to trace the regional extent of this lithological unit, a sample site was chosen in McElmo Canyon, Colorado, approximately 30 miles east of the Big Bench area where a similar rock type occurs in the same stratigraphic interval of the Brushy Basin Member of the Morrison Formation. Samples were also taken from debitage at Site 42Sa22396 and from three other outcrops on Big Bench. Analysis of the samples revealed that the McElmo Canyon sample is distinctively different than those from Big Bench in that the rock is coarser grained in authigenic clay mineralogy. All samples from the Big Bench area are classified as tuffaceous silty claystone, but differ in several ways; 1) not all of them have accretionary lapilli facies, and 2) they all differ slightly in clay mineralogies. The sample from Site 42Sa22396 is classified as tuffaceous silty, chloritic claystone with large (3-5 mm. diameter) accretionary lapilli (Stevenson, In Westfall et al., 1996).

These minute differences in clay mineralogies and presence or absence of accretionary lapilli and other vitroclastic textures can be used as a baseline to identify stone tools quarried from the Big Bench area in particular, and from the Brushy Basin Member in general. Additionally, by recognizing the mineralogy of the hoes produced at Site 42Sa22396, we should be able to determine travel and transport routes of these tools.

SITE 42SA22396

The site area occurs on and downslope of a series of low east/west trending ridges and lies at an approximate elevation of 1537 m. asl. The site area, as defined by the scatter of artifacts, measures 487 m. from north to south by 353 m. east to west and encompasses approximately 17 ha. (Figure 1). The surface of the site consists of a thin desert pavement capped with a patchy veneer of highly fractured, rectangular blocks of tuffaceous silty claystone, ranging from 20 to 60 cm in length and width.

Nineteen lithic concentrations were identified, which include aspects of both lithic quarrying and tool manufacturing reduction strategies. The artifact density within the concentrations varied from 3.56 to 20.25 artifacts per square meter and most of these concentrations include at least a few discarded tools. A total of 663 lithic tools were documented and include three bifaces, three notched pieces, seven scrapers, 14 choppers, 27 hammerstones, 28 retouched/utilized flakes, 162 hoes, 180 test cores and 239 cores. A small number of Mesa Verde Tradition ceramic sherds were observed though they may not be directly associated with the lithic assemblage. The sherds include two gray ware corrugated body sherds of general Pueblo II/III period affiliation and one Mancos Corrugated rim sherd affiliated with the middle Pueblo II period.

The material types represented in the lithic tool assemblage consist of tuffaceous silty claystone (95%), quartzite (3%), chert (1.5%) and chalcedony (.5%). The off-site lithologies are almost exclusively represented by bifaces, scrapers, retouched/utilized flakes and hammerstones.

HOES

A total of 162 hoes representing different stages of reduction were documented at Site 42Sa22396. All were manufactured from tuffaceous silty claystone. The finished hoes are bifacially flaked, display two opposing lateral notches near the midpoint of the tool and, in lateral cross-section, generally exhibit a thick, blunt proximal poll and a beveled distal blade (i.e., as defined here, blade is the working edge of the hoe). On the average, the hoes are 19 cm. long (Range: 11 to 30 cm.), 9 cm. wide and 5 cm. thick.

The majority (n=124, 78%) of the hoes appear to have been reduced from large flake blanks and show some evidence of the original flake platform, longitudinal flake curve, positive bulb of percussion, and dorsal cortex. The other hoes were reduced from core blanks. The main criterion for selection appears to be a large, elongated, ovate to tabular form.

Analysis of the hoe assemblage indicates that over 75% of these specimens are production rejects discarded during manufacture. Less than 25% of the hoe assemblage are fragments. No use-wear was observed on any of the specimens.

All hoes were subjected to technological and morphological analysis. A four stage production sequence was recognized after the initial inspection of the collection. Although intended to represent an exemplary hoe reduction sequence, not all stages are necessary for tool production. During hoe manufacture some stages can be omitted, or breakage may require returning to an earlier stage in order to flake the specimen back into a suitable symmetric shape. Also, although notch formation appears to occur prior to the final margin regularization in the majority of the analysed specimens, a few specimens indicate that this is not necessary and the implement form can be regularized into a symmetrical form prior to notch formation. Morphological descriptions for each stage is outlined below and hoe attribute measurements are presented in Table 1.

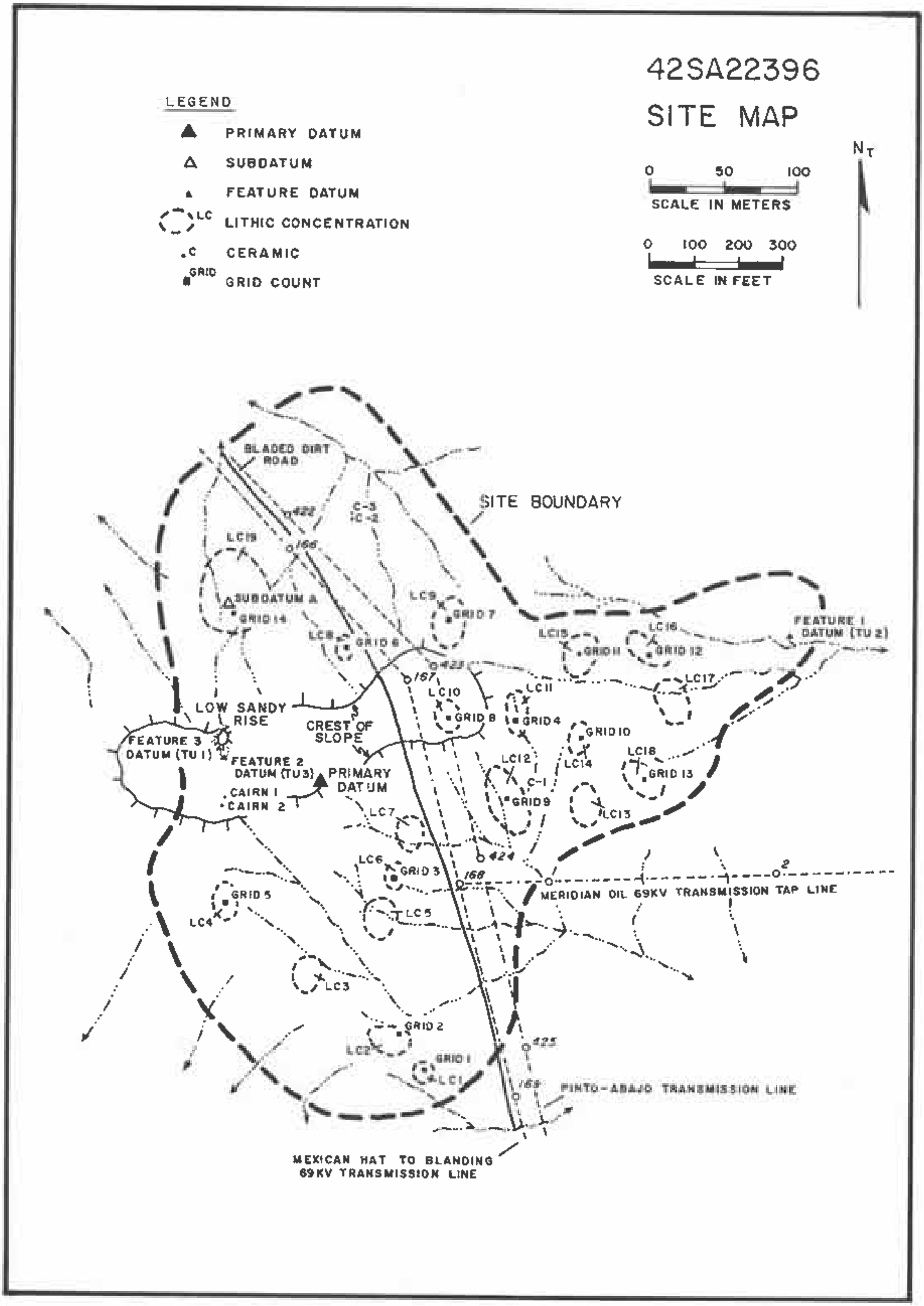

Figure 1. Site 42Sa22396, site map.

Stage 1 Hoes (n=14)

Evidence of the original blank is present (unretouched surface of flake or chunk) and primary retouch flake scars are present on at least one side of the specimen (Figure 2). Overall object shape is somewhat variable although all are elongated forms.

Stage 2 Hoes (n=41)

All exhibit some evidence of initial unifacial and/or bifacial lateral margin regularization by hard-hammer percussion (Figure 3). Flaking is generally coarse with little, if any, platform preparation. Some initial shaping of distal bit/blade and proximal pole positions is evident. Two of the implements exhibit mid-lateral perverse manufacturing fractures.

Stage 3 Hoes (n=68)

Stage 3 is defined by evidence of notch formation by either unifacial or bifacial hard hammer percussion on one or more lateral margins (Figure 4). The location of the notch occurs at the thickest lateral cross-section, which usually corresponds to the lateral midpoint of the specimen. Continual but selected hard-hammer margin regularization improves the overall elongated shape of the implement. Steep unifacial retouch occurs on the dorsal face of the blade with little reduction on the poll of the hoe. Fifteen of the implements exhibit mid-lateral perverse fractures. The fragments reveal that the perverse fracture began at or near one of the notches indicating breakage during the notch formation process.

Stage 4 Hoes (n=39)

Stage 4 hoes exhibit notches which are finished by controlled percussion reduction resulting in extensive step fractures and edge crushing along their interior surfaces (Figure 5). This abrasion/crushing process produces a blunt, relatively smooth notch concavity. Average width at the notch is 7.48 cm. The overall shape of the hoe is relatively regular and symmetrical with some variability of the blade margin outlines and poll configuration. These implements appear to be finished tools ready to be hafted. As with Stage 3 hoes, perverse fractures originating at or near the notches account for production breaks (n=11).

DISCUSSION

In Woodbury's "Prehistoric Stone Implements of Northeastern Arizona" (1954:25 and 166), both hoes and axes are defined as tools shaped partly or wholly by grinding, with a broad blade that is relatively thin and sharp edged." Woodbury also describes "tcamahia," a type of hoe common to the San Juan-Mesa Verde region, as ground or polished blades of hard, fine-grained stone, tapering from a narrow butt to a broad, thin cutting edge (1954:167). He concludes that these artifact types are distinguished by a tremendous variety of form, size, and manufacturing technique, but the common characteristic is a beveled edge suitable for cutting, chopping or digging (1954:166). Their multi-purpose use is further described by Kidder (1932:53) who mentioned at Pecos that after hafted hoes/axes were too dull to be used for chopping or digging, they were often put to use as hafted hammers.

In the archaeological literature, artifacts from San Juan County exhibiting morphological and stylistic attributes

Table 1a. Hoe Attributes (all measurements are in centimeters)

	LENGTH (Major axis)					WIDTH (Minor axis)					THICKNESS				
STAGE	Range	Mean	Variance	Standard Dev.	N=	Range	Mean	Variance	Standard Dev.	N=	Range	Mean	Variance	Standard Dev.	N=
1 (n=14)	14.0 - 22.0	18.61	5.43	2.33	14	6.0 - 12.5	9.11	3.43	1.85	14	3.0 - 8.0	5.00	1.54	1.24	14
2 (n=41)	12.0 - 30.0	18.85	17.35	2.03	39	6.0 - 15.0	9.28	4.13	2.03	41	2.5 - 10.0	5.34	2.42	1.56	41
3 (n=68)	11.0 - 30.0	18.50	15.38	3.92	53	5.5 - 14.5	9.51	4.11	2.03	68	2.0 - 9.0	5.09	2.51	1.59	68
4 (n=39)	12.5 - 30.5	19.01	15.21	3.90	34	5.5 - 15.5	9.79	6.06	2.46	39	2.5 - 7.0	4.79	1.02	1.01	39

Table 1b. Hoe Attributes - Stage 3 and Stage 4 with additional measurements (all measurements are in centimeters)

	BLADE LENGTH					WIDTH AT NOTCH				
STAGE	Range	Mean	Variance	Standard Dev.	N=	Range	Mean	Variance	Standard Dev.	N=
3 (n=68)	5.5 - 19.00	9.05	9.86	3.14	55	4.7 - 13.1	7.93	2.70	1.64	61
4 (n=39)	4.5 - 19.00	8.65	7.37	2.71	36	4.3 - 13.2	7.48	3.59	1.90	39

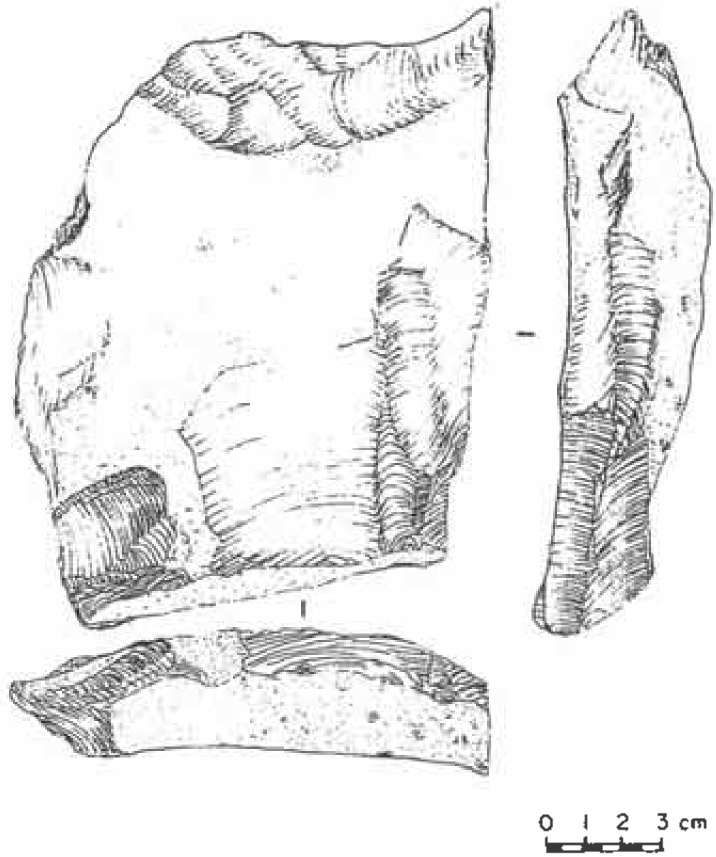

Figure 2. Site 42Sa22396, Stage 1 Hoe, Specimen No. 316.

similar to those described at Site 42Sa22396 have been reported from Mesa Verde Anasazi Tradition sites at Hovenweep (Winter 1976:112), Montezuma Canyon (Harmon 1979:85 and Patterson 1975:136), Alkali Ridge (Brew 1946:239), Recapture Reservoir (Thompson 1985:13-76), White Mesa (Davis 1983:266) and Butler Wash (Nickens 1977:102). Similar artifacts have also been described from Colorado in Bodo Canyon, La Plata County (Fuller 1988:262) and south of the city of Durango (Hand 1980:75). With the exception of Davis (1983:266) and Hand (1980:75) who called the artifacts "hoes," the majority of these artifacts were classified as axes. All were made from cores or large flake blanks and exhibit pecked notches. In addition, none of the blades were modified by grinding. Based on a relatively small population of 23, the average dimensions of the artifacts are 21 cm. long, 9 cm. wide and 6 cm. thick. The mean length of this artifact is nearly double that of axes described by Brew on Alkali Ridge (1946: 232-238). On the other extreme, Nickens (1977:102) describes a similar tool that is 32 cm. long, 13 cm. wide and weighs 2.3 kg. (5 lbs). He ponders that although the blade use and notching indicate a hafted, chopping function, the size and weight of this tool far exceeds similar dimensions of other axes and causes one to wonder about the exact nature of its use (1977:102).

Stylistically, it is often difficult to distinguish between hoes and axes of equal size. However, the functional difference between the two may sometimes be observed in the wear patterns. Polished and dulled flake scars, such as those found on the blade of hoes, are due to the abrasive action of hoeing and contrast with the battered step

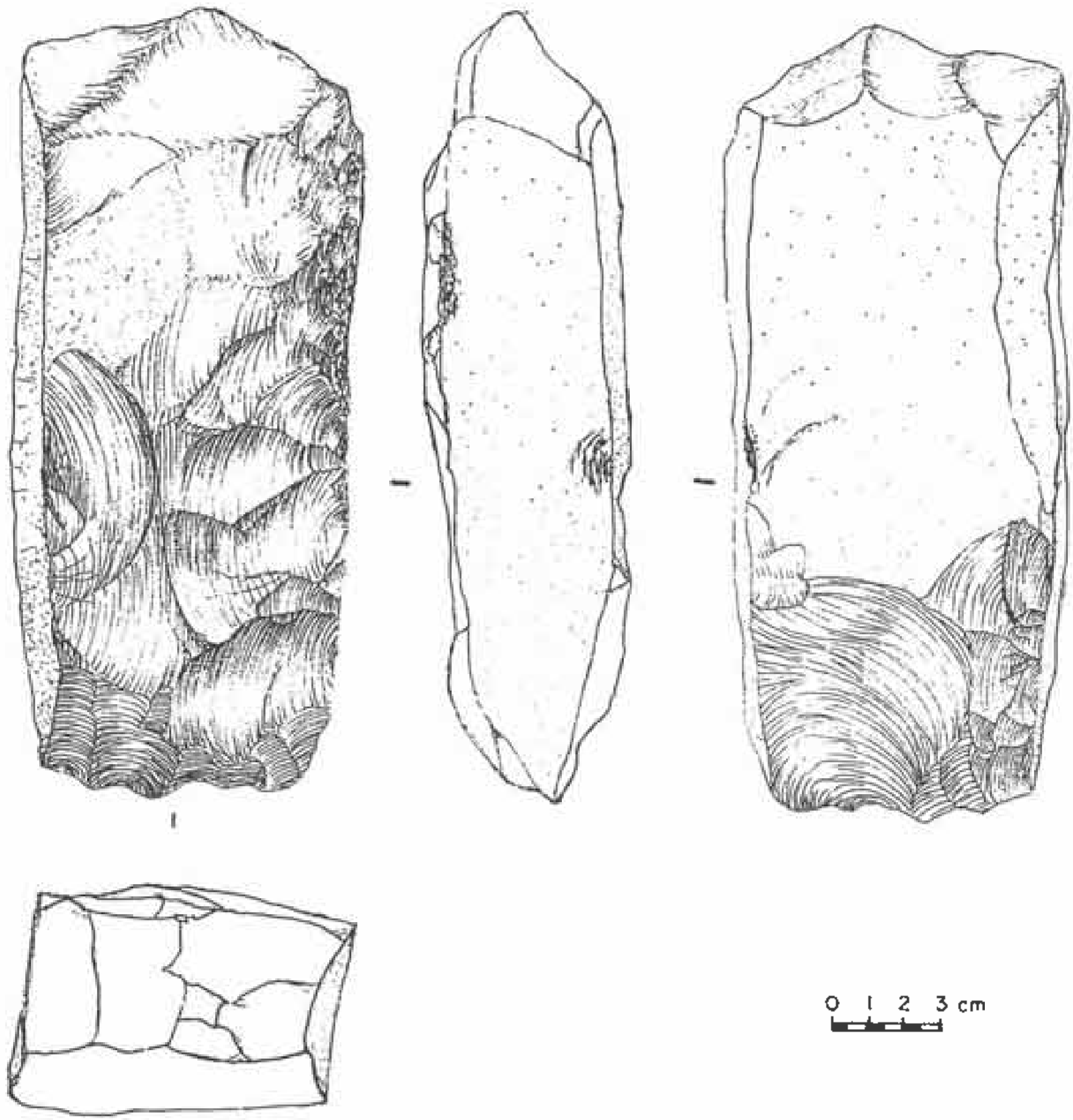

Figure 3. Site 42Sa22396, Stage 2 Hoe, Specimen No. 361.

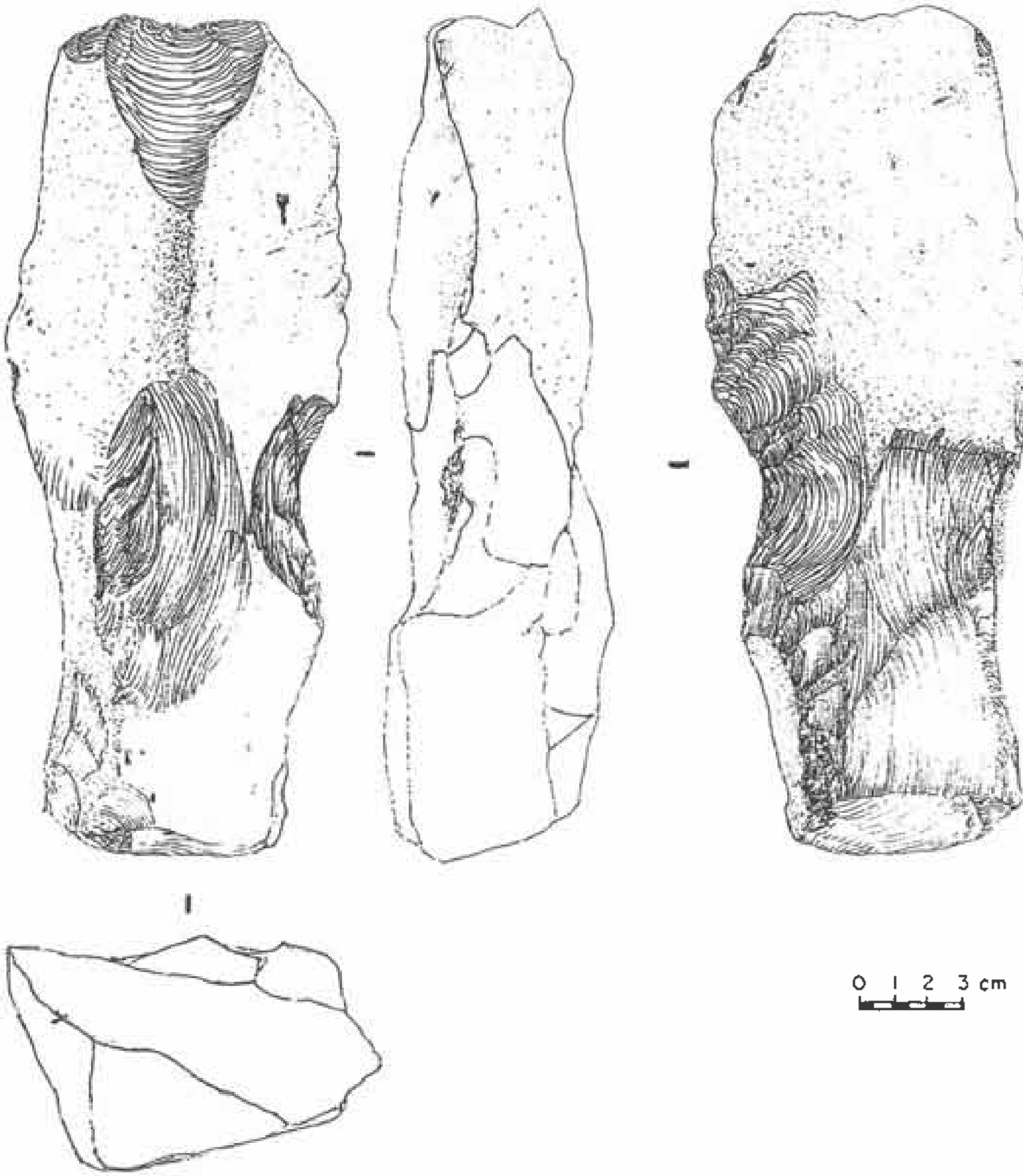

Figure 4. Site 42Sa22396, Stage 3 Hoe, Specimen No. 358.

