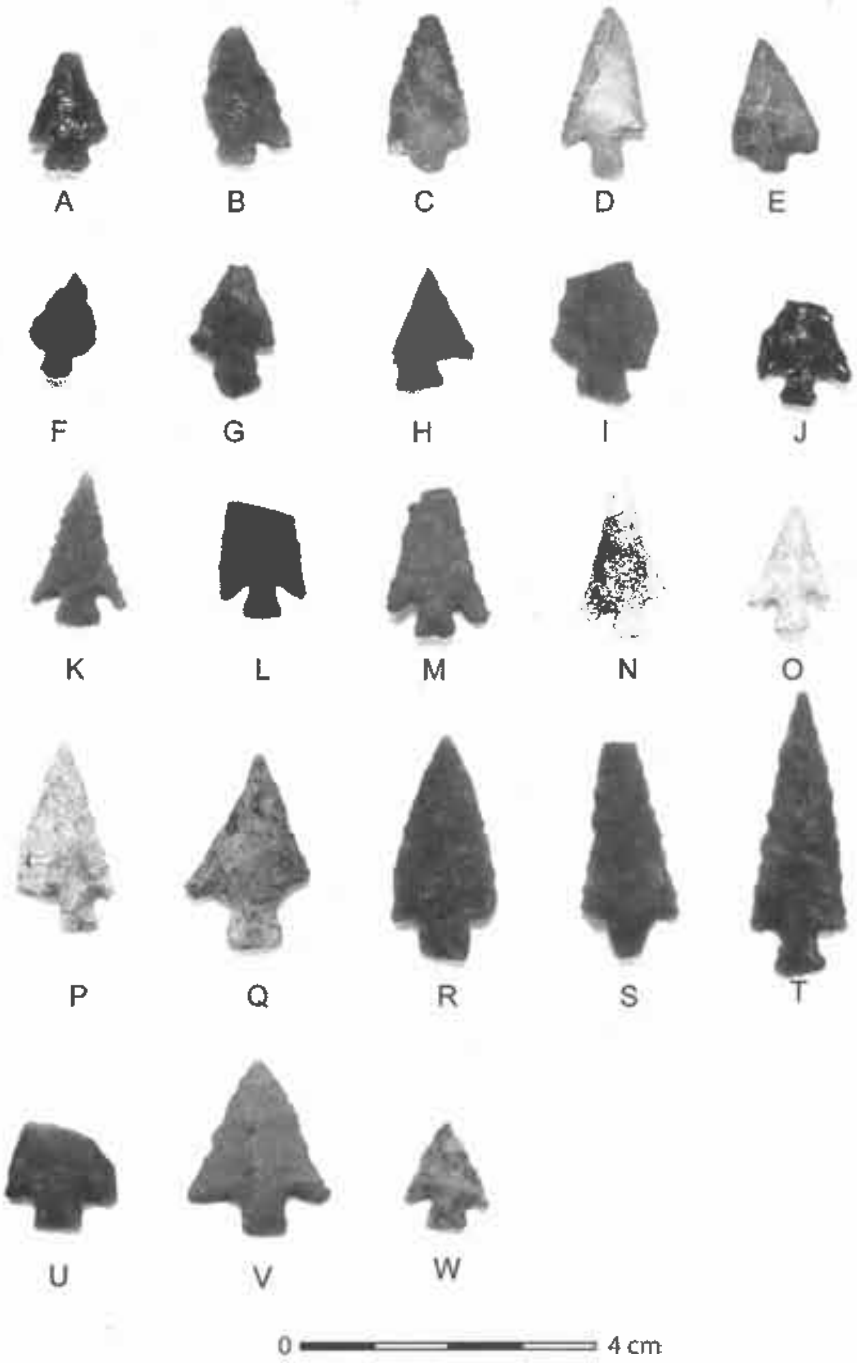
UTAH ARCHAEOLOGY 2004

VOLUME 17



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CURRENT ISSUES IN CULTURAL RESOURCE MANAGEMENT INSTITUTIONS

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Trends among the institutions and individuals that practice Cultural Resource Management is important information to both archaeology students and professionals. To identify and quantify these trends, a survey was composed and sent to fifty CRM firms in Utah and nearby states. Questions focused on the institutions, personnel, salaries, job security, satisfaction, and direction. The information garnered from this survey was analyzed and compared to national data to examine trends in contract archaeology in the Utah area