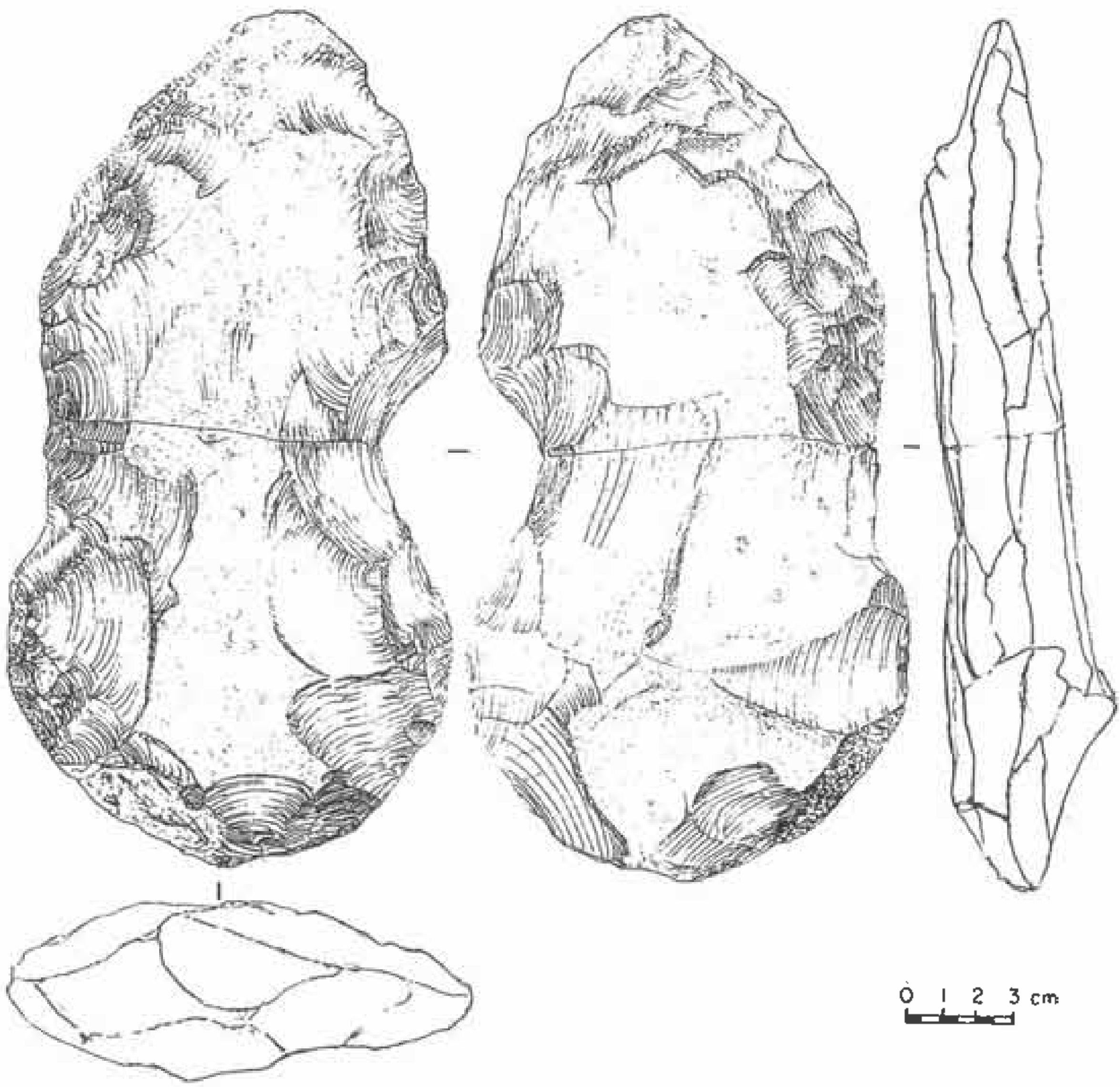

Figure 5. Site 42Sa22396, Stage 4 Hoe, Specimen No. 270 and 271.

fractures on axes (Hand 1980:75). Five hoes from White Mesa morphologically identical to those from Site 42Sa22396, display striations and wear polish at right angles to the blade indicating a drawing motion for use (Davis 1983:266). These artifacts probably functioned as agricultural and/or excavation implements (Davis 1983:266). Until detailed microscopic edge wear analysis has been conducted on a large sample of utilized tools morphologically similar to those from Site 42Sa22396, these artifacts will be referred to as "hoes."

The lithic material type descriptions for the sample population include basalt, unknown igneous, quartzite cobbles, coarse dark green chert and coarse green quartzite. The latter two material descriptions are from artifacts recovered from excavations at White Mesa (Davis 1983:266) and from Recapture Reservoir (Nielson et al. 1985:12-76). Visual inspection of these tools, curated at the Edge of the Cedars Museum, Blanding, Utah, revealed that the lithic material is a tuffaceous silty claystone. Furthermore, two of the tools exhibit a distinctive "spotted" texture identical to accretionary lapilli facies described on Big Bench (Stevenson, In Westfall et al., 1996).

SUMMARY

A predictable and mappable lithology has been recognized on Big Bench, southeastern San Juan County, Utah that appears to have been a selected quarrystone for the manufacture of an unusual and specialized type of prehistoric tool. The localized quarrystone is interpreted as a tuffaceous silty claystone with accretionary lapilli. As demonstrated at Site 42Sa22396, this lithic material was considered to be well-suited for the manufacture of large, notched, bifacially flaked hoes.

An assemblage of 162 hoes depicting different stages of tool production was identified at Site 42Sa22396. A four stage hoe reduction sequence was identified and was used to explain the technological variations present in the hoe production assemblage. This production model revealed that the primary goal in the hoe production sequence was to produce a symmetrical bifacially flaked elongated tool that averaged 19 cm. in length and exhibited a thick, blunt proximal poll and a beveled distal blade. Hoes that did not meet the above criteria were discarded, thus accounting for 75% of the assemblage at the site. It is unknown why 25 of the Stage 4 "finished" hoes were left at the site. It is possible that both hoes and axe blanks were produced at the site and that the axe blanks that otherwise look like small finished hoes were discarded because their flaking morphology was non-conducive to complete final bit/blade grinding.

Though sparsely reported in the archaeological record, this tool type appears on Mesa Verde Anasazi Tradition sites in southeastern Utah and southwestern Colorado. Hoes manufactured from tuffaceous silty claystone with distinct accretionary lapilli facies have been identified from a Basketmaker III site on White Mesa (Davis 1983) and from a Pueblo II site on Recapture Reservior (Nielson et al. 1985), approximately 15 and 28 kilometers north of Site 42Sa22396, respectively. Although awaiting verification through further detailed geologic analysis, there is a strong possibility that hoes produced at Site 42Sa22396 are linked to a more widespread system of deliberate procurement and exchange.

ACKNOWLEDGEMENTS

Research work at 42Sa22396 was supported by San Juan County as part of the proposed San Juan County Landfill Project. The authors would like to thank reviewers Mark Bond, David Breternitz, Steve Fuller, Phil Geib, OD Hand, Winston Hurst, Roger Moore, Alan Reed and Jonathan Till for their comments and advice. Gene Stevenson and

Deborah Westfall are acknowledged for permission to use unpublished data cited in this report. We would also like to thank Todd Prince, Curator at the Edge of the Cedars Museum, Blanding for providing access to the collections. Several other individuals who merit recognition are Joe Pachak, Bluff, Utah and Nancy Lamm, Olathe, Colorado, whose fine-quality artifact drawings and maps make up an important part of this paper.

REFERENCES CITED

Berge, Dale L.

1983 *Archaeological Investigations of the Pinto-Abajo Transmission Line, San Juan County, Southeastern Utah.* Brigham Young University Museum of Peoples and Cultures Technical Series No.84-87. Provo, Utah.

Bond, Mark C.

1993 *Archaeological Investigations Along the Utah Department of Transportation's U.S. Highway 191 Improvements Project Right-of-way: Cow Canyon to State Route 262, San Juan County, Utah.* Abajo Archaeology, Bluff, Utah. Submitted to Environmental Studies Section, Utah Department of Transportation, Salt Lake City.

Brew, John Otis

1946 *Archaeology of Alkali Ridge, Southeastern Utah.* Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. 21. Cambridge, Massachusetts.

Davis, William E.

1985 *Anasazi Subsistence and Settlement on White Mesa, San Juan County, Utah.* University Press of America, Lanham, Maryland.

Fuller, Steven L.

1988 *Archaeological Investigations in the Bodo Canyon Area, La Plata County, Colorado.* UMTRA Archaeological Report 25. Complete Archaeological Services Associates, Cortez, Colorado.

Hand, O D

1980 Ground Stone Tools. In *The Durango South Project. Archaeological Salvage of Two Late Basketmaker III Sites in the Durango District,* John D. Gooding, editor. University of Arizona Press, Tucson.

Harden, Patrick L.

1984 An Archaeological Survey of the Norpac Exploration Service Cowboy Prospect Geophysical Project, Southeastern San Juan County, Utah. Ms. on file with the Bureau of Land Management, San Juan Resource Area, Monticello, Utah.

Harmon, Craig B.

1979 *Cave Canyon Village: The Early Pueblo Components.* Brigham Young University, Department of Anthropology and Archaeology New Series No. 5. Provo, Utah.

Kidder, Alfred V.

1932 *The Artifacts of Pecos.* Yale University Press, New Haven

Montgomery, Keith R.

1994 *Cultural Resource Inventory and Evaluation of the Proposed White Mesa Sanitary Landfill Project Area, San Juan County, Utah.* Abajo Archaeology, Bluff, Utah. Submitted to Environmental Studies Section, Utah Department of Transportation, Salt Lake City.

Nickens, Paul R.

1977 *Wood Rat Knoll: A Multicomponent Site in Butler Wash, Southeastern Utah.* Department of Anthropology, University of Denver.

Nielsen, Asa S., Joel C. Janetski, and James D. Wilde

1985 *Final Recapture Wash Archaeological Project 1981-1983, San Juan County, Utah.* Brigham Young University, Museum of Peoples and Cultures Technical Series No. 85-7. Provo, Utah

Patterson, Gregory R.

1975 A Preliminary Study of an Anasazi Settlement (42Sa971) Prior to A.D. 900 in Montezuma Canyon, San Juan County, Southeastern Utah. Master's thesis, Department of Anthropology, Brigham Young University, Provo, Utah.

Stevenson, Gene M.

1996 *Geological Investigation of Archaeological Quarry Site 42Sa20971, Big Bench, Utah. In Westfall: Archaeological Investigations at Sites 42Sa17725 and 42Sa20971 on Big Bench, Utah Department of Transportation, U.S. Highway 191 Improvement Project, Cow Canyon to Junction of State Route 262, San Juan County, Utah*. Abajo Archaeology, Bluff, Utah. Submitted to Environmental Studies Section, Utah Department of Transportation, Salt Lake City.

Thompson, Charmaine

1985 Ground Stone and Miscellaneous Lithic Tools. In *Final Recapture Wash Archaeological Project 1981-1983, San Juan County, Utah*. Brigham Young University, Museum of Peoples and Cultures Technical Series No. 85-7. Provo, Utah.

Westfall, Deborah A.

1989 *Cultural Resource Inventory of the Utah Power and Light Company Mexican Hat to Blanding 69kv Transmission Line Tap to Meridian Oil, San Juan County, Utah*. Abajo Archaeology, Bluff, Utah. Submitted to the Environmental Services Section, PacificCorp Utah Power, Salt Lake City.

Westfall, Deborah A. and William E. Davis

1994 *A Technical Proposal for Archaeological Data Recovery at Sites 42Sa17725 and 42Sa20971, U.S.191: Cow Canyon to Junction S.R.262, San Juan County, Utah*. Abajo Archaeology, Bluff, Utah. Submitted to Environmental Studies Section, Utah Department of Transportation, Salt Lake City.

Westfall, Deborah A., Nancy B. Lamm, Roger Moore, and Gene Stevenson

1996 *Archaeological Investigations at Sites 42Sa17725 and 42Sa20971 on Big Bench, Utah Department of Transportation, U.S. Highway 191 Improvement Project: Cow Canyon to Junction of State Route 262, San Juan County, Utah*. Abajo Archaeology, Bluff, Utah. Submitted to Environmental Studies Section, Utah Department of Transportation, Salt Lake City.

Williams, H. and A.R. McBirney

1979 *Volcanology*. Freeman, Cooper and Company, San Francisco.

Winter, Joseph C.

1977 Hovenweep 1976. Archaeological Report No. 3, San Jose State University. San Jose, California.

Woodbury, Richard B.

1954 *Prehistoric Stone Implements of Northeastern Arizona*. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol 24. Cambridge.

Figure 17 from DeVed and DeVed article, this volume.

THE PREHISTORIC BASKETS FROM THE LEO C. THORNE COLLECTION, PART 2

C. Lawrence DeVed, 122 South Vernal Avenue, Vernal, Utah 84078

Rhoda Thorne DeVed, 122 South Vernal Avenue, Vernal, Utah 84078

Editor's Note: The following descriptions and accompanying photographs of baskets from the Leo Thorne collection by C. Lawrence and Rhoda Thorne DeVed are an important contribution to knowledge of basketry from in and around the Uinta Basin. Archaeologists have known about the collection for some time and have been anxious to learn more about the extraordinarily diverse basketry. Part 1 of the article is published in the 1994 issue of Utah Archaeology.

THE COLLECTION

Leo Thorne realized in the early 1920's that if someone did not gather together and care for the things being uncovered by people, valuable material would be lost or destroyed. He began to acquire artifacts as they became available and included them in his own collection which was displayed in his photographic studio on South Vernal Avenue.

In the early 1930's, Albert Reagan, then working for the Indian Department at Fort Duchesne, employed Mr. Thorne as photographer and general assistant during the two seasons he worked in the Ashley-Dry Fork area. He made the first systematic record of the rock art of the canyons as well as investigating many dry overhang sites and recording the artifacts collected, which is what most field workers were doing at that time.

At that time, Mr. Thorne also had a limited correspondence with the staff at the Carnegie Museum in Pittsburgh and the Peabody Museum at Harvard University regarding the significance of artifacts that were in his possession.

The Vernal City Office was moved to the 18 West Main location in the 1940's and Mr. Thorne was asked to place his collection there so it would be more accessible to the public. The Lions Club had cases built and the collection was moved there in 1943 or 1944. When the city office was moved to larger quarters in the 1950's, Mr. Thorne moved his studio into the building. The collection continued to grow and is now composed about equally of things Mr. Thorne was in some way instrumental in finding, and material which others had given or sold to him.

The present project, of which this paper is the first part, was to prepare a photographic catalogue and description of the collection before it was moved or broken up. The collection was moved to the Uintah County Heritage Museum in the Western Park complex located in Vernal, Utah, for permanent display in May 1994. We are sorry to give up personal custodianship of the collection, but we feel that Mr. Thorne would be pleased.

The descriptions of the artifacts accompanying each photograph (Figures 1-22) will begin with the copying of Mr. Thorne's descriptions or notes when these are available and can be identified with the artifacts. A brief description of the object will then be followed by any comments or information that might be known about it.

UTAH ARCHAEOLOGY, 8(1), 1995,
pp. 41-53

Figure 1. Tray baskets, LTC.BT.8 and LTC.BT.9 front. LTC.BT.8: Material, possibly split squawbush, wound around a willow base. Diameter of top = 1 ft. 8-3/4 in. Depth = 3 1/4 in. Found at foot of Blue Mountain by Mrs. Hyrum Meeks. Basket contained (foreground) Sinew, a drinking cup made of skin with willow rim sewn in place with sinew and with sinew bail,a tomahawk scabbard made of tanned buckskin sewn with sinew, a knife scabbard made of the tanned skin of a deer's ear, sewn with fiber string, a fringe of buckskin in two pieces, tied together, two bundles of herbs, (one contained in a square of tanned buckskin and the other enclosed in a similar piece of buckskin with a sinew sewn seam), two hanks of cedar bark, a 32 in strand of Cedar bark rope, and a bone awl. LTC.BT.9, Similar materials and weave to LTC.BT.8, over which it was inverted. Diameter at top = 1 ft, 4 3/8 in. Depth = 4 in. Mr. Thorne said Mrs. Meeks told him that the cowboys set fire to the debris in the overhand (probably pack rat material) to clean in out. She saw these two baskets and pulled them out before the fire reached them. Mr. Thorne gave one of the bundles of herbs to an older Indian friend several years ago. The man was very pleased to get it and said it represented "very strong medicine".

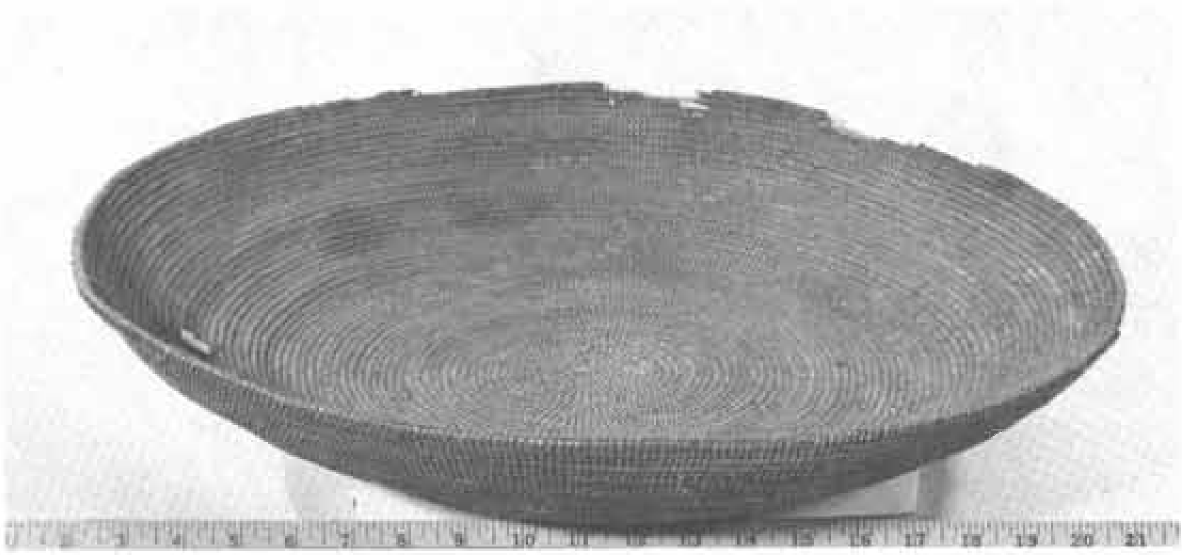

Figure 2. Specimen LTC.BT.8. A nicely constructed coiled tray basket in very good condition. The broken rim is the only damage. Dimensions: Diameter = 52.6 cm; Height = 8.4 cm. Scale (bottom) = inches.

Figure 3. Specimen LTC.BT.9; coiled tray basket in almost perfect condition with no sign of wear and very little dirt on the surface. This was inverted over basket LTC.BT.8 when found. Dimensions: Diameter = 41.5 cm; Height = 10 cm. Scale (bottom) = inches.

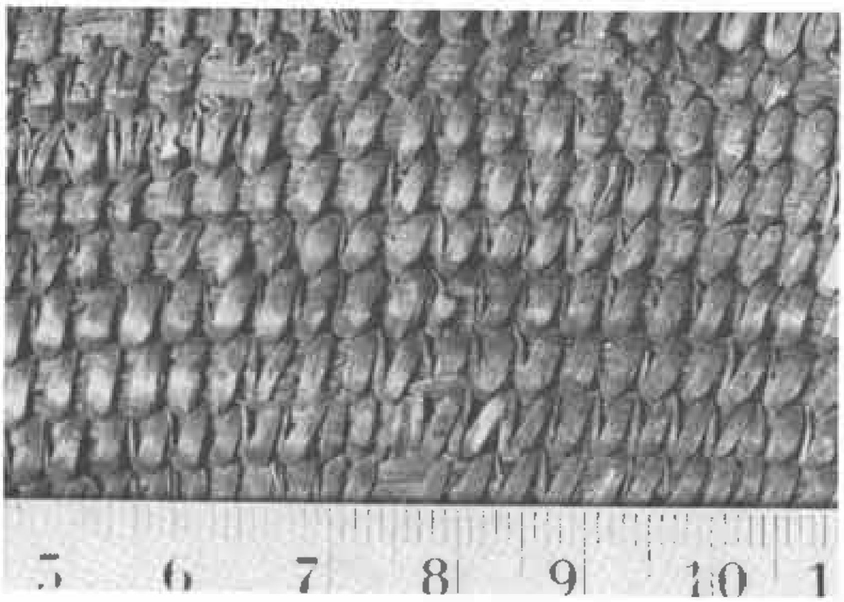

Figure 4. Detail of construction, LTC.BT.9. Scale (bottom) = cm.

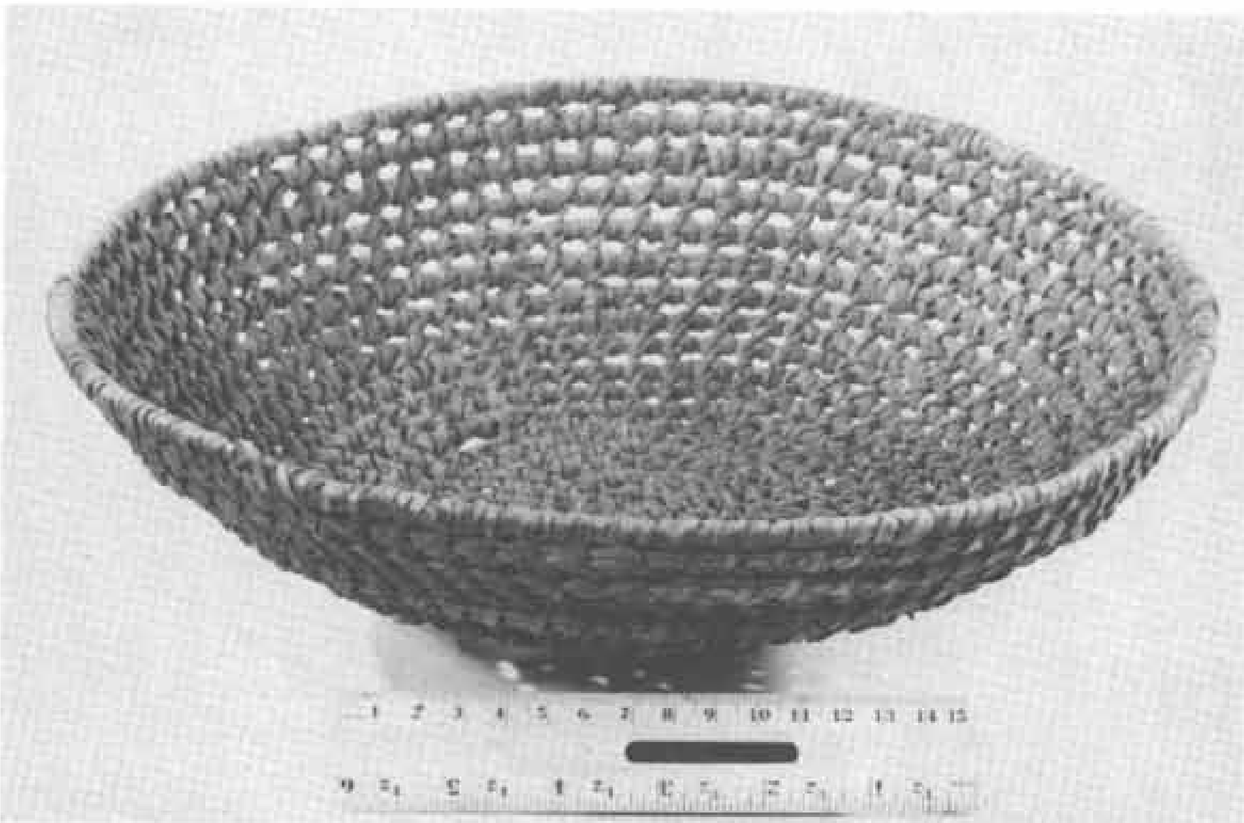

Figure 5. Specimen LTC.BT.10. An openwork tray/sifting basket, very well made and in excellent condition. The specimen was found in a overhand near Green River about eight miles south-west of Jensen, Utah. Coiled construction. The foundation is two split willow rods, together they equal about 6 mm in diameter; stitched with a twisted stitch that holds the coils about 5 mm apart. Dimensions: Diameter = 29.5 cm; Depth = 7.5 cm. Coils = 5 mm apart; Stitches = 1.3 cm apart.

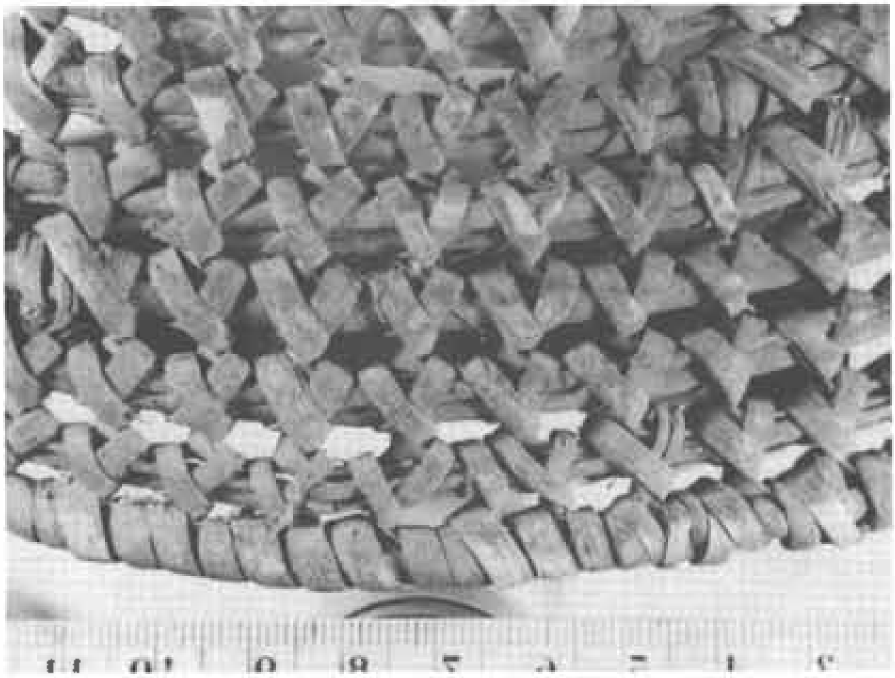

Figure 6. Close-up of LTC.BT.10 to show construction. Scale (top) = inches.

Figure 7. Basket LTC.BT.11 as found. The neck of this basket was exposed when discovered. Baskets LTC.BT.11 and BT.12, and BT.13 (see below) were found in a shallow cave in the northeast cliff of Dry Fork Canyon about half way from the base to the top of the cliff (September 1936).

Figure 8. Specimen LTC.BT.11 Coiled storage basket make of tightly twisted grass rope. Dimensions: Diameter = 43 cm; Height = 38 cm. Coils = 7 mm.

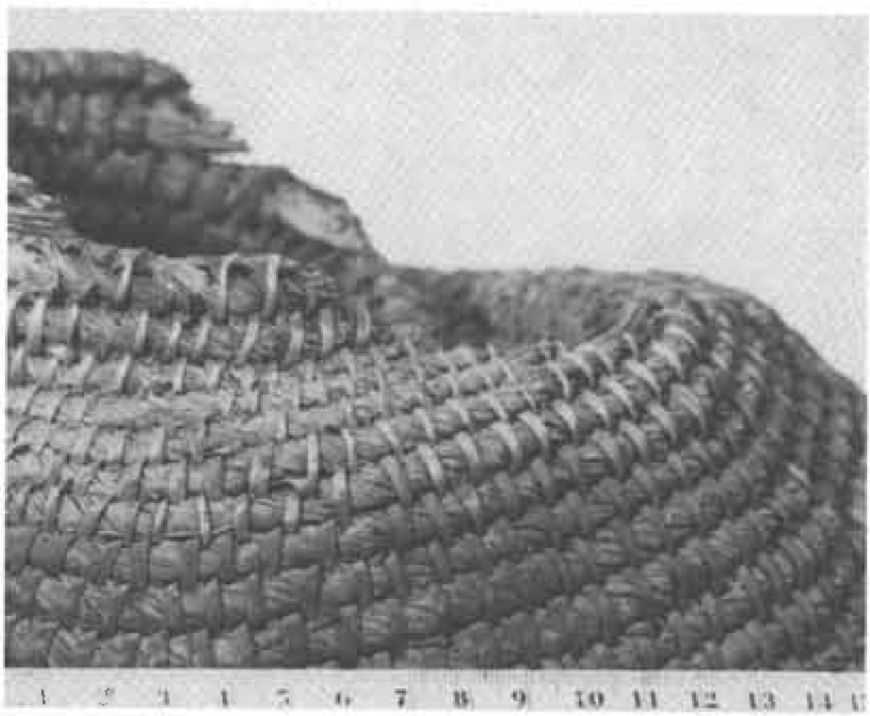

Figure 9. Detail of construction, LTC.BT.11. Scale (bottom) = inches.

Figure 10. Basket LTC.BT.12 as found.

Figure 11. Specimen LTC.BT.12 Grass storage basket coiled of softly twisted grass rope. Dimensions: Diameter = 43 cm; Height = 25.5. Grass Rope Coils = 9 mm.

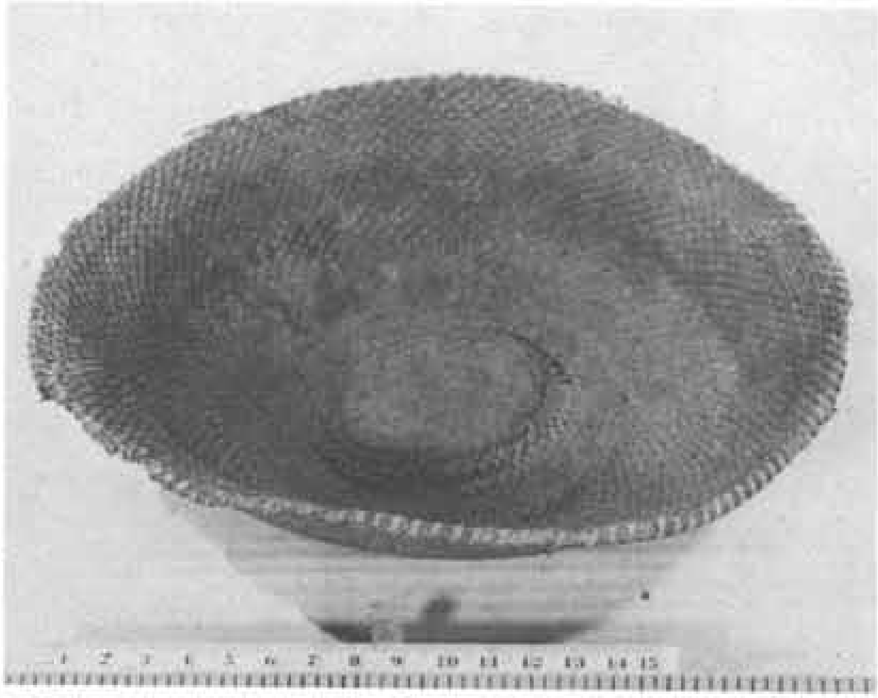

Figure 12. Small basket (specimen LTC.BT.14) used as a lid for LTC.BT.12 (see Figure 10).

Figure 13. Basket LTC.BT.13, in situ.

Figure 14. Specimen LTC.BT.13; Coiled grass storage basket. This is the most tightly twisted grass rope and the most solid basket of the three found together. Dimensions: Diameter = 38 cm; Height = 29 cm. Grass rope coils = 6mm; Stitches = 6 mm apart.

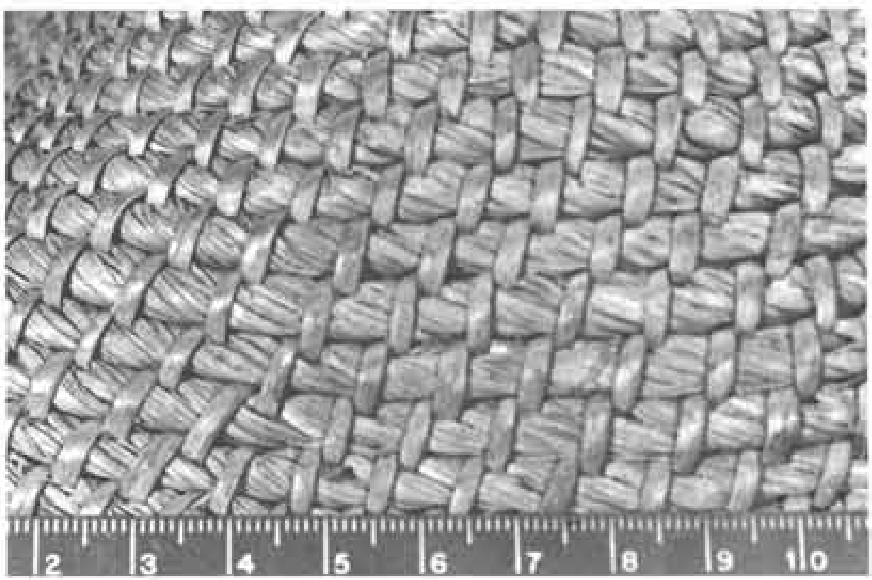

Figure 15. Detail of construction, LTC.BT.13. Scale (bottom) = cm.

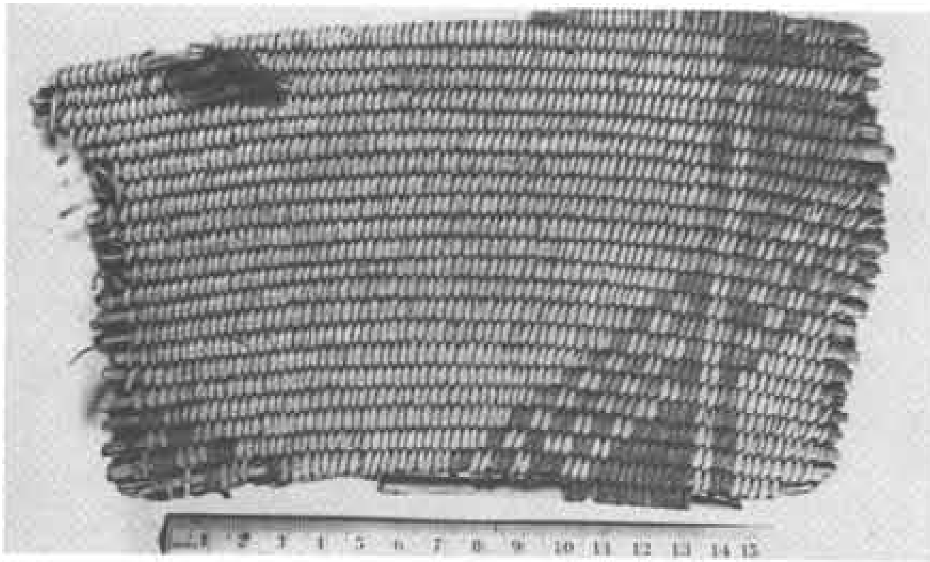

Figure 16. Specimen LTC.BT.15; Fragment of basket found on surface of cave. Split rod and bundle construction with a very nice design. Fragment measures 11.5 x 19.5 cm.

Figure 17. Specimen LTC.BT.16. A cone-shaped burden basket with the bottom worn out, decorated with a zig zag design. One of the carrying loops is buckskin and the other is sinew string. Construction: Coiled; Split rod and fiber bundle. Dimensions: Diameter = 53.5 cm (top), 20.5 cm (bottom); Height = 38.3 cm. Coils = 6 mm; Stitches = 3 mm apart.

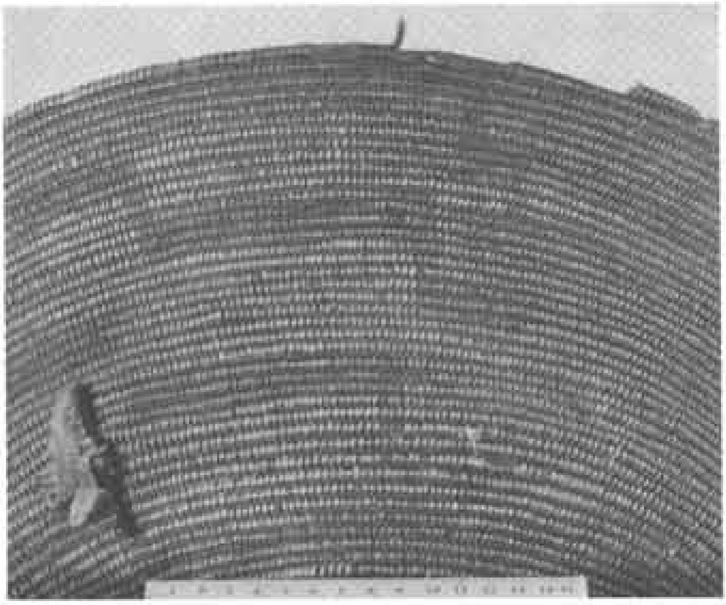

Figure 18. Detail of LTC.BT.16 to show construction. Scale (bottom) = cm.

Figure 19. Specimen LTC.BT.17. A burden basket similar in construction to LTC.BT.16, with which it was found, but with a different design and not in as good condition. Construction: Coiled with split rod and fiber bundle foundation closely stitched with split material. Dimensions: Diameter = 56 x 61 cm (top) 28 x 24 cm (bottom); Height = 36 cm.

Figure 20. Close-up showing construction of LTC.BT.17. Scale (bottom) = cm. Baskets BT.16 and BT.17 and cedar bark ring VF.3, on which one of the baskets was sitting, were found in the Greendale area during the construction of the Flaming Gorge Dam. These are loaned to the collection by Paul Hayes.

Figure 21. Basket LTC.BT.17 shown sitting on cedar bark ring.

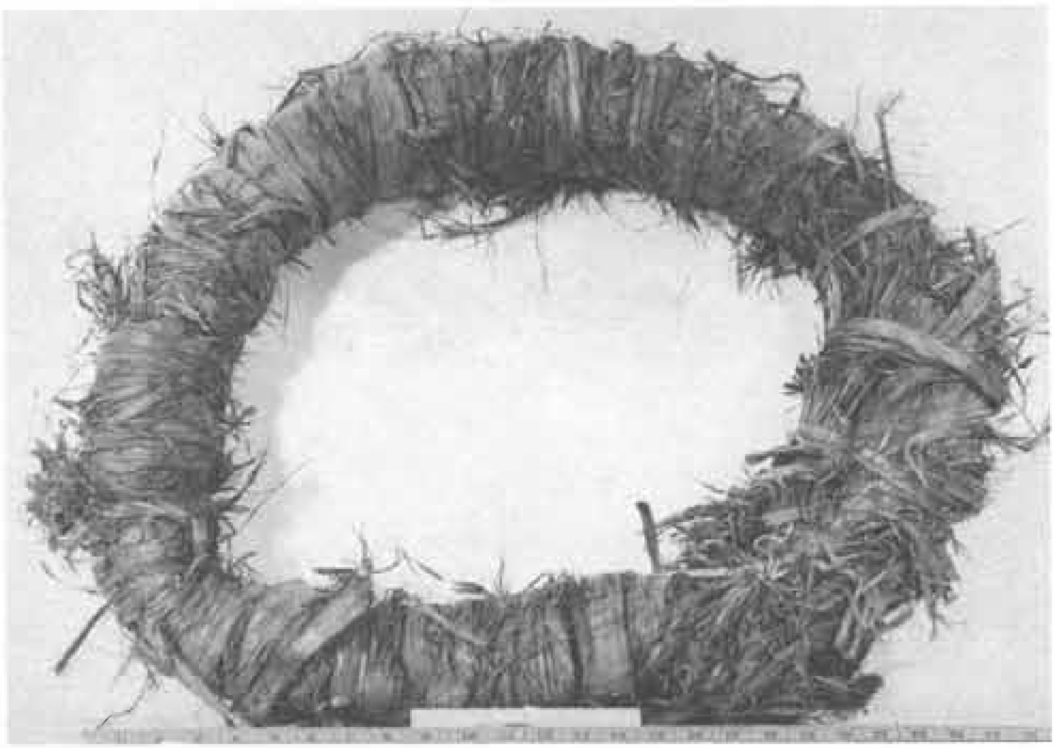

Figure 22. The cedar bark ring (specimen LTC.VF.3) one of the baskets was sitting on when found. It is solidly packed and wrapped, yet flexible. Diameter when lying down = 51 x 63.5 cm; Diameter of the rope = 10 to 11.5 cm.

REFERENCES CITED

Reagan, Albert B.
1933 Anciently Inhabited Caves of the Vernal (Utah) District with Additional Notes on Nine Mile Canyon, Northeast Utah. *Transactions Kansas Academy of Science* 36:41-70.

Detail of rabbit on Mimbres bowl (see Shaffer and Gardner, this volume).

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY, LIST OF REPORTS WITH 1994 PROJECT NUMBER

Evelyn Seelinger, Preservation Section, Division of State History, 300 Rio Grande, Salt Lake City, Utah 84101

INTRODUCTION

All organizations who conduct archaeological projects in the state are obliged to : (1) obtain a project number form the Antiquities Section, Division of State History and (2) submit a report on the work done.

The following is a list of reports received by the Antiquities Section, for projects with 1994 project numbers. These reports are on file, and are available to qualified researchers.

UTAH ARCHAEOLOGY, 8(1), 1995,
pp. 54-80

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
BE	Survey	BIA-Phoenix	G. Cantley	Koosharem Road Project, SPFS Con. No. 1, Rt. 401	U-94-BI-0193i
BE	Survey	BLM-Cedar City	G. Dalley	Commissary Creek Fence	U-94-BL-0431b
BE	Survey	BLM-Cedar City	G. Dalley	Sheldon Jessop Road	U-94-BL-0432b
BE	Survey	BLM-Cedar City	G. Dalley	Gillies Hill Community Pit	U-94-BL-0433b
BE	Survey	BLM-Cedar City	G. Dalley	Water Hollow Division Fence	U-94-BL-0434b
BE	Survey	BLM-Cedar City	G. Dalley	Ranch Canyon Amendment - Dotson	U-94-BL-0435b
BE	Survey	BLM-Cedar City	G. Dalley	Ranch Canyon NOI - Dotson	U-94-BL-0436b
BE	Survey	BLM-Cedar City	G. Dalley	Cherry Creek Stone Sale	U-94-BL-0437b
BE	Survey	BLM-Cedar City	G. Dalley	Gene Hodges - Red Hills	U-94-BL-0438b
BE	Survey	BLM-Cedar City	G. Dalley	H. Bradshaw Temporary Fence	U-94-BL-0439b
BE	Survey	BLM-Cedar City	G. Dalley	Golden Reef Amendment 3	U-94-BL-0457b
BE	Survey	BLM-Cedar City	G. Dalley	Commissary Creek Structures	U-94-BL-0458b
BE	Survey	BLM-Cedar City	G. Dalley	Rock Corral Soil Erosion Structures	U-94-BL-0459b
BE	Survey	BLM-Cedar City	G. Dalley	Badger Knoll Drift Fence	U-94-BL-0460b
BE	Survey	BLM-Cedar City	G. Dalley	Three Kilns Ring Tank	U-94-BL-0461b
BE	Survey	BLM-Cedar City	G. Dalley	Rocky Range Well	U-94-BL-0462b
BE	Survey	BLM-Cedar City	G. Dalley	Black Canyon Fence	U-94-BL-0463b
BE	Survey	BLM-Cedar City	G. Dalley	The Narrows Well and Trough	U-94-BL-0464b
BE	Survey	BLM-Cedar City	G. Dalley	North Lawson Cove Fence #2	U-94-BL-0465b
BE	Survey	BLM-Cedar City	G. Dalley	Cowboy Spring Pasture Fence	U-94-BL-0466b
BE	Survey	BLM-Cedar City	G. Dalley	Cunningham Wash East Spur	U-94-BL-0467b
BE	Survey	BLM-Cedar City	G. Dalley	Bradshaw - Red	U-94-BL-0468b
BE	Survey	BLM-Cedar City	G. Dalley	Bradshaw - King	U-94-BL-0469b
BE	Survey	BLM-Cedar City	G. Dalley	Seeps Riparian	U-94-BL-0470b
BE	Survey	BLM-Cedar City	G. Dalley	Gale - Aurel NOI	U-94-BL-0471b
BE	Survey	BLM-Cedar City	G. Dalley	Barrick - Golden Reef	U-94-BL-0472b
BE	Survey	BLM-Cedar City	G. Dalley	Ranch Canyon Amendment - Dotson Revisit	U-94-BL-0473b
BE	Survey	BLM-Cedar City	G. Dalley	Dotson Clay Sale	U-94-BL-0474b
BE	Survey	BLM-Cedar City	G. Dalley	David Penney - Amendment	U-94-BL-0475b
BE	Survey	BLM-Cedar City	G. Dalley	Applegate Gypsum UTU-72233	U-94-BL-0476b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
BE	Survey	BLM-Cedar City	G. Dalley	Kennecott - Red Beryl UTU-72232	U-94-BL-0477b
BE	Survey	BLM-Cedar City	G. Dalley	Forked Spring Road Realignment	U-94-BL-0478b
BE	Survey	BLM-Cedar City	G. Dalley	Milford Bench Fire Rehab	U-94-BL-0479b
BE	Survey	BLM-Cedar City	G. Dalley	Glat Claims	U-94-BL-0805b
BE	Survey	BLM-Cedar City	G. Dalley	South Creek Soil Pit	U-94-BL-0806b
BE	Survey	Intersearch	B. Frank	State Lands Salt Cabin Spring Wash	U-94-IG-0040s
BE	Survey	JBR	R. Crosland	UP&L Distribution Line to Milford Pig Farm	U-94-JB-0629b,p,s
BE	Survey	Nielson Cons.	A. Nielson	Centurion Mines	U-94-NP-0360s
BE	Survey	USFS-Fishlake	M. Cartwright	Merchant Valley Riparian Fence	U-94-FS-0231f
BE	Survey	USFS-Fishlake	M. Cartwright	Lake Stream Riparian Fence	U-94-FS-0292f
BE	Survey	USFS-Fishlake	M. Cartwright	Jimmy Reed Drift Fence	U-94-FS-0419f
BE	Survey	USFS-Fishlake	C. Mackelprang	Skyline Trail Extension	U-94-FS-0761f
BE/IN	Survey	Intersearch	B. Frank	US West Fiberoptic Line from Parowan to Beaver	U-94-IG-0160b,s
BO	Survey	ARCON	G. Norman	Honeyville to Lampo Transmission Line Extension	U-94-AK-0003b
BO	Survey	ARCON	G. Norman	US 89 & 90 Construction Borrow Pits (UDOT)	U-94-AK-0560p
BO	Survey	BLM-Salt Lake	S. Larralde	South Potter Creek Pipeline Extension	U-94-BL-0150b
BO	Survey	BLM-Salt Lake	J. Vosskuhler	Junction Creek Allotment	U-94-BL-0334b
BO	Survey	BLM-Salt Lake	M. Brewster	Salt Wells Land Exchange	U-94-BL-0335b,p
BO	Survey	BLM-Salt Lake	D. Melton	Rosebud HABS	U-94-BL-0634b
BO	Survey	BLM-Salt Lake	D. Melton	Old Etna Reservoir	U-94-BL-0636b
BO	Survey	BLM-Salt Lake	D. Melton	Rosebud Quarry	U-94-BL-0637b
BO	Survey	BLM-Salt Lake	D. Melton	Cedar Hill Well Pipeline Northeast Extension	U-94-BL-0717b
BO	Survey	BLM-Salt Lake	M. Brewster	Salt Wells Gravel Pits	U-94-BL-0786b
BO	Survey	Hill AFB	D. Weder	Data Recovery Build Fiber	U-94-HL-0121m
BO	Survey	Hill AFB	D. Weder	649 Security Training Area	U-94-HL-0792m
BO	Survey	Hill AFB	D. Weder	Administration Test Plot Water Line	U-94-HL-0793m
BO	Survey	Sagebrush	H. Weymouth	Brigham City Landfill Survey	U-94-SJ-0004p
BO	Survey	Sagebrush	W. Simmons	1994 Snowville Land Exchange	U-94-SJ-0329b
BO	Survey	Sagebrush	M. Polk	Bear River Bridge (UDOT)	U-94-SJ-0697p,s
BO	Survey	USFS-Sawtooth	R. Harper	Raft River Gas	U-94-FS-0211f
BO	Survey	USFS-Sawtooth	D. Santini	Mud Springs Water Development	U-94-FS-0212f