INTRODUCTION

Cultural Resource Management, in one form or another, has been in existence for decades. Its most familiar form coalesced in the late 1960s and early 1970s shortly after the passage of two very important laws. The first was the National Historic Preservation Act (NHPA) of 1966 (King 2004). The NHPA directed federal agencies to identify, manage, and whenever possible, avoid harming historic properties. The section of the NHPA that became the most pertinent to most archaeologists is Section 106. This section requires that federal agencies take into account the effects they may have on cultural resources, and attempt to mitigate these affects whenever feasible. The second important act, the National Environmental Policy Act (NEPA), was passed shortly after the NHPA in 1969 (King 2004). This act directs federal agencies to analyze the effects of their actions on the environment (including cultural resources). It is primarily these two laws, along with numerous smaller federal and state laws, that have led to the development of contract archaeology as we know it today.

Contract archaeology (here used interchangeably with Cultural Resource Management) has grown exponentially since its birth in the 1970s. What started as a few archaeology contract firms, has grown into a state of the art, multimillion dollar industry. This growth has led to an ever increasing number of career opportunities for archaeological professionals and students. Students are generally faced with two primary career choices in archaeology today. One option is to gain an advanced degree and enter the world of academia (usually requiring a

PhD), and the second is to gain an advanced degree and enter the world of CRM (usually requiring an MA or MS). Both career paths have benefits and shortcomings, but the majority of students today enter the world of CRM. This may be for a number of reasons, including the shorter amount of schooling necessary, opportunity for higher pay scales, and a better job market than the primary alternative, academia.

A great many students and professionals alike are quite interested in the current occupational issues in the CRM world. This article's main goal is to identify the major job related issues in CRM institutions so that individuals can make informed career choices. This information is important to students and professionals alike. It is important to students as they graduate and make important career choices. It is also important to professionals, as it will allow them see where their institution falls in the continuum used in this study.

METHODS

To obtain the data necessary for an analysis of issues and trends in local cultural resource management, a 24-question survey was designed. The survey was three pages long and covered a range of topics but focused on the size and growth of CRM institutions, personnel within the institutions, salaries, and job security, satisfaction, and direction. The survey was sent to 50 archaeological firms in Utah and the surrounding states that were chosen from a directory published by Utah's Division of State History. The directory lists contractors who are presently qualified under the provisions and regulations in the state of Utah to conduct cultural resource surveys and inventories. One week after the surveys were sent, each of the firms were contacted to see if they had completed the survey and to encourage them to do so if they had not. Of the 50 surveys sent out, 29 of them were returned. This return rate of 58 percent was much higher than expected and was greatly appreciated. Four surveys were "returned to sender."

Portions of Melinda A. Zeder's work (Zeder 1997) is included so that the local data could be compared and contrasted to the trends in national cultural resource management. Zeder authored the book "The American Archaeologist: A Profile" in 1997. She was employed in the early 1990s by the Society for American Archaeology (SAA) to design and implement a survey to learn more about the SAA's membership and their archaeological professions. The survey asked a number of questions over many different categories, but its two primary themes were: 1) "the changing face of the archaeological workforce, focusing in particular on the status of women and men in the discipline," and 2) "the changing nature of the workplace, principally caused by the growth of private and public sector archaeology" (Zeder 1997: 1). The survey was sent to roughly 6,000 individuals, including 5,000 members of the SAA and 1,000 archaeologists who were not members of the SAA. Zeder received responses from approximately 1,700 archaeologists, a return rate of nearly 30 percent.

Whenever possible, the national trends found by Zeder are compared to the local trends in Utah and the surrounding states. This being said, some of the issues dealt with in the local survey were not addressed by Zeder in her national survey. This is in part because the local survey focused on contract archaeology, its institutions, and its employees, while Zeder's national survey focused on individual archaeologists across a number of different professions. This difference resulted in both surveys asking some similar questions and many very different ones. As such, comparisons are made on a few issues, but for most topics this was not possible.