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
BO	Survey	USFS-Sawtooth	L. Mauser	Wildcat Mine Rehabilitation	U-94-FS-0224f
BO	Survey	USFS-Sawtooth	R. Stone	Clark's Basin Revegetation Project	U-94-FS-0367f
BO	Survey	USFS-Sawtooth	L. Mauser	Raft River Timber Salvage Sale	U-94-FS-0588f
BO/TO	Survey	Weber State Univ.	B. Arkush	1994 Utah Test & Training Range Survey	U-94-WC-0577m
CA	Survey	Sagebrush	S. Murray	Providence Post Office Location	U-94-SJ-0356p
CA	Survey	Sagebrush	S. Murray	Hyrum Intersection (UDOT)	U-94-SJ-0592p
CA	Survey	UDSH-Antiquities	D. Schmitt	East Millville Survey	U-94-UC-0718s
CA/RI	Survey	USFS-Wasatch/Cache	T. Scott	Chournos Land Exchange	U-94-FS-0724f
CB	Survey	AERC	R. Hauck	Portal Fan vic. Deadman Canyon	U-94-AF-0556b
CB	Survey	AERC	R. Hauck	Well 42-14E vic. East Mountain	U-94-AF-0597f
CB	Survey	ARCON	G. Norman	Helper-Columbia 146 KV Line for Airport Runway	U-94-AK-0199b
CB	Survey	ARCON	G. Norman	River Gas of Utah Drilling in Carbon County	U-94-AK-0350b,p,s
CB	Survey	Abajo	K. Montgomery	Cyprus Mining Co. Drill Locations North of Helper	U-94-AS-0675b,p
CB	Survey	Alpine	C. Pope	Anadarko Helper Federal A2 Well	U-94-A1-0041b
CB	Survey	Alpine	J. Horn	Matts Summit Fed #12-1 & Anadarko Helper St #A-1	U-94-A1-0183b,s
CB	Survey	Alpine	J. Horn	Columbine Jct. Log Storage and Loading	U-94-A1-0201b
CB	Survey	BLM-Price	B. Miller	Ninemile Material Sources	U-94-BL-0764b
CB	Survey	BLM-Price	B. Miller	Mounds Reef Fence	U-94-BL-0765b
CB	Survey	BLM-Price	B. Miller	Soldier Creek Pit	U-94-BL-0766b
CB	Survey	Baseline	A. Nielson	Addendum to River Gas in Carbon County	U-94-BS-0658s
CB	Survey	CEU Museum	P. Miller	Harold Pruitt Easement	U-94-CT-0235s
CB	Survey	Dames & Moore	E. Bassett	Emma Park Borrow Site	U-94-DH-0652p
CB	Survey	Metcalf	A. McKibbin	Questar Jurisdictional Lateral 96 PPL	U-94-MM-0558p,s
CB	Survey	Nielson Cons.	A. Nielson	UP&L River Gas Powerline	U-94-NP-0128p,s
CB	Survey	Nielson Cons.	A. Nielson	River Gas: 42 Wells, Compressor, Pipeline & Roads	U-94-NP-0203p,s
CB	Survey	Nielson Cons.	A. Nielson	UP&L Carbonville to Pinnacle Peak Powerline	U-94-NP-0285p,s
CB	Survey	Sagebrush	H. Weymouth	Willow Creek Mine	U-94-SJ-302b,p
CB	Survey	Sagebrush	H. Weymouth	Ninemile Canyon Pipeline	U-94-SJ-303b,p,s
CB	Survey	Sagebrush	J. Montgomery	Ninemile Canyon Pipeline	U-94-SJ-330b
CB	Survey	Sagebrush	H. Weymouth	Cyprus Plateau Alrad Canyon Drill Site Access	U-94-SJ-0416b
DA	Survey	BLM-Vernal	D. Beau-Schantz	Questar Clay Basin Minerals Materials Site	U-94-BL-0026b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
DA	Survey	BLM-Vernal	D. Beau-Schantz	Crosby Building Stone Permit	U-94-BL-0344b
DA	Survey	BLM-Vernal	D. Beau-Schantz	Clay Basin Greasewood Burn	U-94-BL-0564b
DA	Survey	BLM-Vernal	D. Beau-Schantz	Cottonwood Springs Prescribed Burn	U-94-BL-0669b
DA	Survey	BLM-Vernal	D. Beau-Schantz	Bender Mounain Emergency Rehabilitation	U-94-BL-0738b
DA	Survey	USFS-Ashley	C. Gamble	Dutch John Helitack Base	U-94-FS-0180f
DA	Survey	USFS-Ashley	D. Wilson	Diamond Mountain Cattleguard Relocation	U-94-FS-0275f
DA	Survey	USFS-Ashley	B. Loosle	East Park Trail	U-94-FS-0277f
DA	Survey	USFS-Ashley	B. Loosle	Elk Park Rendezvous	U-94-FS-0295f
DA	Survey	USFS-Ashley	B. Loosle	Sheep Creek Firewood and Salvage	U-94-FS-0296f
DA	Survey	USFS-Ashley	B. Loosle	Pipe Creek Underburning	U-94-FS-0297f
DA	Survey	USFS-Ashley	B. Loosle	Dutch John	U-94-FS-0299f
DA	Survey	USFS-Ashley	L. Ingram	NHA Trailer Park at Dutch John	U-94-FS-0397f
DA/UN	Survey	USFS-Ashley	B. Loosle	High Line Trail	U-94-FS-0298f
DC	Survey	AERC	G. Hadden	Balcron Monument Butte Injection Lines	U-94-AF-0332b
DC	Survey	AERC	G. Hadden	Three Wells vic. Pariette Bench	U-94-AF-0414b
DC	Survey	AIA	J. Truesdale	Two Petroglyph Wells 5-17 and 6-30W	U-94-AY-0454i
DC	Survey	AIA	J. Truesdale	Petroglyph Wells	U-94-AY-0595i
DC	Survey	ARCON	G. Norman	Fiber Optic Along US-40 Fruitland to Daniels Cny	U-94-AK-0217f,s
DC	Survey	BIA	J. Welch	Three Timber Sales on the Uintah-Ouray Reservoir	U-94-BI-0391i
DC	Survey	BLM-Vernal	D. Beau-Schantz	Greenwood Firewood Harvest	U-94-BL-0343b
DC	Survey	Mariah	W. Harding	Balcron Oil Field Sites Assessment	U-94-ME-0216b
DC	Survey	Metcalf	J. Scott	6 ANR Ute Wells	U-94-MM-0143i
DC	Survey	Metcalf	D. Barclay	Ute #2-33B6 Well Pad	U-94-MM-0165i
DC	Survey	Metcalf	K. Pool	PG&E Resources 13-20 Access Road Relocation	U-94-MM-0221b
DC	Survey	Metcalf	J. Scott	ARN Production State Highway Right-of-Way (UDOT)	U-94-MM-0516s
DC	Survey	Metcalf	J. Scott	Four Snyder Federal Wells	U-94-MM-0660b
DC	Survey	Metcalf	J. Scott	ANR 2-32 and 1-15 Wells	U-94-MM-0704i
DC	Survey	Nielson Cons.	A. Nielson	UDOT US Highway 40 Bridge Replacement in Myton	U-94-NP-0440p,s
DC	Survey	Sagebrush	H. Weymouth	Lomax #16-34 & 2A-35 Wells & Access Rds.	U-94-SJ-0034b
DC	Survey	Sagebrush	H. Weymouth	2 Lomax Wells Near Wells Draw	U-94-SJ-0043b
DC	Survey	Sagebrush	H. Weymouth	PG&E Well Pad #21-8H Near Castle Peak	U-94-SJ-0355b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
DC	Survey	Sagebrush	H. Weymouth	PG&E Wells Draw Unit Water Injection Service	U-94-SJ-0415b
DC	Survey	Sagebrush	H. Weymouth	Three PG&E Well Pads in Pariette Bench	U-94-SJ-0448b
DC	Survey	Sagebrush	H. Weymouth	One Well Near Pariette Draw	U-94-SJ-0449b
DC	Survey	Sagebrush	J. Montgomery	Lomax Four Wells near Wells Draw	U-94-SJ-0712b
DC	Survey	Sagebrush	J. Montgomery	Lomax Wells Gilsonite State 8-32 & 14-32	U-94-SJ-0713s
DC	Survey	Sagebrush	W. Simmons	Lomax Gilsonite State 10-32 Well	U-94-SJ-0715s
DC	Survey	USFS-Ashley	B. Loosle	Duchesne River Fisheries	U-94-FS-0028i,p
DC	Survey	USFS-Ashley	N. Oprandy	Aspen Water Development	U-94-FS-0073f
DC	Survey	USFS-Ashley	B. Loosle	Crystal Spring No. 2/Cow Canyon Waterline	U-94-FS-0074f
DC	Survey	USFS-Ashley	N. Oprandy	Saddle Spring No. 2/Timothy Creek Extension	U-94-FS-0075f
DC	Survey	USFS-Ashley	N. Oprandy	Yellowstone Grazing Allotment	U-94-FS-0140f
DC	Survey	USFS-Ashley	N. Oprandy	Yellowstone Trail Reroute	U-94-FS-0293f
DC	Survey	USFS-Ashley	N. Oprandy	Yellowstone ATV Trail	U-94-FS-0294f
DC	Survey	USFS-Ashley	B. Loosle	Little Farm Creek Group Project	U-94-FS-0316i
DC	Survey	USFS-Ashley	B. Loosle	Chepeta Lake PIT Survey	U-94-FS-0538f
DC	Survey	USFS-Ashley	B. Loosle	Bear Wallow Timber Sale	U-94-FS-0733f
DC/UN	Survey	AERC	R. Hauck	Four Wells vic. Monument Butte	U-94-AF-0167b
DC/UN	Survey	AERC	R. Hauck	Balcron Wells-Pariette Drw/8Mile Flat/Castle Pk Dr	U-94-AF-0710b
DC/UN	Survey	AERC	G. Hadden	Wells and Access vic. Castle Pk Drw & 8 Mile Flat	U-94-AF-0746b,s
DC/UN	Survey	AERC	G. Hadden	Balcron Wells vic. Monument Butte & Pleasant Vlly	U-94-AF-0775b
DC/UN	Survey	AIA	J. Truesdale	Seven Snyder Wells	U-94-AY-0653b,s
DC/UN	Survey	Sagebrush	H. Weymouth	Three Lomax Wells Access Rds near Pleasant Valley	U-94-SJ-0594b
DC/UN	Survey	Sagebrush	W. Simmons	Five Wells for Lomax Exploration	U-94-SJ-0714b
DC/UN	Survey	Sagebrush	W. Simmons	Overview & Sample Inventory in Uinta Basin (CUP)	U-94-SJ-0741f,i,p
DV	Survey	Sagebrush	H. Weymouth	A Second Burke Lane Extension Modification (UDOT)	U-94-SJ-0042p,s
DV	Survey	Sagebrush	M. Polk	UDOT Antelope Drive	U-94-SJ-0711s
EM	Survey	AERC	G. Hadden	Subsidence Zone Evaluation in Rilda Canyon	U-94-AF-0383f
EM	Survey	ARCON	G. Norman	Blackhawk, Emery City 69KV Tap & Gen. Wall Load	U-94-AK-0134b
EM	Survey	Abajo	J. Montgomery	UDOT Huntington Creek Bridge Replacement	U-94-AS-0002p,s
EM	Survey	Abajo	J. Montgomery	UDOT 3 Bridge Replacements Along SR 155	U-94-AS-0025p,s
EM	Survey	Abajo	J. Montgomery	UDOT Bridges, Lower San Rafael/Price R. E. of Elmo	U-94-AS-0068b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
EM	Survey	Alpine	J. Horn	Ampolex Seismic Line San Rafael NEQ-1	U-94-A1-0200b,s
EM	Survey	BLM-Price	B. Miller	Cedar Mountain Radio Tower	U-94-BL-0767b
EM	Survey	BLM-Price	B. Miller	Neva Fence	U-94-BL-0768b
EM	Survey	BLM-Price	B. Miller	Reid Nelson Draw Gap Fence	U-94-BL-0769b
EM	Survey	BLM-Price	B. Miller	Dinosaur Quarry Road Realignment	U-94-BL-0770b
EM	Survey	BLM-Price	B. Miller	University of Colorado Right of Way	U-94-BL-0771b
EM	Survey	BLM-Richfield	C. Harmon	Little Wild Horse Mesa Reservoir Maintenance 1	U-94-BL-0092b
EM	Survey	BLM-Richfield	C. Harmon	Little Wild Horse Mesa Reservoir Maintenance 2	U-94-BL-0093b
EM	Survey	BLM-Richfield	C. Harmon	Rock Springs Reservoir	U-94-BL-0776b
EM	Survey	BYU-OPA	L. Richens	Nielson Construction on Buffalo Bench	U-94-BC-0304b
EM	Test	BYU-OPA	D. Schmitt	Buckhorn Wash Shelter, 42Em2419	U-94-BC-0720b
EM	Survey	Mariah	T. Reust	Drill Holes & Access Roads for US Gypsum	U-94-ME-0639b
EM	Survey	Nielson Cons.	A. Nielson	Horse Canyon Coal Burn	U-94-NP-0127p
EM	Survey	Nielson Cons.	A. Nielson	UP&L Green River Sign Underground Cable	U-94-NP-0234s
EM	Survey	Sagebrush	H. Weymouth	Two Wells in Emery County	U-94-SJ-0366b,p
EM	Survey	Senco-Phenix	J. Senulis	Genwal Mine Expansion	U-94-SC-0424p
EM	Survey	UDSH-Antiquities	D. Schmitt	Doe Ferron Access and Core Hole Survey	U-94-UC-0205s
EM	Survey	USFS-Manti/La Sal	S. McDonald	Joe's Valley Reservoir Recreation Improvement	U-94-FS-0104f
EM	Survey	USFS-Manti/La Sal	L. Evans	Green Haven Partnership	U-94-FS-0208f
EM	Survey	USFS-Manti/La Sal	L. Evans	Blaze of Glory Timber Sale	U-94-FS-0209f
EM	Survey	USFS-Manti/La Sal	B. Blackshear	Rilda Canyon County Road Upgrade	U-94-FS-0254f
EM	Survey	USFS-Manti/La Sal	D. Youngstrom	East Mountain Ponds Development	U-94-FS-0376f
EM	Survey	USFS-Manti/La Sal	S. McDonald	Ferron Dugway Hollow Pinyon Juniper Treatment	U-94-FS-0451f
EM	Survey	USFS-Manti/La Sal	L. Evans	Forks of Huntington Creek National Recreatn Trail	U-94-FS-0773f
EM/SA	Survey	AERC	R. Hauck	Eco-Challenge 1995 Race in the San Rafael Swell	U-94-AF-0598b,p,s
EM/SV	Survey	AERC	G. Hadden	Quitchupah Creek Road	U-94-AF-0785b,f,p,s
GA	Survey	Abajo	J. Montgomery	UDOT Asay Creek Bridge Replacement	U-94-AS-0011p,s
GA	Survey	Abajo	W. Davis	BHP Petroleum State 2 #1 Drill Location	U-94-AS-0112s
GA	Survey	Abajo	K. Montgomery	UDOT SR 89 Orton Jct. to Circleville	U-94-AS-0357b,p,s
GA	Excavation	Anasazi State Park	W. Latady	42Ga34 - The Coombs Site	U-94-UD-0142s(e)
GA	Survey	BLM-Kanab	D. McFadden	Big Flat Burn	U-94-BL-0060b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
GA	Survey	BLM-Kanab	D. McFadden	North Star Camp Location	U-94-BL-0063b
GA	Survey	BLM-Kanab	D. McFadden	Horton Fence	U-94-BL-0135b
GA	Survey	BLM-Kanab	D. McFadden	Panguitch Lake Highway Right-of-Way Fence	U-94-BL-0321b
GA	Survey	BLM-Kanab	D. McFadden	Asay Creek Riparian Restoration Project	U-94-BL-0322b
GA	Survey	BLM-Kanab	D. McFadden	Marshall Cny Commercial Firewood Cutting Area #2	U-94-BL-0323b
GA	Survey	BLM-Kanab	D. McFadden	Bear Valley Seeding	U-94-BL-0340b
GA	Survey	BLM-Kanab	D. McFadden	Sevier River Protection Fence	U-94-BL-0341b
GA	Survey	BLM-Kanab	D. McFadden	NOI Near Alvey Wash	U-94-BL-0342b
GA	Survey	BLM-Kanab	D. McFadden	Big Flat Burn No. 2	U-94-BL-0351b
GA	Survey	BLM-Kanab	D. McFadden	Sheep Hollow Well	U-94-BL-0410b
GA	Survey	BLM-Kanab	D. McFadden	Panguitch City Solid Waste Transfer Station R&PP	U-94-BL-0581b
GA	Survey	BLM-Kanab	D. McFadden	Kennedy Ranch Access Right of Way	U-94-BL-0701b
GA	Survey	BLM-Kanab	D. McFadden	Panguitch Airport Runway Extension	U-94-BL-0716b
GA	Survey	BLM-Richfield	C. Harmon	Dell Seep Road Reservoir	U-94-BL-0088b
GA	Survey	BLM-Richfield	C. Harmon	Poison Spring Reservoir	U-94-BL-0089b
GA	Survey	BLM-Richfield	C. Harmon	Eggnog Cabin Reconstruction	U-94-BL-0179b
GA	Survey	BYU-OPA	R. Talbot	Pine Hills/Johnson Bench Parcels	U-94-BC-0227s
GA	Survey	Baseline	A. Nielson	Panguitch Waste Water	U-94-BS-0563p,s
GA	Survey	NPS-Glen Canyon	T. Burchett	Pedestal Alley Hiking Trail	U-94-NA-0031n
GA	Survey	NPS-Zion	L. Naylor	Proposed Passing Lane on SR-12 (UDOT)	U-94-NA-0396n
GA	Survey	USFS-Dixie	M. Jacklin	Garfield County Yard	U-94-FS-0178f
GA	Survey	USFS-Dixie	M. Jacklin	Allen Canyon Corral	U-94-FS-0210f
GA	Survey	USFS-Dixie	M. Jacklin	Pine Lake Water Line	U-94-FS-0260f
GA	Survey	USFS-Dixie	M. Jacklin	Horse Springs Water Line	U-94-FS-0261f
GA	Survey	USFS-Dixie	M. Jacklin	Griffin Land Exchange Update	U-94-FS-0262f
GA	Survey	USFS-Dixie	M. Jacklin	Kings Creek Water Line	U-94-FS-0319f
GA	Survey	USFS-Dixie	M. Jacklin	Roger Peak Salvage	U-94-FS-0521f
GA	Survey	USFS-Dixie	M. Jacklin	Water Canyon Salvage	U-94-FS-0522f
GA	Survey	USFS-Dixie	M. Jacklin	Chriss Lake Reconstruction	U-94-FS-0623f
GA	Survey	USFS-Dixie	M. Jacklin	Sweetwater Decorative Stone Quarry	U-94-FS-0626f
GA	Survey	USFS-Dixie	M. Jacklin	Sand Creek Watershed Project	U-94-FS-0627f

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
GA	Survey	USFS-Dixie	M. Jacklin	Wildcat Guard Station Restoration Plan	U-94-FS-0763f
GA	Survey	USFS-Dixie	R. Houston	John Cameron Trough	U-94-FS-0788f
GA	Survey	USFS-Dixie	R. Houston	Pass Creek Pipeline Extension	U-94-FS-0789f
GA	Survey	Utah State Lands	K. Wintch	Excavation at 42Ga3474	U-94-UM-0033s(e)
GA/KA	Survey	BLM-Kanab	D. McFadden	Twenty Mile Well Locations	U-94-BL-0064b
GR	Survey	AERC	G. Hadden	AGC Wells, Thompson Springs	U-94-AF-0532b
GR	Survey	Abajo	W. Davis	Klondike Flat Sanitary Landfill	U-94-AS-0578b
GR	Survey/Test	Abajo	W. Davis	UDOT CR 154 Improvement/Test at 42Gr2556 & 2557	U-94-AS-0696p
GR	Survey	BLM-Grand	B. Louthan	Sand Flats Recreation Inventory	U-94-BL-0097b,s
GR	Survey	BLM-Grand	M. Piontkowsi	Buckhorn Allotment Fences	U-94-BL-0148b
GR	Survey	BLM-Grand	B. Louthan	Cassidy Fence Extension, Mouth of Dry Canyon	U-94-BL-0170b
GR	Survey	BLM-Grand	B. Louthan	Dubinky Wash and Sheep Camp Ponds	U-94-BL-0533b
GR	Survey	BLM-Grand	B. Louthan	Granite Bench Ponds and Twin Granary Fence	U-94-BL-0534b
GR	Survey	BLM-Grand	B. Louthan	Proposed Dump	U-94-BL-0535b
GR	Survey	BLM-Grand	B. Louthan	Between the Creeks Cattleguard	U-94-BL-0618b
GR	Survey	BLM-Grand	B. Louthan	Mill Creek Road Barrier	U-94-BL-0619b
GR	Survey	BLM-Grand	B. Louthan	Four Thompson Reservoirs	U-94-BL-0620b
GR	Survey	BLM-Grand	B. Louthan	Castle Rock Trail and Parking	U-94-BL-0621b
GR	Survey	BLM-Grand	B. Louthan	Westwater Miner's Cabin Fence	U-94-BL-0622b
GR	Survey	BLM-Grand	B. Louthan	Tenmile Canyon Gap Fences	U-94-BL-0725b
GR	Survey	Baseline	A. Nielson	Valley Asphalt Material Borrow Site SE of Cisco	U-94-BS-0737b,p
GR	Survey	GRI	C. Conner	Bar-X Unit #21 and BMG Federal #9 Well Locations	U-94-GB-0115b
GR	Survey	GRI	C. Conner	Pipeline to Bar-X No. 21 Well	U-94-GB-0352b
GR	Survey	GRI	C. Conner	Windy Mesa Pipeline for the Linn Bros. Oil & Gas	U-94-GB-0638b,s
GR	Survey	GRI	C. Conner	Bar X Nos. 22 & 23 for Lone Mountain	U-94-GB-0740b
GR	Survey	JBR	S. Billat	Dollar Oil White Wash	U-94-JB-0774s
GR	Survey	La Plata	S. Fuller	Celsius Largo Canyon No. 1 Well	U-94-LA-0021b,s
GR	Survey	La Plata	F. Harden	SW Energy 9-1 Well Pad 12 Miles SW of Green River	U-94-LA-0207b
GR	Survey	La Plata	S. Fuller	Salt Wash 1-16 Well	U-94-LA-0758p,s
GR	Survey	Metcalf	L. Shields	A Class III Transmission Facility	U-94-MM-0318i
GR	Survey	Metcalf	K. McDonald	Cellular One Cell Site	U-94-MM-0389s

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
GR	Survey	NPS-Canyonlands	N. Coulam	Arches NP Mine Reclamation	U-94-NA-0009n
GR	Survey	USFS-Manti/La Sal	S. McDonald	South Beaver Mesa Livestock Pond, E. La Sal Mts.	U-94-FS-0182f
GR	Survey	USFS-Manti/La Sal	S. Saunders	Wilcox Flat FM Radio Tower	U-94-FS-0375f
GR	Survey	Utah Trust Lands	K. Wintch	Sand Flat Burial Project	U-94-UM-0759s
GR/CO	Survey	Abajo	K. Montgomery	UP&L Green River to Grand Junction 345 KV Line	U-94-AS-0443b,p,s
GR/UT	Survey	SWCA	L. Neal	UDOT Three Bridges on State Highways	U-94-ST-0571b,p
IN	Survey	Abajo	J. Montgomery	UDOT Maple Creek Bridge Replacement	U-94-AS-0013b,s
IN	Survey	BIA-Phoenix	G. Cantley	Cedar City Road Project, SPFS Con. No. 1, Rt. 301	U-94-BI-0192i
IN	Survey	BLM-Cedar City	G. Dalley	Mountain Spring Holding Facility	U-94-BL-0480b
IN	Survey	BLM-Cedar City	G. Dalley	Rock - Parowan City	U-94-BL-0481b
IN	Survey	BLM-Cedar City	G. Dalley	Willow Creek Trail	U-94-BL-0482b
IN	Survey	BLM-Cedar City	G. Dalley	Parowan Archery Range - Final	U-94-BL-0483b
IN	Survey	BLM-Cedar City	G. Dalley	UDOT Free Use Permits	U-94-BL-0484b
IN	Survey	BLM-Cedar City	G. Dalley	Marshall Well Fire Rehabilitation	U-94-BL-0797b
IN	Survey	BLM-Cedar City	G. Dalley	Paragonah Spring and Pipeline	U-94-BL-0807b
IN	Survey	BLM-Cedar City	G. Dalley	Lily White Stone Sale	U-94-BL-0808b
IN	Survey	BLM-Cedar City	G. Dalley	Seismic Monitoring Station	U-94-BL-0809b
IN	Survey	BLM-Cedar City	G. Dalley	Lebaron Claims	U-94-BL-0810b
IN	Survey	Intersearch	B. Frank	Enoch Pipeline and Storage Tank	U-94-IG-0087b
IN	Survey	Intersearch	B. Frank	Parowan Airport Expansion	U-94-IG-0362s
IN	Survey	Intersearch	B. Frank	Bulloch Brothers - Airport Road Survey	U-94-IG-0734p,s
IN	Survey	Intersearch	B. Frank	WW Clyde - Cedar Canyon Materials	U-94-IG-0790p
IN	Survey	USFS-Dixie	M. Jacklin	Nicols Land Exchange	U-94-FS-0263b
IN	Survey	USFS-Dixie	M. Jacklin	Brianhead Bike Trails	U-94-FS-0386f
IN	Survey	USFS-Dixie	M. Jacklin	Rudd's Roost Road	U-94-FS-0519b
IN	Survey	USFS-Dixie	M. Jacklin	Lowder Pond Trail	U-94-FS-0520b
IN	Survey	USFS-Dixie	M. Jacklin	Brianhead Vista Restoration Plan	U-94-FS-0762f
IN	Survey	USFS-Dixie	R. Houston	Evans Spring and Pipeline	U-94-FS-0787f
JB	Survey	BLM-Fillmore	N. Shearin	Middle Fork Fence	U-94-BL-0069b
JB	Survey	BLM-Fillmore	N. Shearin	Furner Ridge Cutting	U-94-BL-0138b
JB	Survey	BLM-Fillmore	N. Shearin	Death Creek Fence	U-94-BL-0186b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
JB	Survey	BLM-Fillmore	N. Shearin	Desert Mountain West Fence	U-94-BL-0187b
JB	Survey	BLM-Fillmore	N. Shearin	Warehouse Rock Fence	U-94-BL-0188b
JB	Survey	BLM-Fillmore	N. Shearin	Utah Clay Drill Holes	U-94-BL-0189b
JB	Survey	BLM-Fillmore	N. Shearin	Cherry Creek Pipeline	U-94-BL-0190b
JB	Survey	BLM-Fillmore	N. Shearin	Trout Creek Road Realignment	U-94-BL-0247b
JB	Survey	BLM-Fillmore	N. Shearin	Sage Valley Fence	U-94-BL-0265b
JB	Survey	BLM-Fillmore	N. Shearin	Indian Springs Pipeline	U-94-BL-0266b
JB	Survey	BLM-Fillmore	N. Shearin	Cabin Spring Pipeline	U-94-BL-0267b
JB	Survey	BLM-Fillmore	N. Shearin	Cow Hollow Fire	U-94-BL-0405b
JB	Survey	BLM-Fillmore	N. Shearin	Mona Fire	U-94-BL-0406b
JB	Survey	BLM-Fillmore	N. Shearin	Valley Asphalt Pit	U-94-BL-0407b
JB	Survey	USFS-Manti/La Sal	R. Mathies	Maple Hollow Watershed Treatment	U-94-FS-0378f
JB	Survey	USFS-Manti/La Sal	R. Mathies	Securities 1 Through 4 Mine Expansion	U-94-FS-0379f
JB	Survey	USFS-Manti/La Sal	R. Mathies	Fourmile III and IV Timber Sale	U-94-FS-0381f
JB	Survey	USFS-Uinta	C. Thompson	McCune Canyon Salvage Sale	U-94-FS-0206f,p
JB/MD	Survey	BLM-Fillmore	N. Shearin	Wild Horse Corrals	U-94-BL-0246b
JB/SP	Survey	ARCON	G. Norman	U. S. West Fiberoptic Cable	U-94-AK-0139b,s
KA	Survey	AERC	R. Hauck	Andalex Road/Powerline/Gravel/Microwave (4 repts.)	U-94-AF-0118b,n,s
KA	Survey	BLM-Kanab	D. McFadden	Cove Reservoir Fence	U-94-BL-0058b
KA	Survey	BLM-Kanab	D. McFadden	Willis Creek Pipeline R/W	U-94-BL-0059b
KA	Survey	BLM-Kanab	D. McFadden	Seaman Wash Pipeline Improvement	U-94-BL-0061b
KA	Survey	BLM-Kanab	D. McFadden	East and West Clark Bench Range Projects	U-94-BL-0062b
KA	Survey	BLM-Kanab	D. McFadden	Kane County Mineral Material FUP	U-94-BL-0253b
KA	Survey	BLM-Kanab	D. McFadden	NOI: Low Down Claim UTU-71335	U-94-BL-0514b
KA	Survey	BLM-Kanab	D. McFadden	Fivemile Mountain Fire Rehab	U-94-BL-0515b
KA	Survey	BLM-Kanab	D. McFadden	Church Wells Solid Waste Transfer Station R&PP	U-94-BL-0582b
KA	Survey	Intersearch	B. Frank	S Centr Utah Telephone, Mt. Carmel Jct to Zion NP	U-94-IG-0133?
KA	Survey	Intersearch	B. Frank	Edwards - Bald Knoll Mineral Lease II	U-94-IG-0155s
KA	Survey	Intersearch	B. Frank	Kane County Road Improvement	U-94-IG-0239s
KA	Survey	Intersearch	B. Frank	Elliot - State Lands Survey	U-94-IG-0526s
KA	Survey	NPS-Glen Canyon	C. Goetze	New Housing - Kane Co. Schools in Bullfrog	U-94-NA-0579n

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
KA	Survey	NRCS-Albuquerque	M. Johnson	Brown Brush Control	U-94-SH-0791p,s
KA	Survey	SWCA	L. Neal	Kanab Airport	U-94-ST-0301p
KA	Survey	USFS-Dixie	M. Jacklin	Mammoth Road Junction Parking Lot	U-94-FS-0583f
MD	Survey	AERC	R. Hauck	ASP Federal No. 1 in Snake Valley	U-94-AF-0599b
MD	Survey	ARCON	G. Norman	Cricket Mts. Quarry 1994 Expansion Tracts A and B	U-94-AK-0242b
MD	Survey	ARCON	G. Norman	Cricket Mts. Quarry 1994 Expansion Tract C	U-94-AK-0309b
MD	Survey	ARCON	G. Norman	Delta Airport Bypass Road Borrow Pits	U-94-AK-0337b,p
MD	Survey	Abajo	J. Montgomery	UDOT Cattle Underpasses, SR 50 West of Salina	U-94-AS-0194b,p,s
MD	Survey	Abajo	M. Bond	UDOT SR-6 and SR-136 Realignment	U-94-AS-0278p,s
MD	Survey	BLM-Fillmore	N. Shearin	Snowflake Drill Hole	U-94-BL-0020b
MD	Survey	BLM-Fillmore	N. Shearin	Gale NOI	U-94-BL-0045b
MD	Survey	BLM-Fillmore	N. Shearin	Ferguson Well Pipeline FWP	U-94-BL-0046b
MD	Survey	BLM-Fillmore	N. Shearin	Skunk Springs Pipeline	U-94-BL-0047b
MD	Survey	BLM-Fillmore	N. Shearin	Black Rock Drill Holes	U-94-BL-0070b
MD	Survey	BLM-Fillmore	N. Shearin	Little Sahara Gravel Pit	U-94-BL-0071b
MD	Survey	BLM-Fillmore	N. Shearin	Border Inn Land Exchange	U-94-BL-0081b
MD	Survey	BLM-Fillmore	N. Shearin	Painter Spring Project	U-94-BL-0083b
MD	Survey	BLM-Fillmore	N. Shearin	Mud Spring Project	U-94-BL-0084b
MD	Survey	BLM-Fillmore	N. Shearin	Pyramid Knoll Buried Tank	U-94-BL-0107b
MD	Survey	BLM-Fillmore	N. Shearin	Cowboy Pass Buried Tank	U-94-BL-0108b
MD	Survey	BLM-Fillmore	N. Shearin	Lower Red Pass Buried Tank	U-94-BL-0109b
MD	Survey	BLM-Fillmore	N. Shearin	Swazey Mountain Recon Survey	U-94-BL-0184b
MD	Survey	BLM-Fillmore	N. Shearin	Cricket Mountain Drilling	U-94-BL-0185b
MD	Survey	BLM-Fillmore	N. Shearin	Moriah Ranch Pipeline	U-94-BL-0243b
MD	Survey	BLM-Fillmore	N. Shearin	Border Inn Land Addition	U-94-BL-0244b
MD	Survey	BLM-Fillmore	N. Shearin	Anderson Public Sale	U-94-BL-0245b
MD	Survey	BLM-Fillmore	N. Shearin	Low Hills Guzzler	U-94-BL-0264b
MD	Survey	BLM-Fillmore	N. Shearin	Mountain Home Pipeline Extension	U-94-BL-0287b
MD	Survey	BLM-Fillmore	N. Shearin	East Long Ridge Trough	U-94-BL-0311b
MD	Survey	BLM-Fillmore	N. Shearin	Dolomite Seed	U-94-BL-0312b
MD	Survey	BLM-Fillmore	N. Shearin	Johnson Gravel Pit	U-94-BL-0315b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
MD	Survey	BLM-Fillmore	N. Shearin	Black Springs - Beaver Lode Claim	U-94-BL-0324b
MD	Survey	BLM-Fillmore	N. Shearin	Tuff Drilling	U-94-BL-0398b
MD	Survey	BLM-Fillmore	N. Shearin	Horse Hollow Fire No. 2	U-94-BL-0399b
MD	Survey	BLM-Fillmore	N. Shearin	Cricket Mountain Fire	U-94-BL-0400b
MD	Survey	BLM-Fillmore	N. Shearin	East Twin Peak Fire	U-94-BL-0401b
MD	Survey	BLM-Fillmore	N. Shearin	Horse Hollow Fire	U-94-BL-0402b
MD	Survey	BLM-Fillmore	N. Shearin	Black Rock Fire	U-94-BL-0403b
MD	Survey	BLM-Fillmore	N. Shearin	Black Springs Lode Claim	U-94-BL-0404b
MD	Survey	BLM-Fillmore	N. Shearin	Antelope Mountain Fire Rehab	U-94-BL-0524b
MD	Survey	BLM-Fillmore	N. Shearin	Black Willow Fire Rehab	U-94-BL-0525b
MD	Survey	BLM-Fillmore	N. Shearin	Armstrong Fire	U-94-BL-0609b
MD	Survey	BLM-Fillmore	N. Shearin	Gandy Marsh Fences	U-94-BL-0630b
MD	Excavation	BLM-Fillmore	N. Shearin	Thursday Site Excavation	U-94-BL-0802b(e)
MD	Survey	Baseline	A. Nielson	UDOT Three Bridge Replacements - Leamington/Delta	U-94-BS-0612p,s
MD	Survey	Baseline	A. Nielson	Desert Harding Road Upgrade	U-94-BS-0613p,s
MD	Survey	Desert West	K. Carambelas	Black Rock Drill Pads: Relocation of Federal #1-17	U-94-WZ-0017b
MD	Survey	Desert West	K. Carambelas	Black Rock Prospect: Line 3	U-94-WZ-0035b
MD	Survey	Desert West	K. Carambelas	Black Rock Prospect: Line 1 Extension	U-94-WZ-0036b
MD	Survey	Desert West	K. Carambelas	Black Rock Prospect: Line 1 Access Road	U-94-WZ-0037b
MD	Survey	Desert West	K. Carambelas	Snake Valley 2-D Seismic Program Part 1	U-94-WZ-0371b,s
MD	Survey	Desert West	K. Carambelas	Snake Valley 2-D Seismic Program Part 2	U-94-WZ-0409b,s
MD	Survey	Desert West	K. Carambelas	Black Rock Federal Well 1-29	U-94-WZ-0666b
MD	Survey	Nielson Cons.	A. Nielson	UP&L Little Sahara	U-94-NP-0161s
MD	Survey	UDSH-Antiquities	D. Schmitt	Clear Lake Waterfowl Management Area	U-94-UC-0110s
MO	Survey	BOR	S. Larralde	Gateway Canal Tunnels	U-94-BE-0241w
MO	Survey	Sagebrush	S. Murray	Lost Creek Reservoir RMP	U-94-SJ-0418p,s
MULTI	Survey	AERC	R. Hauck	Evaluations vic. Long Canyon & Jump Creek	U-94-AF-0413p
MULTI	Survey	Nielson Cons.	A. Nielson	U.S. West Buried Cable CB/SP/SV	U-94-NP-0132s
MULTI	Survey	USFS-Manti/La Sal	S. McDonald	Small Road Improvements CB/EM/SP	U-94-FS-0289f
MULTI	Survey	USFS-Manti/La Sal	S. McDonald	Huntington Canyon Interpretive Sites CB/EM/SP/UT	U-94-FS-0452b,f,p
PI	Survey	Abajo	J. Montgomery	UDOT Sevier River Bridge Evaluation vic. Kingston	U-94-AS-0010p,s