DATA AND INTERPRETATION

The Institutions

The first theme in the survey deals with aspects pertaining to the individual CRM institutions. Zeder's research did not touch upon this topic so no comparisons are made between the national and local data. The survey first inquired as to how long the institution had existed, and if it had grown, diminished, or stayed the same size in the last five years. Almost all of the respondents answered these questions. Fifty percent (n = 14) of the institutions had been in existence for more than 21 years, while 25 percent (n = 7) had been in existence for 11-20 years, and 25 percent (n = 7) had been in existence for 0-10 years.

Of the twenty-seven institutions that responded, 63 percent (n = 17) reported that their institution had grown in size within the last five years, with this growth usually being between 0-25 percent. Fifteen percent (n = 4) reported that their institution had diminished in size and 22 percent (n = 6) reported that their institution had experienced neither growth or reduction in size (Figures 1 and 2). This is a positive trend for the CRM archaeologist, in that the majority of institutions are growing and are likely expanding their infrastructure to accommodate this growth.

The size of the institutions were judged by how many professional full-time and part-time archaeologists the company employed. Judging the size of CRM firms in this way, the majority of them were small, employing 1-5 full-time professional archaeologists. There was a definite clustering effect near the smaller end of the size spectrum, with only two institutions employing more than 50 full-time professional archaeologists (Figure 3).

The survey then asks how often the institution hired new full-time professional archaeological staff. Forty-one percent (n = 11) of the institutions reported that they hired one or more staff members every year or two, 26 percent (n = 7) reported that they hired one staff member every couple of years (0-5 years), and 33 percent (n = 9) reported that they hired a new staff member rarely (less than every 5 years) or not at all. Surprisingly, the majority of institutions hired often. This may indicate one of two things. First, institutions are growing and need

new staff members to help them meet this growth, or second, there is a high turnover rate among professional archaeologists in some CRM firms.

The next question asked what was the most important characteristic in a job candidate when determining whether or not an institution would hire him or her. This was an open-ended question and so it produced a variety of answers. The two most common answers were experience and overall "fit". Experience included experience in the field (specifically doing CRM work) and also experience in writing reports or other technical writing. The other common answer usually referred to how a person "fit" into the company, specifically if they seemed personable and able to get along well with others.

Personnel

The next group of questions deal with the personnel within the CRM institutions, namely their degrees, their attitudes toward higher education, the average age of full-time archaeological staff, and the ratio of male and female full-time and part-time archaeological staff. The first question on this topic asked how many full-time archaeological staff members at the CRM firm held a Master's degree. This raw number was useful by itself, but became much more useful when divided by the number of full-time professional archaeologists listed in an earlier question. This division gave the percentage of individuals with a Master's degree at each institution. This same process was followed for determining the number and percentage of individuals with a PhD at each CRM firm. Small firms with 1-5 full time (F/T) archaeological staff members were composed of an average of 61 percent MA's and five percent PhD's (Figure 4). Firms with between 6-10 F/T archaeological staff members were composed of an average 73 percent MA's and 17 percent PhD's, firms with 11-15 F/T archaeological staff members were composed of 77 percent MA's and 14 percent PhD's, firms with 16-20 F/T archaeological staff members were composed of 30 percent MA's and eight percent PhD's, and firms with more than 50 F/T archaeological staff members were composed of 53 percent MA's and 18 percent PhD's. As would be expected, most full-time professional archaeologists in CRM have a degree greater than a BA, although the percentage of MA's greatly outnumbers the percentage of PhD's. Besides asking how many MA's and PhD's were at an institution, the survey also asked, "In your line of work do you think it matters from what institution someone received their higher degree? Why or why not?" Sixty-seven percent (n = 18) of the respondents did not think it mattered where an archaeologist received their higher degree.

When asked why, nearly all respondents focused on the idea that most institutions trained archaeologists the same and that experience in the field and good writing ability are what matter most in CRM. Counter to this line of thinking, 29 percent (n = 8) of the respondents felt that it did matter where a degree was received. When

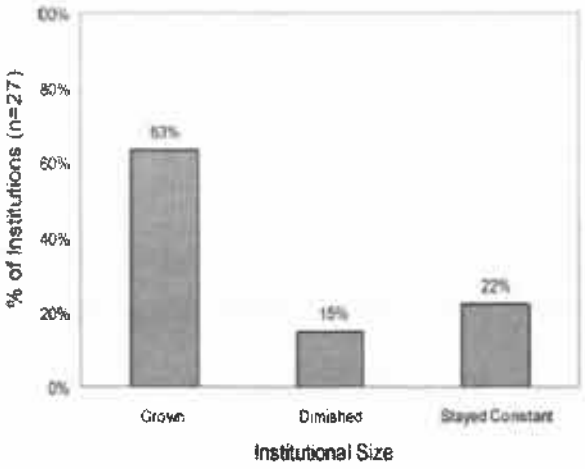

Figure 1. Institutional growth in the last five years

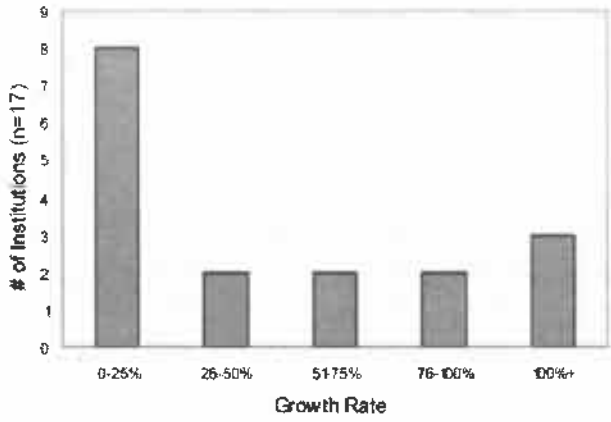

Figure 2. Percentage of institutional growth within the last five years

asked why, those surveyed replied along one of two lines. First, it mattered because some schools have a more CRM-focused program, which is what the firms were looking for. Second, schools with regional expertise in the area that the CRM firm was located were looked upon more favorably than those out of the area.

Next, to get an idea of the age of professional archaeologists in CRM in the Utah area, the survey asked about the average age of the full-time archaeological staff at each institution. Not surprisingly the average age was split between two different age groups: 31-40 and 41-50 (Figure 5). These two categories accounted for 85 percent (n = 22) of the respondents. The other 15 percent (n = 4) was found in the 51-60 age group. This does not imply that there are no archaeologists older than 60 or younger than 30 working in the Utah area. The question asked for an average age of archaeologists working at the institution, not specific ages.

In her national data, Zeder (1995:10-12) found that the large majority (46 percent) of her respondents were in the 40-49 years of age group and the 30-39 group only accounted for 20 percent of her respondents. But it must be remembered that Zeder's survey was taken roughly ten years ago, and if we "aged" the individuals within each age category ten years, without compensating for people entering or leaving the field, we would have the majority of individuals in the 50-59 age group and a much smaller number in the 40-49 group (Figure 5). This would make for a significant difference between Zeder's national results and the local ones. This being said, Zeder herself notes problems in her survey, in that it was primarily directed to members of the Society for American Archaeology (SAA). Many younger archaeologists do not yet belong to the SAA and may therefore be under represented in Zeder's data. Other problems include that fact that I asked for average ages while Zeder asked for specific ages and Zeder's data includes academics while mine does not. Comparisons between the two datasets are tentative.

The final personnel question dealt with the percentage of male and female archaeological staff at each CRM institution. Fifty-four percent (n = 14) of the institutions surveyed reported they had an almost equal ratio of male and female full-time archaeological staff members, 23 percent (n = 6) reported having between 60-80 percent full-time male staff, 11 percent (n = 3) reported having between 80-100 percent full-time male staff, one institution reported having between 20-40 percent full-time male staff, one institution reported having between 1-20 percent full-time male staff, and one institution reported having 0 percent full-time male staff. Although most institutions have an almost equal representation among the sexes, all but three of the remaining firms report employing more male full-time archaeologists than female.

The percentage of male and female full-time archaeological staff is an area where there are differing results between the local and national data. Zeder (1995:48) reports that the percentage of male and female employees in the private sector[1] is equal. The local data gathered by my survey portrays a different picture. Although the majority (54 percent) of institutions report an equal distribution of male and female full-time archaeologists, there seems to be a trend showing that more full-time male archaeologists are employed at CRM firms in the Utah area than women. This conclusion is tentative because percentages were asked for in the survey instead of exact numbers. If a disparity does exist, its cause goes beyond the scope of this paper; but it is a trend worth noting.