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
PI	Survey	Abajo	W. Davis	UDOT SR 153 Historic Culvert Replacement	U-94-AS-0393b,s
PI	Survey	BLM-Richfield	C. Harmon	Deer Trail Mine (KG 1 & 2)	U-94-BL-0124b
PI	Survey	BLM-Richfield	C. Harmon	Deer Trail Mine (KG 3)	U-94-BL-0125b
PI	Survey	USFS-Fishlake	R. Leonard	Dalton Cabin Removal	U-94-FS-0291f
PI/WN	Survey	USFS-Fishlake	R. Leonard	Fish Lake Power Lines	U-94-FS-0233f
RI	Survey	BLM-Salt Lake	D. Melton	Randolph Fire Rehab	U-94-BL-0635b,s
RI	Survey	BLM-Salt Lake	D. Melton	Alkali Fire Seeding	U-94-BL-0702b,p
RI	Survey	BLM-Salt Lake	D. Melton	Murphy Fire Seeding	U-94-BL-0703b,p
RI	Survey	Nielson Cons.	A. Nielson	Phosphate Mine Rehab in the Crawford Mountains	U-94-NP-0202p
SA	Survey	4-Corners	C. DeFrancia	Big Sky 6-E Well, Access and Pipeline	U-94-FE-0151i
SA	Survey	4-Corners	C. DeFrancia	Meridian Seismograph Lines BNK-7 & BNK-8	U-94-FE-0196b
SA	Survey	4-Corners	C. DeFrancia	Anasazi 6H-2 Pipeline Route	U-94-FE-0346i
SA	Survey	4-Corners	C. DeFrancia	Sahgzie 5D-2 Well & Pipeline	U-94-FE-0803i
SA	Survey	Abajo	W. Davis	Expansion of Lime Ridge Materials Location	U-94-AS-0005s
SA	Survey	Abajo	J. Montgomery	UDOT Kane Springs Wash Bridge Replacement	U-94-AS-0016b,s
SA	Survey	Abajo	J. Montgomery	UP&L Blue Goose Patent Power Line	U-94-AS-0095b,p
SA	Survey	Abajo	W. Davis	San Juan County Rd A-235 Improvement, Lime Ridge	U-94-AS-0218b,s
SA	Survey	Abajo	M. Bond	Six Film Locations in Valley of the Gods	U-94-AS-0369b
SA	Survey	Abajo	K. Montgomery	UDOT US 191 Morman Tank	U-94-AS-0372b,s
SA	Survey	Abajo	M. Bond	Holiday Gravel Pit on Top of Bluff Bluffs (UDOT)	U-94-AS-0631s
SA	Survey	Abajo	W. Davis	Ken's Lake ISUZU Commercial	U-94-AS-0673s
SA	Survey	Abajo	K. Montgomery	HSI Prod., Dome Plateau, Dry Mesa & Kane Springs	U-94-AS-0674b
SA	Test	Abajo	M. Bond	(UDOT) Legrand Johnson Bluff Bench Materials Site	U-94-AS-0739s
SA	Survey	Abajo	K. Montgomery	UDOT US 191 Kane Springs Rest Area	U-94-AS-0760s
SA	Survey	Abajo	K. Montgomery	UDOT West Coyote Wash Bridge Repair	U-94-AS-0778s
SA	Survey	Abajo	J. Till	SR-262 Legrand Johnson Materials Pit	U-94-SJ-0730b
SA	Excavation	Alpine	J. Horn	Aneth Excavation, SR 262	U-94-A1-0072i(e)
SA	Survey	BLM-Grand	B. Louthan	Four Lisbon/Sumo Ground Water Monitor Wells	U-94-BL-0615b
SA	Survey	BLM-Grand	B. Louthan	Wray Mesa - Colorado Burn Fence	U-94-BL-0616b
SA	Survey	BLM-Grand	B. Louthan	Blue Hill/CNHA Building Stone Quarry	U-94-BL-0617b
SA	Survey	BLM-San Juan	D. Davidson	Gebauer-Skeen #20A	U-94-BL-0018b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
SA	Survey	BLM-San Juan	D. Davidson	Gebauer-Groom #76	U-94-BL-0019b
SA	Survey	BLM-San Juan	D. Davidson	Howe Right-of-Way	U-94-BL-0027b
SA	Survey	BLM-San Juan	D. Davidson	Indian Creek Camp	U-94-BL-0099b
SA	Survey	BLM-San Juan	D. Davidson	Section 15 Stock-Watering Reservoir	U-94-BL-0100b
SA	Survey	BLM-San Juan	D. Davidson	Overflow Camping Rehab	U-94-BL-0641b
SA	Survey	BLM-San Juan	D. Davidson	Perkins Water Developments	U-94-BL-0676b
SA	Survey	CASA	N. Hammack	NECA Shiprock IHS Project	U-94-CH-0049i
SA	Survey	CASA	L. Hammack	Mobil Pipeline, RU 13-23 Header to RU 14-43 Well	U-94-CH-0050i
SA	Survey	CASA	L. Hammack	Thirteen Mobil Injection Pipelines	U-94-CH-0051i
SA	Survey	CASA	L. Hammack	UP&L Dishface Camp Powerline vic. Montezuma Creek	U-94-CH-0053i
SA	Survey	CASA	L. Hammack	UP&L McCracken Mesa Powerline	U-94-CH-0056i
SA	Survey	CASA	L. Hammack	Six Mobil Wells, Pipelines, Powerlines & Roads	U-94-CH-0102i
SA	Survey	CASA	N. Hammack	Shiprock Homesites & Waterline Exts.(also AZ, NM)	U-94-CH-0103i
SA	Survey	CASA	N. Hammack	Unocal Coyote 29-1 Well Pad	U-94-CH-0119b,s
SA	Survey	CASA	N. Hammack	C. & B. Norton and H. & L. Bitsuie House Lots	U-94-CH-0157i
SA	Survey	CASA	N. Hammack	Mobil, 12.5 KV Powerline Substation to Water Plant	U-94-CH-0158i
SA	Survey	CASA	N. Hammack	Rangeland Judd Hollow #1 Well	U-94-CH-0159b
SA	Survey	CASA	L. Hammack	Max Shorty Home Site	U-94-CH-0214i
SA	Survey	CASA	L. Hammack	Eddie, White & Broadway Homesites W of Chapter Hse	U-94-CH-0215i
SA	Survey	CASA	N. Hammack	Three Small Flowlines, Mobil McElmo Creek Unit	U-94-CH-0314i
SA	Survey	CASA	L. Hammack	Calvin Weston House Lot, Aneth Chapter	U-94-CH-0338i
SA	Survey	CASA	L. Hammack	Mobil Battery 1 Pipeline	U-94-CH-0546i
SA	Survey	CASA	L. Hammack	Mobil RU 21 Well	U-94-CH-0547i
SA	Survey	CASA	L. Hammack	Five Red Mesa Chapter Homesites	U-94-CH-0548i
SA	Survey	CASA	L. Hammack	Four Aneth Chapter Homesites	U-94-CH-0550i
SA	Survey	CASA	L. Hammack	Lisbon Unit C-64 & D-74 Wellpads for UNOCAL	U-94-CH-0602b
SA	Survey	CASA	L. Hammack	Ratherford Pipeline RU 21-23 Well to RU 21-67 Pipe	U-94-CH-0603i
SA	Survey	CASA	N. Hammack	Ratherford 21-67 Well & Pipeline, Red Mesa Chapter	U-94-CH-0604i
SA	Survey	CASA	L. Hammack	Five (to Eight) Homesites in the Red Mesa Chapter	U-94-CH-0605i
SA	Survey	CASA	N. Hammack	Homesites in the Aneth Chapter	U-94-CH-0606i
SA	Survey	CASA	N. Hammack	Lisbon Valley Substation and Telephone Line	U-94-CH-0695b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
SA	Survey	CASA	N. Hammack	U-14 & T-15 Redrills for Mobil	U-94-CH-0707i
SA	Survey	CASA	N. Hammack	Three Powerlines for Mobil, Red Mesa Chapter	U-94-CH-0708i
SA	Survey	CASA	N. Hammack	Mobil Surface Pipeline RU 10-44 to Satellite 15	U-94-CH-0709i
SA	Survey	CASA	N. Hammack	Red Mesa Economic and Sports Complex	U-94-CH-0800i
SA	Survey	GRI	C. Conner	Lisbon Valley Rectifier Site	U-94-GB-0365b
SA	Survey	GRI	C. Conner	SR 191 MRAP Road Improvement (UDOT)	U-94-GB-0575f,p,s
SA	Survey	La Plata	S. Fuller	Meridian Kiva Federal 24-4 Well	U-94-LA-0281b
SA	Survey	La Plata	S. Fuller	Meridian Kiva Federal 13-4 Well	U-94-LA-0282b
SA	Survey	La Plata	S. Fuller	Meridian Kiva 31-9 Well	U-94-LA-0283b
SA	Survey	La Plata	S. Fuller	Meridian 42-5 Waterline	U-94-LA-0284b,i
SA	Survey	La Plata	S. Fuller	Papoose Limestone Mine in Lisbon Valley	U-94-LA-0348s
SA	Survey	La Plata	S. Fuller	Ampole Steelhead No. 1 Well	U-94-LA-0677b
SA	Survey	La Plata	S. Fuller	Ampole Lower Squaw Point No. 2 Well	U-94-LA-0678b
SA	Survey	La Plata	S. Fuller	Ampole Cactus Park No. 3 Well	U-94-LA-0679b
SA	Survey	La Plata	S. Fuller	DJ Simmons Cherokee Wellpad	U-94-LA-0745b
SA	Survey	Metcalf	L. Travis	Union Pacific - 2 Wells	U-94-MM-0230b
SA	Survey	NPS-Canyonlands	N. Coulam	Upheaval Dome Seismic Line	U-94-NA-0007n
SA	Survey	NPS-Canyonlands	N. Coulam	Island-in-the Sky Helipad	U-94-NA-0008n
SA	Survey	NPS-Glen Canyon	C. Goetze	Fee Station and Housing Areas	U-94-NA-0665n
SA	Survey	NPS-Natural Bridges	N. Coulam	Natural Bridges Cattle Fence	U-94-NA-0149b
SA	Survey	NPS-Natural Bridges	N. Coulam	Cattle Fence Along the NW Boundary of Nat. Bridges	U-94-NA-0545n
SA	Survey	SWCA	J. Mabry	Blanding Natural Gas 12 Mile Extension	U-94-ST-0147b
SA	Excavation	UDSH-Antiquities	D. Schmitt	Burial for San Juan County: Cedar Mesa, 42Sa22520	U-94-UC-0145s(e)
SA	Survey/Test	USFS-Manti/La Sal	L. Hunt	Baker Bunkhouse Replacement & Addendum	U-94-FS-0001f
SA	Survey	USFS-Manti/La Sal	S. McDonald	Hell Canyon Trail and Squaw Springs Pond	U-94-FS-0085f
SA	Survey	USFS-Manti/La Sal	S. Saunders	Deer Springs Exclosure	U-94-FS-0373f
SA	Survey	USFS-Manti/La Sal	S. Saunders	Geyser Pass Aspen Regeneration	U-94-FS-0374f
SA	Survey	USFS-Manti/La Sal	B. Blackshear	Buckboard, Dalton Sprs & Devil's Cny Campgrounds	U-94-FS-0540f
SA	Survey	USFS-Manti/La Sal	B. Blackshear	Deadman Point Timber Sale	U-94-FS-0541f
SA	Survey	USFS-Manti/La Sal	B. Blackshear	South Elks CR Survey	U-94-FS-0607f
SA	Survey	USFS- Manti/La Sal	L. Hunt	Dry Wash Caves Interpretive Trail	U-94-FS-0722f

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
SA	Excavation	Utah State Lands	K. Wintch	Mitigation at 42Sa21367, 22468, 22470 & 22475	U-94-UM-0286s(e)
SA	Survey	Woods Canyon	J. Fetterman	Abajo Mts: 4 Study Units in Manti/La Sal NF	U-94-WN-0544f
SL	Survey	BYU-OPA	S. Billat	U.S. Postal Station, Salt Lake City	U-94-BC-0048s
SL	Survey	Baseline	A. Nielson	Salt Lake Airport Project	U-94-BS-0425p
SL	Survey	Baseline	A. Nielson	UDOT 106th South/I-15 Railroad Realignment Detour	U-94-BS-0569p,s
SL	Survey	Baseline	A. Nielson	Salt Lake Airport Expansion	U-94-BS-0614p,s
SL	Survey	Baseline	A. Nielson	UDOT 90th South/106th South Alternative Detours	U-94-BS-0659p
SL	Survey	Dames & Moore	E. Bassett	Red Butte Dam EIS	U-94-DH-0272f,s
SL	Survey	Dames & Moore	E. Bassett	Redwood Road Expansion Addendum #2 (UDOT)	U-94-DH-0574p
SL	Survey	JBR	L. Billat	Documentation of American Barrel Site, 42SL217	U-94-JB-0552p
SL	Survey	Metcalf	L. Travis	Jordan River Parkway	U-94-MM-0255s
SL	Survey	Nielson Cons.	A. Nielson	Highland Dr. Upgrade Between 33rd and 45th South	U-94-NP-0126s
SL	Survey	Sagebrush	S. Murray	9400 South Widening Between 1300 & 2300 E (UDOT)	U-94-SJ-0136p,s
SL	Survey	Sagebrush	M. Polk	UDOT 7200 South	U-94-SJ-0181p,s
SL	Survey/Test	Sagebrush	H. Weymouth	UDOT 138thSouth Variant II	U-94-SJ-0252p,s
SL	Survey	Sagebrush	S. Murray	UDOT 2000 East Extension III - 9400 S. to Sego	U-94-SJ-0271p,s
SL	Survey	Sagebrush	M. Polk	90th Detention Basins (UDOT)	U-94-SJ-0593p
SL	Survey	Sagebrush	M. Polk	600 North in Salt Lake City (UDOT)	U-94-SJ-0752p,s
SL	Excavation	UDSH-Antiquities	D. Madsen	Salvage of Burials (42SL197) in Jordan River Delta	U-94-UC-0300s(e)
SL	Survey	Univ. of Utah	R. Barlow	The Park and Ride Lot 9400 S 2000 E	U-94-UA-0250s
SL	Survey	Weber State Univ.	B. Arkush	Titan IV Rocket Motor Storage Program	U-94-WC-0030p
SL/UT	Survey	UNLV-ERC	L. Blair	Kern River Geneva Steel Lateral	U-94-EE-0172p
SM	Survey	Sagebrush	A. Polk	Emory Port of Entry Site (UDOT)	U-94-SJ-0450b
SM	Survey	USFS-Ashley	B. Loosle	Cow Hollow EA	U-94-FS-0445f
SM	Survey	USFS-Wasatch/Cache	T. Scott	Mirror Lake Highway Trailheads	U-94-FS-0067f
SM	Survey	USFS-Wasatch/Cache	S. Gibbons	Star Lake Dam Reconstruction	U-94-FS-0446f
SM	Survey	USFS-Wasatch/Cache	T. Scott	East Fork Blacks Fork EIS Supplement	U-94-FS-0642f
SM	Survey	USFS-Wasatch/Cache	S. Gibbons	Marjorie and Long Lakes Survey	U-94-FS-0643f
SM	Survey	USFS-Wasatch/Cache	S. Gibbons	Duck Lake	U-94-FS-0644f
SM	Survey	USFS-Wasatch/Cache	T. Scott	Lost Lake	U-94-FS-0645f
SM	Survey	USFS-Wasatch/Cache	S. Gibbons	Pot, Weir and Wall Lakes	U-94-FS-0646f

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
SM	Survey	USFS-Wasatch/Cache	S. Gibbons	Fire, Island and Big Elk Lakes	U-94-FS-0647f
SM	Survey	USFS-Wasatch/Cache	T. Scott	Crystal and Teapot Lakes	U-94-FS-0648f
SM	Survey	W. Wyoming College	K. Thompson	Union Pacific Resources Lodgepole Pipeline	U-94-WK-0562p
SM	Survey/Monitor	W. Wyoming College	K. Thompson	Class III & Trench Inspection, Lodgepole Pipeline	U-94-WK-0632p
SP	Survey	BLM-Richfield	C. Harmon	Swede Fence	U-94-BL-0094b
SP	Survey	BLM-Richfield	C. Harmon	Barney Quarry	U-94-BL-0358s
SP	Survey	BLM-Richfield	C. Harmon	Lone Cedar Community Pit Expansion	U-94-BL-0672b
SP	Survey	USFS-Manti/La Sal	L. Evans	Jungle Aspen Regeneration Burn	U-94-FS-0032f
SP	Survey/Monitor	USFS-Manti/La Sal	S. McDonald	Monitor & Data Recovery - New Sewerline, 42Sp274	U-94-FS-0111f
SP	Survey	USFS-Manti/La Sal	L. Evans	Cove Creek Watershed Treatment	U-94-FS-0377f
SP	Survey	USFS-Manti/La Sal	R. Mathies	Clifford Sackett Private Access Road	U-94-FS-0380f
SP	Survey	USFS-Manti/La Sal	R. Mathies	Baseball Flat Gravel Pit	U-94-FS-0382f
SP/UT	Survey	USFS-Manti/La Sal	B. Blackshear	Price District Water Trough and Guzzlers	U-94-FS-0347f
SV	Survey	AERC	R. Hauck	SUFC 94-1	U-94-AF-0117f
SV	Survey	Abajo	J. Montgomery	UDOT Sevier River Bridge Replacement vic. Redmond	U-94-AS-0023p,s
SV	Survey	Abajo	K. Montgomery	UDOT SR 260 Improvement	U-94-AS-0567b,p
SV	Survey	Abajo	K. Montgomery	Clear Creek Material Pit for I-70 (UDOT)	U-94-AS-0573p
SV	Survey	Abajo	K. Montgomery	UDOT I-70 Sevier Interchange Maintenance	U-94-AS-0580b
SV	Survey	BLM-Richfield	C. Harmon	Sage Flat Landfill Road	U-94-BL-0078b
SV	Survey	BLM-Richfield	C. Harmon	Farnsworth Quarry	U-94-BL-0359s
SV	Survey	BLM-Richfield	C. Harmon	Gary Nave Pipeline	U-94-BL-0671b
SV	Survey	BLM-Richfield	C. Harmon	South Central Telephone Relocated Cable	U-94-BL-0736b
SV	Survey	Baseline	G. Norman	US West Fiberoptics, Richfield to Sevier	U-94-BS-0523b,s
SV	Survey	Baseline	A. Nielson	UDOT Sevier River Bridge - Lost Creek	U-94-BS-0610p,s
SV	Survey	Baseline	A. Nielson	UDOT Nebeker Ln Bridge Over Sevier R nr Anabella	U-94-BS-0611p,s
SV	Survey	Intersearch	B. Frank	US West Clear Creek Canyon	U-94-IG-0531?
SV	Survey	Intersearch	B. Frank	State Lands - Aurora Survey	U-94-IG-0735s
SV	Survey	Nielson Cons.	A. Nielson	US West, Cove Fort	U-94-NP-0325f,s
SV	Survey	USFS-Fishlake	R. Leonard	Mill Creek and Annabella Timber Sales	U-94-FS-0057f
SV	Survey	USFS-Fishlake	L. Leach	Fishlake Survey (San Diego State University)	U-94-FS-0098f
SV	Survey	USFS-Fishlake	R. Leonard	Second Left Hand Fork Trail	U-94-FS-0232f

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
SV	Survey	USFS-Fishlake	R. Leonard	Fish Lake Improvements	U-94-FS-0259f
SV	Survey	USFS-Fishlake	R. Leonard	Dam Reconstruction at Twin Ponds & Abe's Reservoir	U-94-FS-0326f
SV	Survey	USFS-Fishlake	R. Leonard	Jolly Mill Point Timber Sale	U-94-FS-0327f
SV	Survey	USFS-Fishlake	R. Leonard	Mortenson Land Exchange	U-94-FS-0420f
SV	Survey	USFS-Fishlake	R. Leonard	West Tidwell Salvage Sale	U-94-FS-0421f
SV	Survey	USFS-Fishlake	R. Leonard	Hansen Land Exchange	U-94-FS-0742f
SV	Survey	USFS-Fishlake	R. Leonard	South Last Chance Aspen Timber Sale	U-94-FS-0744f
SV	Survey	Utah Trust Lands	K. Wintch	Bagley Meadows Parcel	U-94-UM-0363s
SV	Survey	Utah Trust Lands	K. Wintch	Tenderfoot Ridge Parcel	U-94-UM-0811s
SV	Survey	Utah Trust Lands	K. Wintch	Guard Station Hill	U-94-UM-0812s
TO	Survey	ARCON	G. Norman	USPCI Grassy Mountain Exchange 3	U-94-AK-0390b
TO	Survey	BLM-Fillmore	N. Shearin	Brush Creek Pipeline	U-94-BL-0268b
TO	Survey	BLM-Salt Lake	M. Brewster	Saxton Oil Access Road	U-94-BL-0015b
TO	Survey	BLM-Salt Lake	M. Brewster	Rediam Pipeline Extension	U-94-BL-0029b
TO	Survey	BLM-Salt Lake	M. Brewster	Cold Spring Burn	U-94-BL-0065b
TO	Survey	BLM-Salt Lake	M. Brewster	Dead Cow Materials Pit	U-94-BL-0141b
TO	Survey	BLM-Salt Lake	J. Vosskuhler	Needle Point Community Pit	U-94-BL-0257b
TO	Survey	BLM-Salt Lake	M. Brewster	The Boyd Warr Exchange	U-94-BL-0320b
TO	Survey	BLM-Salt Lake	J. Vosskuhler	World Minerals Marie Project	U-94-BL-0456b
TO	Survey	BLM-Salt Lake	R. Macpherson	White Rocks ESR Emergency Fire Rehabilitation	U-94-BL-0584b
TO	Survey	BLM-Salt Lake	M. Brewster	Fish Springs Cattle Exclosure	U-94-BL-0780w
TO	Survey	BLM-Salt Lake	M. Brewster	Emergency Fire Rehab 1994	U-94-BS-0423b
TO	Survey	Hill AFB	D. Weder	Target 21 Upgrade	U-94-HL-0120m
TO	Survey	Hill AFB	D. Weder	Fiberoptic to Existing Cinetheodolite Pads 41 & 42	U-94-HL-0122m
TO	Survey	Hill AFB	D. Weder	Detach 3 Expansion	U-94-HL-0191m
TO	Survey	Hill AFB	D. Weder	Mini Mute Site by TPQ 39	U-94-HL-0794m
TO	Survey	Hill AFB	D. Weder	Sand Island to Wildcat Road	U-94-HL-0795m
TO	Survey	Hill AFB	D. Weder	Wildcat South End Tank Target	U-94-HL-0796m
TO	Excavation	JBR	S. Billat	Excavations at Tooele Pioneer Cemetery	U-94-JB-0447s(e)
TO	Survey	Sagebrush	W. Simmons	UDOT Lowe to Delle Rotomilling Storage Site	U-94-SJ-0168p
TO	Survey	USAS-Salt Lake/Davis	J. Vosskuhler	Simpson Springs CCC Camp	U-94-US-0258b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
TO	Survey	USFS-Uinta	M. DePietro	W. Bennion & Benmore/Little Valley Pipelines	U-94-FS-0163f
TO	Survey	USFS-Uinta	M. DePietro	Sabie Bench Spring Redevelopment	U-94-FS-0195f
TO	Survey	USFS-Uinta	M. DePietro	Bennion Unit Division Fence	U-94-FS-0240f
TO	Survey	USFS-Uinta	C. Thompson	Joe's Canyon Mine	U-94-FS-0801f
UN	Survey	AERC	R. Hauck	Three Wells vic. Wild Horse Bench	U-94-AF-0166b
UN	Survey	AERC	G. Hadden	CNG Well RBU 8-11F	U-94-AF-0213b
UN	Survey	AERC	G. Hadden	Eight Wells in Pleasant Valley	U-94-AF-0331b
UN	Survey	AERC	R. Hauck	Water Injection Line in the Coyote Basin	U-94-AF-0555b
UN	Survey	AERC	R. Hauck	Pipeline for Shoyo Unit No. 37 vic. White River	U-94-AF-0600i
UN	Survey	AERC	G. Hadden	Two State Wells vic. Castle Peak Draw	U-94-AF-0783s
UN	Survey	AERC	G. Hadden	Three Wells vic. Ouray	U-94-AF-0784i
UN	Survey	AIA	J. Truesdale	Nine Chapita Wells	U-94-AY-0082b
UN	Survey	AIA	J. Truesdale	Chapita Well CWU-432-12N	U-94-AY-0162b
UN	Survey	AIA	J. Truesdale	Petroglyph and Enron Wells	U-94-AY-0310i
UN	Monitor	AIA	J. Truesdale	Enron Natural Cotton 12-17 Well Monitor	U-94-AY-0387i
UN	Survey	AIA	J. Truesdale	Enron Chapita Well Pipeline	U-94-AY-0388b
UN	Survey	AIA	J. Truesdale	Glen Bench Gravel Pits	U-94-AY-0394i
UN	Monitor	AIA	J. Truesdale	Enron NBU 333-2E Well Monitor	U-94-AY-0426i
UN	Monitor	AIA	J. Truesdale	Enron Natural Cotton 43-16 Well Monitor	U-94-AY-0427i
UN	Survey	AIA	J. Truesdale	Chapita Wells - 10 CWU Units	U-94-AY-0428b
UN	Survey	AIA	J. Truesdale	Three Enron Chapita Wells Pipelines	U-94-AY-0453b
UN	Survey	AIA	J. Truesdale	Two Enron Chapita Wells: CWU 440-14F & CWU 459-11N	U-94-AY-0596b
UN	Survey	AIA	J. Truesdale	Snyder Oil Wells Horseshoe Bend #86-12, 9-4 & 4-14	U-94-AY-0628b,s
UN	Survey	AIA	J. Truesdale	Horseshoe Bend 36-8 Well and Access	U-94-AY-0719b
UN	Survey	AIA	J. Truesdale	Enron Flowline for NBU 333-2E	U-94-AY-0731i
UN	Survey	AIA	J. Truesdale	Ouray Gravel Pit	U-94-AY-0779i
UN	Survey	Alpine	A. Reed	Bonanza Anode System	U-94-A1-0317b,s
UN	Survey	BIA-Phoenix	N. Crozier	UOIR Consolidated #15 Road Survey	U-94-BI-0248i
UN	Survey	BIA-Phoenix	N. Crozier	UOIR Consolidated #16 Road Survey	U-94-BI-0249i
UN	Survey	BLM-Vernal	B. Phillips	Uintah County Anamometer Site	U-94-BL-0066b
UN	Survey	BLM-Vernal	B. Phillips	Pariette Draw Road '94	U-94-BL-0079b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
UN	Survey	BLM-Vernal	B. Phillips	Harley Jackson Right-of-Way	U-94-BL-0080b
UN	Survey	BLM-Vernal	B. Phillips	Bitter Creek Burn	U-94-BL-0153b
UN	Survey	BLM-Vernal	B. Phillips	West Brush Creek Gap Fence/Slickrock Guzzler	U-94-BL-0228b
UN	Survey	BLM-Vernal	B. Phillips	Book Cliffs RMP Land Sale Amendment	U-94-BL-0270b
UN	Survey	BLM-Vernal	B. Phillips	Bitter Creek Greasewood Burn	U-94-BL-0280b
UN	Survey	BLM-Vernal	D. Beau-Schantz	Twelve Mile Wash Mineral Disposal	U-94-BL-0345b
UN	Survey	BLM-Vernal	B. Phillips	Pariette Draw Riprap Project	U-94-BL-0565b
UN	Survey	BLM-Vernal	B. Phillips	Brush Creek Scenic Byway	U-94-BL-0566b,p,s
UN	Survey	BLM-Vernal	E. Moncrief	Young Irrigation Pipeline	U-94-BL-0587b
UN	Survey	BLM-Vernal	D. Beau-Schantz	Ouray Wildlife Refuge Disposal	U-94-BL-0732b
UN	Survey	BYU-OPA	R. Talbot	Steinaker Borrow Pit	U-94-BC-0392w
UN	Survey	BYU-OPA	R. Talbot	Steinaker Survey	U-94-BC-0513w
UN	Survey	BYU-OPA	R. Talbot	SOCO Well Pads & Pipelines	U-94-BC-0723b,s
UN	Survey	Baseline	A. Nielson	UDOT Ashley Creek Bridge Replacement US 40	U-94-BS-0667p,s
UN	Survey	Baseline	A. Nielson	UDOT Lapoint Bridges on SR 121	U-94-BS-0668i,s
UN	Survey	GRI	C. Conner	Seven Wells in East Coyote Draw	U-94-GB-0113b
UN	Survey	GRI	C. Conner	Hells Hole Unit 2-1-11-25 and Access	U-94-GB-0114b
UN	Survey	GRI	C. Conner	15 Wells in the Southman Canyon Gas Field	U-94-GB-0223b
UN	Survey	GRI	C. Conner	Two Wells in East Coyote Draw	U-94-GB-0251b
UN	Survey	GRI	C. Conner	Glen Bench State Well 6-16	U-94-GB-0561s
UN	Survey	GRI	C. Conner	Rocky Mountain Wells 4-2 & 4-3 South of Myton	U-94-GB-0576b
UN	Survey	GRI	C. Conner	Six Wells vic. Evacuation Creek for Trinity	U-94-GB-0706b,s
UN	Survey	GRI	C. Conner	Glen Bench State Wells 7-16 and 12-16 & Access	U-94-GB-0721s
UN	Survey	GRI	C. Conner	New Access to Chandler Bonanza 5-30 Well	U-94-GB-0726b
UN	Survey	GRI	C. Conner	COG State 33-16 Well and Access	U-94-GB-0754s
UN	Survey	JBR	S. Billat	Hanging Rock Federal 24-13 Well	U-94-JB-0601b
UN	Survey	Metcalf	J. Scott	Two Coastal Wells	U-94-MM-0076b,i
UN	Survey	Metcalf	A. McKibbin	Coastal NBU 221 Well, Access & Pipeline	U-94-MM-0116s
UN	Survey	Metcalf	D. Barclay	Coastal NBU 222 Well	U-94-MM-0164s
UN	Survey	Metcalf	K. Pool	Coastal NBU 223 Well	U-94-MM-0219s
UN	Survey	Metcalf	K. Pool	Coastal NBU 224 Well and Access Road	U-94-MM-0220s