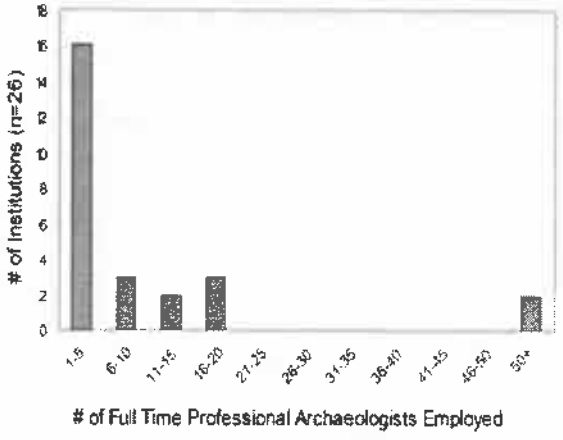

Figure 3. Number of full-time professional archaeologists employed by CRM firms

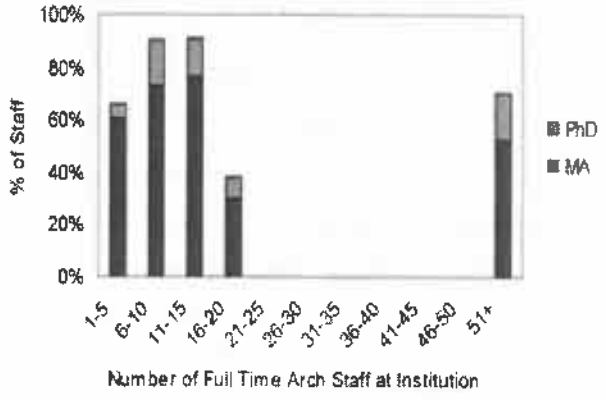

Figure 4. Percentage of full-time archaeological staff with Master or Doctorate degrees

Among the part-time archaeological staff, the male/female ratio is more evenly distributed. Seventy-four percent (n=14) of the institutions report having an even mix of male and female part-time employees, 16 percent (n = 3) report having no male part-time archaeological staff, and the remaining 10 percent is evenly split with five percent employing between 21-40 percent male part-time employees and five percent employing between 61-80 percent male part-time employees.

Salary

Monetary compensation, is very often a touchy issue when surveying or polling any group of people. As such, it was thought that fewer respondents would reply to the questions asking them about salary levels. Surprisingly, the vast majority of those surveyed responded to these questions seemingly without hesitation. When asking about salaries, the questions were framed in this manner, "What is the salary range of a full-time archaeologist who has just been hired at your institution? What is the salary range of a full-time archaeologist at your institution between 0-5 years?" and so forth until 10-plus years had been reached. The respondents could chose to answer these questions by marking a general salary range which started at $15-20,000 and generally proceeded by degrees of $5,000 until it reached the final category of $65,000 plus[2].

The salary span of a new hire ranged from $20,000 to 50,000 a year, but the majority of salaries (42 percent, n = 10) were reported to be between $30-40,000 followed closely by the $25-30,000 range (33 percent, n = 8) (Figure 6). The salary range of an individual working at an institution between 0-5 years ranged from $20-60,000 a year. The distribution of salaries for the 0-5 year time scale conforms well to a normal shaped distribution with the highest number of institutions paying $30-45,000 a year in salary. The salary range for individuals at an institution for 6-10 years rose slightly, with the lower end being $30-40,000 a year and the higher end being $65,000-plus. Most salaries (73 percent, n = 14) for this time scale fell between $30-50,000 a year, although all salaries outside of this range were higher on the pay scale, none lower. Finally, the salary range for individuals working at an institution for 10-plus years had the highest potential for a wide range, with the lowest salaries being between $30-40,000 and the highest salaries being above $65,000. In fact, within this salary range the $65,000-plus category is the mode, having the highest representation with 41 percent (n = 7).