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
UN	Survey	Metcalf	J. Scott	Reliable Exploration 3-D Seismic	U-94-MM-0222b,i
UN	Survey	Metcalf	J. Scott	Reliable Little Desert 2-D Seismic	U-94-MM-0256i
UN	Survey	Metcalf	J. Scott	Three PG&E Wells	U-94-MM-0537b,s
UN	Survey	Metcalf	K. Pool	Four Wells for Consolidated Oil	U-94-MM-0568b
UN	Survey	Metcalf	K. Pool	Snyder Oil Southam Canyon 9-3-M Pipeline & Road	U-94-MM-0589b
UN	Survey	Metcalf	K. Pool	Six Snyder Pipelines	U-94-MM-0590b
UN	Survey	Metcalf	D. Barclay	3 Snyder Oil Ute Well Pads and Access	U-94-MM-0591i
UN	Survey	Metcalf	K. Pool	Two Snyder Oil Ute Wells	U-94-MM-0633i
UN	Survey	Metcalf	J. Scott & K. Pool	Six Coastal Federal and State Wells	U-94-MM-0649b,s
UN	Survey	Metcalf	J. Scott	Five Snyder Federal Wells	U-94-MM-0650b
UN	Survey	Metcalf	K. Pool	Beartooth Duncan Federal 1 to Squire 1 Pipeline	U-94-MM-0654b,p
UN	Survey	Metcalf	D. Barclay	Five Snyder Ute Wells and Access	U-94-MM-0655i
UN	Survey	Metcalf	J. Scott	Four Snyder Federal Wells	U-94-MM-0656b
UN	Survey	Metcalf	M. Metcalf	Snyder Southam Canyon 8-4-J Well	U-94-MM-0661b
UN	Survey	Metcalf	D. Barclay	Six Coastal Ute Wells and Accesses + Addendum	U-94-MM-0663i
UN	Survey	Metcalf	D. Barclay	COG State 12-32 Well	U-94-MM-0705b,s
UN	Survey	Metcalf	J. Scott	Three COG Wells	U-94-MM-0751b,s
UN	Survey	NPS-Dinosaur	D. Whitman	Orchid Draw Wash	U-94-NA-0777n
UN	Survey	Nielson Cons.	A. Nielson	White Rock Road Material Borrow	U-94-NP-0204i
UN	Survey	Sagebrush	H. Weymouth	Five Wells near Pariette Draw	U-94-SJ-0096b
UN	Survey	Sagebrush	H. Weymouth	Stagecoach 44-8 Well	U-94-SJ-0137i
UN	Survey	Sagebrush	M. Polk	Parriette Draw Federal 13-24 Well	U-94-SJ-0518b
UN	Survey	Sagebrush	M. Polk	Wildrose Federal 13-24 Well	U-94-SJ-0557b
UN	Survey	Sagebrush	W. Simmons	UDOT US 40 to Colorado Border Widening	U-94-SJ-0662b,s
UN	Survey	Sagebrush	M. Polk	LaPaglia No. 1 Well and Access Road	U-94-SJ-0664b
UN	Survey	Sagebrush	M. Polk	Two Flow Lines for PG&E	U-94-SJ-0698b
UN	Survey	Sagebrush	M. Polk	Pariette Federal 14-24 and 24-24 Well Pads	U-94-SJ-0781b
UN	Survey	Senco-Phenix	J. Senulis	Red Wash Unit No. 305(4-1) Well, Access & Flowline	U-94-SC-0395b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit Nos. 312, 316 and 321	U-94-SC-0572b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 319	U-94-SC-0680b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 306	U-94-SC-0681b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 307	U-94-SC-0682b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 308	U-94-SC-0683b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 309	U-94-SC-0684b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 310	U-94-SC-0685b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 311	U-94-SC-0686b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 313	U-94-SC-0687b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 314	U-94-SC-0688b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 315	U-94-SC-0689b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 317	U-94-SC-0690b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 318	U-94-SC-0691b
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 320	U-94-SC-0692s
UN	Survey	Senco-Phenix	J. Senulis	Chevron Red Wash Unit No. 322	U-94-SC-0693s
UN	Survey	Sen^Co-Phenix	J. Senulis	Red Wash Expansion	U-94-SC-0694b,p,s
UN	Survey	Senco-Phenix	J. Senulis	Gypsum Hills Unit No. 14	U-94-SC-0747i
UN	Survey	Senco-Phenix	J. Senulis	Gypsum Hills Unit No. 15	U-94-SC-0748i
UN	Survey	Senco-Phenix	J. Senulis	Gypsum Hills Unit No. 19	U-94-SC-0749i
UN	Survey	USF&W-Denver	R. Lewis	Ouray Borrow Area	U-94-UK-0044w
UN	Survey	USFS-Ashley	B. Loosle	Murray Irrigation Project	U-94-FS-0146p
UN	Survey	USFS-Ashley	K. Wilkins	Charley Park Sales	U-94-FS-0225f
UN	Survey	USFS-Ashley	B. Bachtel	White Rocks Campground Fence	U-94-FS-0274f
UN	Survey	USFS-Ashley	D. Wilson	Gull Lake Mining Claim	U-94-FS-0276f
UN	Survey	USFS-Ashley	B. Loosle	Steinaker Flood Control	U-94-FS-0307s
UN	Survey	USFS-Ashley	D. Wilson	Steinaker Dam Riprap	U-94-FS-0361f
UN	Survey	USFS-Ashley	B. Loosle	Anderson Creek Timber Sale EA	U-94-FS-0444f
UN	Survey	W. Wyoming College	K. Thompson	SOCO Flat Mesa Federal 2-7 Lateral	U-94-WK-0429b
UN	Survey	Woods Canyon	J. Fetterman	Vernal Pipe Replacement and CPS Site	U-94-WN-0105b,s
UN	Survey	Woods Canyon	J. Fetterman	NWR Cathodic Station 1037	U-94-WN-0154b
UN/CO	Survey	AERC	R. Hauck	Pipeline Evaluation: Evacuation Creek	U-94-AF-0412b,s
UT	Survey	BLM-Salt Lake	M. Brewster	Mining Claim 345, 577, etc.	U-94-BL-0038b
UT	Survey	BLM-Salt Lake	M. Brewster	White Knolls Community Pit	U-94-BL-0313b
UT	Survey	BLM-Salt Lake	J. Vosskuhler	North Wiley Canyon Community Pit	U-94-BL-0651b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
UT	Survey	BYU-Museum	J. Janetski	Road Corridor on Swede's Lane	U-94-BC-0539s
UT	Survey	BYU-OPA	S. Baker	Hafen Pipeline	U-94-BC-0169s
UT	Survey	Desert West	K. Carambelas	Springville Heights Subdivision	U-94-WZ-0542p
UT	Survey	Nielson Cons.	A. Nielson	UDOT 800/900 S-Springville; SR 89 to Mapleton Main	U-94-NP-0130s
UT	Survey	Nielson Cons.	A. Nielson	Springville Hobble Creek Bridge	U-94-NP-0131s
UT	Collection	Nielson Cons.	A. Nielson	Mitigation at 42Ut920	U-94-NP-0354s(c)
UT	Survey	Nielson Cons.	A. Nielson	North Springville Mountain Spring	U-94-NP-0364s
UT	Survey	Nielson Cons.	A. Nielson	Main Street & 1600 N Upgrade in Springville	U-94-NP-0441p,s
UT	Survey	Sagebrush	H. Weymouth	University Avenue Intersection (UDOT)	U-94-SJ-0006p,s
UT	Survey	Sagebrush	S. Murray	Two Railroad Crossings Near Santaquin (UDOT)	U-94-SJ-0753p,s
UT	Survey	USFS-Uinta	C. Thompson	Dry Canyon Trail Head	U-94-FS-0156f
WA	Survey	ARCON	G. Norman	UP&L UAMPS 138KV 1993 System	U-94-AK-0106b
WA	Survey	ARCON	G. Norman	Bog Pole Road Realignment Easement 266	U-94-AK-0368s
WA	Survey	BOR	S. Larralde	Big Dry Hollow Spring Improvements	U-94-BE-0353f
WA	Survey	BYU-OPA	S. Baker	Three Segments of US-189 in Provo Canyon	U-94-BC-0236p
WA	Survey	Desert West	K. Carambelas	U.S. West Park City to Heber Conduit	U-94-WZ-0517s
WA	Survey	Desert West	K. Carambelas	US West Heber To Whiskey Springs	U-94-WZ-0536s
WA	Survey	Nielson Cons.	A. Nielson	UAMPS Quail Creek 69KV Line	U-94-NP-0152p,s
WA	Survey	Nielson Cons.	A. Nielson	UDOT Current Creek - Highway 40	U-94-NP-0339p,s
WA	Survey	Sagebrush	H. Weymouth	Strawberry Reclamation Project	U-94-SJ-0608f
WA	Survey	USFS-Wasatch/Cache	T. Scott	Shingle Creek Water System	U-94-FS-0306f
WB	Survey	Hill AFB	D. Weder	Little Mountain Shaker Building	U-94-HL-0022m
WB	Survey	Sagebrush	M. Polk	UDOT Widen 5600 South betwn I-15 & 3800 W in Roy	U-94-SJ-0173p,s
WB	Survey	Sagebrush	M. Polk	Country Hills Drive (UDOT)	U-94-SJ-0308p,s
WB	Survey	Sagebrush	A. Polk	UDOT Widening of SR-126 in West Haven	U-94-SJ-0336p,s
WB	Survey	Sagebrush	M. Polk	Ogden Entryways (UDOT)	U-94-SJ-0411s
WB	Survey	Sagebrush	S. Murray	Midland Drive Intersection Expansion (UDOT)	U-94-SJ-0417b
WB	Survey	Sagebrush	M. Polk	Two Bridges in Ogden Valley (UDOT)	U-94-SJ-0699p,s
WB	Survey	Sagebrush	A. Polk	5600 South Additions in Roy (UDOT)	U-94-SJ-0729p,s
WB	Survey	Sagebrush	W. Simmons	Ogden Water Treatment	U-94-SJ-0782f,p,s
WB	Survey	USFS-Wasatch/Cache	T. Scott	Ogden Ranger District Recreation Projects	U-94-FS-0144f

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
WB	Survey	USFS-Wasatch/Cache	T. Scott	Snowbasin Downhill Ski Run	U-94-FS-0333f
WN	Survey	BLM-Price	B. Miller	Sandy Well	U-94-BL-0772b
WN	Survey	BLM-Richfield	C. Harmon	Fremont Dump Extension	U-94-BL-0077b
WN	Survey	BLM-Richfield	C. Harmon	Burr Point Reservoir	U-94-BL-0090b
WN	Survey	BLM-Richfield	C. Harmon	Noton Gravel Pit	U-94-BL-0091b
WN	Survey	BLM-Richfield	C. Harmon	Wayne County Long Hollow Dump	U-94-BL-0305b
WN	Survey	BLM-Richfield	C. Harmon	Goatwater Fence	U-94-BL-0756b
WN	Survey	BLM-Richfield	C. Harmon	Jon Young Access Road	U-94-BL-0757b
WN	Survey	NPS-Canyonlands	N. Coulam	Land of Standing Rocks Campsite Inventory	U-94-NA-0455n
WN	Survey	NPS-Capitol Reef	L. Kreutzer	New Septic System, Capitol Reef National Park	U-94-NA-0798n
WN	Survey	NPS-Capitol Reef	L. Kreutzer	Vault Toilets, East Boundary and Hickman Bridge	U-94-NA-0799n
WN	Survey	NPS-Capitol Reef	L. Kreutzer	Garkane Powerline Reconstruction and R/W Grant	U-94-NA-0804n
WN	Survey	NPS-Glen Canyon	C. Goetze	Backcountry Mgt Plan Campsites vic Orange Cliffs	U-94-NA-0197n
WN	Survey	USFS-Dixie	A. Chappell	Beaver Dam Reconstruction	U-94-FS-0700f
WN	Survey	USFS-Fishlake	R. Leonard	Sun Glow Campground Toilet Replacement	U-94-FS-0198f
WS	Survey	ARCON	G. Norman	Shivwits Power Plant	U-94-AK-0370b,i,p,s
WS	Survey/Test	ARCON	G. Norman	Hurricane to Hildale Transmission Alternative	U-94-AK-0551b
WS	Survey	ARCON	G. Norman	TASCO Natural Gas Pipeline	U-94-AK-0657b,i,s
WS	Survey	Abajo	J. Montgomery	UDOT SR 9 & SR 17 vic. Hurricane and LaVerkin	U-94-AS-0012p,s
WS	Survey	Abajo	J. Montgomery	UDOT Mesquite Wash Bridge Replacement	U-94-AS-0024p,s
WS	Survey/Test	Abajo	K. Montgomery	UDOT SR-18 St. George to Snow Canyon	U-94-AS-0570b,p,s
WS	Survey	BLM-Cedar City	G. Dalley	Harlow NOI UTU-71737	U-94-BL-0485b
WS	Survey	BLM-Cedar City	G. Dalley	Phillips NOI UTU-71736	U-94-BL-0486b
WS	Survey	BLM-Cedar City	G. Dalley	Erickson Notice	U-94-BL-0487b
WS	Survey	BLM-Cedar City	G. Dalley	Moore NOI UTU-71740	U-94-BL-0488b
WS	Survey	BLM-Cedar City	G. Dalley	Terry Notice	U-94-BL-0489b
WS	Survey	BLM-Cedar City	G. Dalley	U.S.G.S. Geophysical Survey and Wells	U-94-BL-0490b
WS	Survey	BLM-Cedar City	G. Dalley	Diamond Valley Fence	U-94-BL-0491b
WS	Survey	BLM-Cedar City	G. Dalley	KMG Limestone	U-94-BL-0492b
WS	Survey	BLM-Cedar City	G. Dalley	Santa Clara Quantity Grant	U-94-BL-0493b
WS	Survey	BLM-Cedar City	G. Dalley	North Creek Oil Well Plugging	U-94-BL-0494b

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
WS	Survey	BLM-Cedar City	G. Dalley	Harrisburg Jct. Quantity Grant	U-94-BL-0495b
WS	Survey	BLM-Cedar City	G. Dalley	Tad Mine UTU-72210	U-94-BL-0496b
WS	Survey	BLM-Cedar City	G. Dalley	Carroll Notice UTU-72243	U-94-BL-0497b
WS	Survey	BLM-Cedar City	G. Dalley	Delong NOI UTU-70057	U-94-BL-0498b
WS	Survey	BLM-Cedar City	G. Dalley	Warner Ridge Deco. Stone	U-94-BL-0499b
WS	Survey	BLM-Cedar City	G. Dalley	Bergosh Sand Dunes	U-94-BL-0500b
WS	Survey	BLM-Cedar City	G. Dalley	Cornelius Notice	U-94-BL-0501b
WS	Survey	BLM-Cedar City	G. Dalley	Landscape Rock - Personal	U-94-BL-0502b
WS	Survey	BLM-Cedar City	G. Dalley	Goldstrike Road and Drill	U-94-BL-0503b
WS	Survey	BLM-Cedar City	G. Dalley	Tolman Flood Control Dike	U-94-BL-0504b
WS	Survey	BLM-Cedar City	G. Dalley	Hurricane Allotment Pipe and Trough	U-94-BL-0505b
WS	Survey	BLM-Cedar City	G. Dalley	Brooks Pace Water Tank	U-94-BL-0506b
WS	Survey	BLM-Cedar City	G. Dalley	Bergosh Sand	U-94-BL-0507b
WS	Survey	BLM-Cedar City	G. Dalley	Bedolla Notice	U-94-BL-0508b
WS	Survey	BLM-Cedar City	G. Dalley	Delong Notice	U-94-BL-0509b
WS	Survey	BLM-Cedar City	G. Dalley	Desert Tortoise Exchange	U-94-BL-0510b
WS	Survey	BLM-Cedar City	G. Dalley	Motoqua Fire Rehab	U-94-BL-0511b
WS	Survey	BLM-Cedar City	G. Dalley	Future Opportunity NOI UTU-72773	U-94-BL-0512b
WS	Survey	BYU-OPA	R. Talbot	Sand Hollow	U-94-BC-0290b
WS	Survey	BYU-OPA	R. Talbot	Purgatory Flat	U-94-BC-0328b
WS	Test	BYU-OPA	R. Talbot	Test Excavation at 42Ws2269	U-94-BC-0408s(e)
WS	Survey/Test	Baseline	A. Nielson	Hildale-Hurricane Utilities Inventory and Testing	U-94-BS-0422p,s
WS	Survey	Baseline	A. Nielson	Kanarraville Rest Stop - I-15 Redesign	U-94-BS-0430p,s
WS	Survey	Dames & Moore	S. Novak	Utah Abandoned Mines - Silver Reef	U-94-DH-0273b,p
WS	Survey	Intersearch	B. Frank	St. George - Pierce Wash Easement	U-94-IG-0014s
WS	Survey	Intersearch	B. Frank	Willis State Lands Survey	U-94-IG-0039s
WS	Survey	Intersearch	B. Frank	Quail Creek Debris Basins	U-94-IG-0086b
WS	Survey	Intersearch	B. Frank	St. George - Bloomington Sewer Project Road	U-94-IG-0237b
WS	Survey	Intersearch	B. Frank	RUI Washington Black Ridge Mineral Lease	U-94-IG-0238s
WS	Survey	Intersearch	B. Frank	Ivins Bike Path	U-94-IG-0279s
WS	Survey	Intersearch	B. Frank	St. George - Upper Santa Clara Aqueduct	U-94-IG-0527b,i,s

ANTIQUITIES SECTION, UTAH DIVISION OF STATE HISTORY
1994 PROJECT REPORTS RECEIVED

County	Activity	Organization	Field Supervisor	Project Name	Project Number
WS	Survey	Intersearch	B. Frank	Gunlock Wells and Pipeline (2 reports)	U-94-IG-0528b
WS	Survey	Intersearch	B. Frank	Gunlock Road (UDOT)	U-94-IG-0529b,s
WS	Survey	Intersearch	B. Frank	Alpha Engineering Gould Wash	U-94-IG-0530s
WS	Survey	Intersearch	B. Frank	Enviroserve Microwave Tower Survey	U-94-IG-0585b
WS	Survey	Intersearch	B. Frank	Arid Lands - Sky Ranch	U-94-IG-0586b
WS	Survey	Intersearch	B. Frank	Southwest Testing Brookside Estates Access	U-94-IG-0640b
WS	Survey	Intersearch	B. Frank	Topham-Kunz Outdoor Advertising	U-94-IG-0755p
WS	Survey	NPS-Zion	B. Frank	Shunes Creek Water Diversion	U-94-NA-0101n
WS	Survey	NPS-Zion	J. Burns	Parunaweap 1994 Historical Survey	U-94-NA-0123n
WS	Survey	NPS-Zion	L. Naylor	Stave Sawmill Survey	U-94-NA-0171n
WS	Excavation	NPS-Zion	J. Burns	Canyon Jct Roasting Pit Excavation, 42Ws2864	U-94-NA-0559n(e)
WS	Monitor	NPS-Zion	L. Naylor	ZNP Bicycle Trail Construction Monitor	U-94-NA-0727n
WS	Excavation	NPS-Zion	L. Naylor	Sites in Parunuweap Cny-42Ws104, 149, 2590 & 2804	U-94-NA-0728n(e)
WS	Survey	Nielson Cons.	A. Nielson	Hildale-Colorado City Wastewater Lagoon	U-94-NP-0442p
WS	Survey	USFS-Dixie	M. Jacklin	Atchinson Spring Pipeline	U-94-FS-0174f
WS	Survey	USFS-Dixie	M. Jacklin	Bowler Road Right of Way	U-94-FS-0175f
WS	Survey	USFS-Dixie	M. Jacklin	Ox Valley Revegetation	U-94-FS-0176f
WS	Survey	USFS-Dixie	M. Jacklin	Pine Park Road Gravel Pit	U-94-FS-0177f
WS	Survey	USFS-Dixie	M. Jacklin	Chinese Ditch Trail	U-94-FS-0384f
WS	Survey	USFS-Dixie	M. Jacklin	Pine Valley Bunkhouse	U-94-FS-0385f
WS	Survey	USFS-Dixie	M. Jacklin	Pine Valley Powerline	U-94-FS-0624f
WS	Survey	USFS-Dixie	M. Jacklin	Northern Stone Supply Claim	U-94-FS-0625f

REVIEWS

Across the West: Human Population Movement and the Expansion of the Numa. by David B. Madsen and David Rhode, editors. University of Utah Press, 1994. xi + 255 pp., figures, tables, references. $50.00 (cloth).

Reviewed by **Robert L. Kelly**, University of Louisville, Department of Anthropology, Louisville KY 40292

I love maps. In school the lines and patterns tracing the physical and human history of the globe fascinated me. My favorite were the maps with bold, curving arrows that showed the Huns' descent on Rome, the Oregon Trail, the stream of Bantu through Africa--the movement of humans across the globe. So, it seemed natural to me that archaeology should also put arrows on maps, arrows to show, say, the migration of Lapita peoples across the Pacific, or of Pleistocene Asians into North America.

Then I read Binford and discovered the error of my ways. Migration, complete with its (horrors!) normative concept of culture was out, adaptation was in.

I first learned of the Numic migration 23 years ago listening to David Hurst Thomas' lectures around a morning campfire. But it did not capture my imagination, and I turned more and more to environment and technology, the only factors (I thought) of importance in adaptation.

Then I read *Across the West* and discovered the error of my ways. It is hard for me to speak with authority, but this volume must be one of the finest examples of archaeologists grappling with the putative migration of a ethnolinguistic unit. The book is divided into four sections: Background, Theoretical and Methodological Issues, Regional Perspectives, and Summary. Well-edited and produced, it contains fine contributions from 25 authors.

For the uninitiated, the Numa (or Numics) spoke and still speak languages that formed a related group within the Uto-Aztekan linguistic family. The (Sydney) Lamb model suggests that they migrated out of southeastern California around 1000 A.D. as a single wave, replacing or incorporating pre-Numics in the Great Basin, as well as Fremont and Anasazi horticulturalists.

But there are problems in this model, and they are the reason for this volume. For starters, the date is based on an erroneous linguistic technique (Grayson); other techniques and data, however, support the 1000 A.D. date (Rhode and Madsen, Jorgenson, Bettinger), but we still do not know when the migration happened (or even if it is logical to search for 'the' date). Many archaeologists, including some here, still assume the 1000 A.D. date is correct because in some places, e.g., the eastern Basin, there are dramatic changes in material culture soon after 1000 A.D. (Janetski, Madsen, Reed). But elsewhere e.g., the western Great Basin, there is no such radical change (Elston, Raven).

Bettinger has made a sophisticated attempt to account for the migration in theoretical terms. Briefly, he argues that the Numics developed an adaptive strategy that resulted (from and in?) population growth and that made intense use of low-return but reliable foods such as grass seeds and pinyon. (If true, this probably marks a shift in women's labor, the reasons for which need to be considered.) The Numics then expanded out of southeast California and outcompeted the Basin's pre-Numic inhabitants.

Bettinger argues that the migration might not be expected to alter the population growth curve that would result from a normal rate of growth, or to expand diet breadth. Instead, he only expects differences in the *intensity* of the use of certain foods--something that is far more difficult to document than changes in food diversity (though the latter has its own problems). Ethnographic data are important to Bettinger's model (and important to many to define what artifacts signal a Numic presence). But one can find ethnographic data that fit a model of migration and competitive exclusion or not (Madsen, Knack).

One potential test of Bettinger's model lies in the age of the late prehistoric alpine villages of Mt Jefferson (central Nevada) and the White Mts (east central California). The former should date later then the latter as they are further north, but they do not, even when accounting for the 'old wood' effect (Thomas). This may fit with Aikens' suggestion that the Numics were in central Nevada since 3500 B.C., although not necessarily. (Rhode also uses TL dates to show that pottery does not 'move' in the direction implied by the Lamb model; and Lyneis suggests that the existence of two pottery technologies in the southern Basin means that Numic pottery may not have even had a single origin and direction of spread.)

Unfortunately, the regional papers do not evaluate Bettinger's model. Instead, they document changes in material culture and ask: do these changes signify the appearance of the Numics? A problem that all contributors recognize is how do we define Numic archaeologically? This is more than a problem in definition. We can't document or investigate how ethnolinguistic groups migrate if we can't see them archaeologically, but we can't see them archaeologically unless we know something about how ethnolinguistic units migrate and interact. Any study of the Numic migration is confronted by significant issues of both middle range and general theory.

Historically (and to Bettinger's argument), an important 'signature' of the migration (Fowler) is the organic component of technology--baskets, sandals, seedbeaters--artifacts that do not preserve well. Our post-1000 A.D. sample of organic technology is small, but it is a treasure trove compared to the pre-1000 A.D. sample, some of which comes from undated or poorly dated contexts (we need more AMS dates on organic artifacts from Lovelock Cave to add to those Tuohy got for the duck decoys; Rhode demonstrates that we need to use TL dates on pottery, too, rather than the associated radiocarbon dates).

Which artifact(s) is (are) to be used as a marker of ethnic change (Elston, Hughes)? This is a serious question, for if we did not know what language was spoken ethnographically in the Great Basin, would we interpret changes in the archaeology as ethnolinguistic replacement (Jones)? Pottery and basketry are the traditional favorites to mark the Numics. Following the old-dog-can't-learn-new-tricks argument, the complexity of basketry manufacture may make it a reliable ethnic marker (Adovasio and Pedler). But does a change in the ways a basket or fishing net is made *necessarily* reflect a change in population? And aren't stone tools hard to manufacture as well? And the sort of pottery techniques we see in the Great Basin are not that difficult to master--especially if one already knows something about clay, temper, and firing. How difficult does a trick have to be before an old dog won't learn it? What conditions whether an ethnic group will borrow a technique from another? How do we know when it is functional or material differences, when it is degrees of interaction (e.g., intergroup marriage) and spheres of education--and when it is the symbolic load of a piece of material culture?

It may be that changes in constellations of artifacts are the best indicators of a change in ethnic groups but several contributors clearly wish to know how much of material culture has to change for population replacement to be inferred. What, for example, do we make of the sequence in Utah, where there are two dramatic changes in material culture after 1000 A.D., one that 'replaces' the horticultural Fremont, and one about 1600 A.D. (Janetski). Are these both Numics? Is the second the Navajo? Some other interloper? One a product of migration, the other, *in situ* behavioral change? What about instances where the organic technology changes, but the stone tools remain the same, as happens in southern Idaho (Holmer)? For those who want to see continuity in material culture, it's there; for those who want to see discontinuity, it's there, too (Fowler). And what is called 'Numic' in one region, is not always what is Numic elsewhere.

Culture, and mental templates for manufacturing objects, are indeed real, but so are other factors. To talk about a change in technology without considering other factors (change in the function of a class of objects, raw material availability, mobility, etc.) is to return to the justifiably criticized normative archaeology. Are parching trays late (Sutton) because the Numics are late, or because the adaptive strategy attributed to the Numics that made use of parching trays was a late, but in situ development in response to climatic change or population density? Or because earlier parching trays have not survived the ravages of time?

Oddly enough for the Basin, environment does not play much of a role here. Only Aikens suggests that a post-500 A.D. arid interval may have played a role in the migration. Bettinger claims that climate can be made to explain anything and thus explains nothing. Perhaps Basin archaeologists are falling in line with many outside Basin archaeology, and moving away from environmental explanations. But perhaps it is because the post-500 A.D. climatic story is complex and not fully understood, and because previous efforts to link environment and behavior were conducted under an outdated school of cultural ecology (producing disappointing results and now causing some to throw the baby out with the bathwater). Simms has said that there isn't much reason why the pre-Numics could not have adopted Numic tactics--it's not like seed beaters and green cone pinyon procurement are that hard to master. So, is it that a social organization would have been coupled to these strategies that would have made them difficult to implement for the pre-Numics (albeit easy to learn)? Maybe short term environmental changes provided the sort of rapid selective context that favored a Numic over a pre-Numic strategy. Maybe not, but I think it would be unwise to write climatic change off this early in the game. (Climate certainly played a role in the 13th century abandonment of the Colorado plateau, and that may have played a role in the strategy of the Numics who may have entered the region sometime earlier.)

We still do not know if the Numic migration is about the movement of a linguistic, ethnic, and/or biological population. Boas taught us that there is no necessary reason that all these things must go together. This volume was put together before results of genetic studies of skeletal remains from the Stillwater Marsh and Great Salt Lake were available. But, unfortunately, these are still plagued by sample size problems and the inability to decide which genetic markers can trace changes in biological populations. Even if the received view is correct, there almost certainly would have been some pre-1000 A.D. gene flow between the Numics in California and whoever was in the Basin. Elston asks of the archaeology "How will I know you?"; the same question could be asked of DNA.

This volume makes considerable strides toward understanding what we are talking about when we talk about the Numic migration. But most archaeologists avoid the fact that studying migration means studying the interaction of 'ethnic' groups--and thus they avoid unfamiliar terrain: the often bewildering ways in which people categorize themselves and are categorized by others, and how groups of people who view themselves as 'different' interact under different circumstances. Even cultural anthropologists--who talk to people!--have a tough time with this. Groups who see themselves as different may be indistinguishable genetically, linguistically, or in terms of material culture. Simms, Jones, Larson and Kornfeld, and, in their conclusion, Rhode and Madsen deal with this issue. They come to no resolution, but do point to the conceptual issues that we must confront. Ethnicity is part of adaptation; it is not only a unit of adaptation. How individuals relate to others they perceive as "different" channels behavior as much as environment and technology. The degree to which there are boundaries between groups is an element of adaptive strategy. And language itself is part of the adaptive process, not just a passive recorder of the social units involved (Jorgenson).

Conceptually, how should we think of the migration--as a wave of advance, or a migration stream; one, or many 'migrations' (Simms)? Whatever it was, how would we prove *or disprove* a Numic migration (Hughes, Jones)? Rhode and Madsen conclude that trying to connect artifacts to ethnicity is useless--better to focus on behavior. I want to agree, but don't we need to see ethnic or ethnolinguistic social units archaeologically--or at least evidence that such boundaries are being negotiated--to study the role of ethnicity in adaptation? Thus, we return to the necessary link between middle range and general theory.

(Also, a discussion of ethnicity leads to the conclusion that as far as NAGPRA is concerned, it matters not when the linguistic ancestors of the Paiute, Shoshone, Ute, etc. entered the Basin. If modern peoples define prehistoric folk as ethnic affiliates no amount of proof of the migration's timing will make those feelings of connectedness go away. This must be considered in discussing the role that documenting the Numic migration has for NAGPRA compliance [Barker and Pinto].)

If I have spoken critically, it is only because this book made me think. If I have carped, it is only out of frustration and the lack of any better ideas. To conclude, then, readers of *Across the West* will come away with better, more stimulating ideas about a problem that is shaping up to be the significant issue in late Holocene Great Basin history.

Accidental Archaeologist. Jesse D. Jennings. University of Utah Press, Salt Lake City. 1994. xxi + 307 pp., index, photographs. $29.95 (cloth).

Reviewed by **William B. Fawcett, Jr.**, Department of Sociology, Social Work, and Anthropology, Utah State University, Logan, Utah 84322

Jesse Jennings' book adds to the growing number of autobiographies of the pioneering archaeologists in the Americas. Without doubt he contributed more to our knowledge of the human history of the Great Basin and other portions of the Americas than most individuals. He founded the Utah Museum of Natural History, established the Great Basin Anthropological Conference, edited the *University of Utah Anthropological Papers* and *American Antiquity*, and directed and published on some of the largest archaeological projects ever undertaken in Utah (Glen Canyon, Danger, Hogup and other caves). Jennings also wrote several major textbooks for teaching about the prehistory and Indians of the Americas. From his telling, much of this work was opportunistic, as was his first experience in archaeology in the American Midwest. He became an archaeologist by accident, but then excelled in his abilities to organize, teach and direct other aspiring archaeologists. Jennings denies that he neatly fits into any single pigeon hole or category of archaeologist, but most of us would probably view his work as largely cultural and natural historical. The experiences that he describes and many of the positions that he takes both reflect and contribute to the American archaeology that prevailed from the 1930s into the 1970s. What he tells about his own triumph over adversity reads very much like some of the scenarios that he and his students have also written about the native inhabitants of the American west. His autobiography joins the growing ranks of his contemporaries (e.g., MacNeish, Willey, etc.) in documenting this phase in the development of American archaeology.

Much of the book is devoted to describing his struggles and accomplishments. It is perhaps telling that Jennings devotes so much (half) of the book (Chapters 1-8) to events before his arrival in Utah. The latter portion of his life, for which he is most known, is sketched in much less detail (Chapters 9-15). The concluding chapters (16-17) represent his reflections on archaeology as a discipline and his contributions.

Jesse David Jennings was born in Oklahoma to a devout southern Baptist mother, and a father who worked as a traveling salesman and was often absent, and never close to his son. His family suffered illnesses and poverty that led them to move to first the Estancia Valley and then Montezuma (near Las Vegas) in New Mexico. At Montezuma, Jennings attended a now defunct Baptist college, while working to help support his family. He accompanied his Greek teacher to Chicago, and soon applied to the University of Chicago to complete graduate studies in English. His accounts of earlier brawls and employment as a police officer on the campus contrast sharply with his subsequent claims to be a pacifist and isolationist regarding World War II. As he began to take anthropology courses, his interests centered more on ethnography, but this changed after he participated in the mandatory archaeology field school. Between field schools in Illinois, Jennings returned to New Mexico and taught in a public school to supplement his family's income after his father became ill. There in 1931 he directed his first archaeological field project. During the Great Depression he worked in the American South (1933-36) supervising archaeological excavations for the Civil Works Administration (CWA) and Works Progress Administration (WPA). His PhD dissertation was based on the excavations accomplished at the Mayan city Kaminaljuyu in Guatemala (1936-37) with A.V. Kidder. For a decade (1937-48), Jennings worked for the National Park Service, first in the

American Southwest, then in the Southeast, and finally in the Plains. He is best known for his teaching and research at the University of Utah (1948-86) mentioned earlier in this review. What he tells of this portion of his life is very selective, telling little about the many students that he influenced. Beyond his discussion of tabletop archaeology as a teaching tool, he reveals very little about the content and style of his teaching. Research results are mentioned less than the logistical difficulties and costs inherent in accomplishing the research.

The final chapter (17) is the most puzzling and yet telling in the entire book. Here Jennings proposes that he accomplished his archaeological research without preconceived hypotheses, theories, or assumptions that might bias or alter the objectivity of his research. He did archaeology because it was fun, and he was good at it. He was curious about the past of Native Americans and other Americans. Many of his contemporaries share Jennings' position, that ideology has little bearing on everyday practice. Yet certainly Jennings used his preconceived notions to select various sites for investigation, to decide which observations were important and worthy of recordation, and to classify his finds, and to decide what was worthy to include in reports. As processual and post-processual archaeologists have shown there are considerable advantages to making one's assumptions and research strategies more explicit and consciously reflecting and critiquing them. Nevertheless, Jennings raises some excellent points about the growing costs and redundancy in cultural resource management (CRM). Throughout his life as an archaeologist, Jennings always tried to use techniques and methods that maximized relevant (non-redundant) data recovery with the least expenditure--this included using appropriate field equipment for the job, streamlining bureaucratic red-tape, and insuring that research results were published. This lesson is one that CRMers (contractors and government archaeologists) could relearn.

Jesse Jennings has done us a great service by recording his impressions and memories of a fruitful life as a professional archaeologist. His autobiography is one that should be read, thought about, and discussed, in our search to further our understanding of the past and the ways we go about investigating and learning from it.

Holocene Archaeology Near Squaw Butte, Canyonlands National Park, Utah, by Betsy L. Tipps. Selections from the Division of Cultural Resources, Rocky Mountain Region, National Park Service, No.7, 1995. Available from Canyonlands National Park, 2282 S. West Resource Blvd., Moab, UT 84532. 207 pages (plus appendices), soft cover. Free.

Reviewed by **Owen Severance**, Post Office Box 1015, Monticello UT 84535

This excellent report is the second National Park Service publication on cultural resources in the Needles District of Canyonlands National Park. It expands on the first, "Cultural Resource Inventory and Testing in the Salt Creek Pocket and Devils Lane Areas, Needles District, Canyonlands National Park," which was published in 1989 and covered the first of four years of field investigations carried out by P-III Associates, Inc. of Salt Lake City, Utah. This volume focuses primarily on the second year of field investigations and includes information on the paleoenvironment by Larry Agenbroad and Jim Mead of Northern Arizona University that contributes significantly to the report. The second year's survey covered two more sample areas in the Needles District - one near Squaw Butte and the other on and adjacent to the Salt Creek floodplain. The prehistoric time periods represented in the Needles District now include: Paleoindian, Early Archaic, Middle Archaic, Late Archaic, Terminal Archaic, Early Formative and Late Formative. One Historic Navajo site was also recorded. Limited testing at six of the recorded sites provided nine radiocarbon dates which were crucial in providing evidence of this long time sequence.

One of the original research problems for the Canyonlands Archaeological Project was to attempt to determine when Barrier Canyon Style rock art was created. Enough direct and indirect dates have now been obtained to arrive at a tentative time period of approximately 1900 B.C. to 300 A.D. Future work will probably modify this initial time range, but Barrier Canyon Style rock art now appears to be firmly rooted in the Terminal Archaic.

Since I live south of the Colorado River, the term "Terminal Archaic" is one that I was not familiar with. The report includes a good discussion of the term and the differences between this designation and the more familiar Basketmaker II designation. The discussion also makes it clear that more research is needed to provide a better understanding of how the transition from the hunter/gatherer lifestyle to a horticultural lifestyle occurred on both sides of the Colorado River.

While almost all of the sites that were recorded showed only short term use, there isn't much discussion regarding where the people using these sites we going to or coming from. Indian Creek, east of the study area, contains a significant amount of Fremont rock art; the artists who made that rock art presumably crossed the Colorado River and moved through the Needles District to get to Indian Creek. Barrier Canyon Style rock art is more common on the north side of the Colorado River than on the south side. The people who made it also had to cross the river to enter the Needles District. The most obvious prehistoric crossing in that area is at Spanish Bottom, yet there is no reference to this or any other Colorado River crossings that were used in prehistoric times. In addition, four pieces of obsidian that were found on one site were submitted for obsidian sourcing analysis. All were from Government Mt./Sitgreaves Peak (northwest of Flagstaff) in Arizona. Assuming that obsidian was a trade item, what possible routes could have been used to bring it to the Needles District? Some speculation on these questions would have added to the report. The keys to understanding the prehistory of Canyonlands National Park lie outside of the Park.

One other minor shortcoming of the report is in the field of geology. In several places the Cedar Mesa Sandstone is said to have originated in part from a marine based environment. David Loope, in research conducted primarily in Canyonlands National Park, has conclusively shown that the Cedar Mesa Sandstone has an eolian origin (Loope 1981, 1984, 1985).

A major limitation imposed on the project by the Park Service was a "no collection" policy. As a result of this shortsighted policy, future researchers have only a small collection of artifacts from the field work to examine. It will probably be a long time before additional research of this kind will be done in the Park; and, at the rate that surface artifacts are disappearing, it won't be long before few will be left for future archaeologists to find. The limited area sampled during the four years of field investigations did not provide answers to all of the questions about the prehistoric occupation of the Needles District. I hope that the Park Service will find ways to continue research efforts in spite of the limited availability of funding. The top priority should be controlled surface collections of artifacts at potentially significant sites.

Because of budget constraints, this report may be the last one that the Park Service will publish for the foreseeable future. That is unfortunate. Not often has so much information about the prehistoric occupation of an area been derived from such limited data. This report is a welcome change from the usual report that doesn't attempt to stretch the available data with intelligent speculation.

REFERENCES CITED

Loope, David B.

1981 "Deposition, Deflation and Diagenesis of Upper Paleozoic Eolian Sediments, Canyonlands National Park, Utah."Unpublished Ph.D. dissertation, Department of Geology and Geophysics, University of Wyoming, Laramie.

1984 "Eolian Origin of Upper Paleozoic Sandstones, Southeastern Utah." Journal of Sedimentary Petrology 54:563-580.

1985 "Episodic deposition and preservation of eolian sands: A late Paleozoic example from southeastern Utah." Geology 13:73-76.

MANUSCRIPT GUIDE FOR *UTAH ARCHAEOLOGY*

UTAH ARCHAEOLOGY is a journal focusing on archaeological research within or relevant to Utah. Articles on either prehistoric or historic archaeological research are acceptable and both are encouraged. All articles must be factual technical writing with some archaeological application. The journal is sponsored by the Utah Statewide Archaeological Society (USAS), the Utah Professional Archaeological Council (UPAC), and the Utah Division of State History. The journal is published annually.

Authors submitting manuscripts are requested to follow Society for American Archaeology (SAA) style in text references and bibliography (see October 1992 issue of *American Antiquity*). If you do not have access to a copy of the style guide, write to Kevin Jones requesting a photocopy. Authors are asked to submit one original and three copies of their manuscripts as all submitted articles will be reviewed by three readers. Reviewers will be selected on the basis of paper topic. Manuscripts should be double spaced with margins adequate to allow for comments and should include a short abstract if the manuscript is intended for an article rather than a report or a comment.

Categories of papers are: (1) Articles (up to 30 pages in length) are synthetic; review or overview articles are especially encouraged); (2) Reports (shorter, usually less than 10 pages) are more descriptive; (3) Notes are short, descriptive papers on new (or old) data with a minimum of comparative or interpretive discussion; (4) Comments focus on issues of current interest in *UTAH ARCHAEOLOGY* or on previous publications. Comments on previously published works will be submitted to the author of that work for review and reply; and (5) Book Reviews.

Authors are responsible for figure and photo production. Figures need to be publishable quality and should not exceed 6½ inches by 8 inches in size (including caption). Use pressure sensitive transfer letters or KROY lettering for labels. Figure captions should be submitted on a separate sheet and clearly correlated to figures or photos. Please submit figures as computer generated graphics or as positive mechanical transfer prints (PMTs). If such a process is unavailable, submit figures as photo-ready drawings in black ink. Photos should be black and white glossy and 5 inches by 7 inches in size.

Once the manuscript has been reviewed and accepted for publication, usually with revisions, authors will be asked to respond to the reviewer's comments. A hard copy of the revised manuscript should then be submitted to the editor with a computer disk in either WordPerfect or ASCII. The material will be copy edited, formatted, and returned to the author for final proofreading.

Citation examples:

Beck, Charlotte, and George T. Jones
1994 On-Site Artifact Analysis as an Alternative to Collection. *American Antiquity* 59:304-315.

Janetski, Joel C.
1991 *The Ute of Utah Lake*. Anthropological Papers No. 116. University of Utah Press, Salt Lake City.

O'Connell, James F., Kristen Hawkes, and Nicholas Blurton-Jones
1991 Distribution of Refuse-Producing Activities at Hadza Residential Base Camps: Implications for Analyses of Archaeological Site Structure. In *The Interpretation of Archaeological Spatial Patterning*, edited by Ellen M. Kroll and T. Douglas Price, pp. 61-76. Plenum Press, New York.

Subscriptions are available through membership in either USAS or UPAC or annual subscriptions. Individual issues are available through selected retail outlets throughout the state. These include the Utah Division of State History Bookstore, the Museum of Peoples and Cultures Publications Department, Fremont Indian State Park, and Edge of the Cedars Museum.

UPAC members send manuscripts to:
Kevin T. Jones
Antiquities Section
Utah Division of State History
300 Rio Grande
Salt Lake City, UT 84101-1182

USAS members send manuscripts to:
Robert B. Kohl
Jennifer Jack-Dixie Chapter
Utah Statewide Archaeological Society
P.O. Box 1865
St. George, Utah 84771

UTAH ARCHAEOLOGY 1995

CONTENTS