Comparing salaries at the national and local level was problematic due to the differing measures used in the local and national surveys as well as the time difference between surveys, but despite these problems a comparison was made. In the local survey I asked what the average salary range of a full-time professional archaeologist was, based on time at the institution. Zeder (1995:107-110) approached this differently by breaking down salary range based on an individuals responsibilities such as "field director," "project manager," etc. Despite these differences, I compared the 6-10 year salary range with Zeder's "project manager" category. Salary categories in

the local survey had to be combined to conform with Zeder's broader salary ranges, and by doing so produced the data seen in Figure 7. Comparing the two datasets, it seems that in general, full-time archaeologists in the Utah area are paid a higher salary than the national average. This conclusion should be taken tentatively however, due to the differing measures used in the national and local surveys and the 10 year time span between the two studies.

The survey then asks what were the primary factors that determined a person's salary range. This was another open ended question that produced a number of different responses. Most respondents however indicated that experience in differing areas of CRM work was the primary factor. Although not stated, "experience" most likely reflects not only experience in CRM work in general, but "experience" at the institution (meaning time employed at that particular CRM firm). Level of education was the second most listed factor in determining an employees salary range, and associated with education and experience was the number of permits an employee was eligible for. Many institutions also indicated that good writing skills, and the ability to work within a designated timeframe and budget, were other factors that determined a person's salary.

Finally, the respondents were asked if salaries at the CRM institutions had grown, diminished, or stayed constant within the last five years. The vast majority (81 percent, n = 21) reported that salaries had grown, the remaining 19 percent (n = 5) reported that their salaries had stayed constant, and no firms reported diminishing salaries. In response to the previous question, institutions were asked how much their salaries had grown. Seventeen of the twenty respondents (85 percent) classified their salaries as having grown between 0-25 percent, two institutions reported between 26-50 percent growth, and one institution reported between 76-100 percent increase of salaries within the last five years. Although this salary growth needs to be balanced against inflation, this increase seems to point to a positive trend for those employed in cultural resource management in the Utah area.

Job Security, Satisfaction, and Direction

The last group of questions the survey asked dealt with job security, job satisfaction, and perceived job market trends. Specifically, I asked the respondents how they would rate their institution in terms of job security for their full-time archaeologists. The choices given were "very secure," "secure," or "tenuous." Twenty-six percent (n = 7) responded "very secure," 59 percent (n = 16) responded "secure," and 15 percent (n = 4) responded "tenuous". This also seems like a positive trend for CRM professionals, in that 85 percent of the institutions surveyed believe that their full-time archaeologists have a job security rating of either secure or very secure. It must be noted however that in general owners or high ranking individuals within the institutions were the ones completing this survey and so there may be a bias (most likely toward the positive side of job security) among the responses.

An important part of any career is job satisfaction. Though important, job satisfaction is hard to measure, especially without interviewing each employee. But as some general idea of how CRM professionals felt about their jobs was needed, the survey asked, "On a scale of 1-10 how would you estimate job satisfaction for the full-time archaeological staff at your institution? (10 being extremely satisfied and 1 being extremely dissatisfied)." Although I hoped to have an accurate accounting, just as with the job security question, the individual filling out the survey was usually the owner or a high ranking individual within the company who may have a skewed view of job satisfaction "among the troops," so to speak. But as the majority of institutions surveyed were small (1-5 full-time archaeologists), I felt that most individuals filling out the survey would have a good idea of the job satisfaction of their co-workers. Thirteen percent (n = 3) of those polled responded that the job satisfaction at their institution was between 5-6, 57 percent (n = 13) report their job satisfaction being between 7-8, and 30 percent (n = 7) report their job satisfaction as being between 9-10. This indicates that the majority of CRM archaeologists are satisfied or extremely satisfied with their work while a few archaeologists' seem to feel neither satisfied or unsatisfied with there jobs.

Job satisfaction was one of the subjects where Zeder's national data and the local data were comparable and similar trends were observed. Zedér (1995:113-120) reports that of the respondents in the private employment category, three percent report being unsatisfied, 62 percent report being satisfied, and 35 percent report being highly satisfied in their careers. Although the exact percentages were not the same, the general trend between Utah area archaeologists and their national counterparts was very similar.

One of the final questions of the survey asked, "In your opinion, is the archaeological job market increasing, decreasing, or remaining static?" Surprisingly, this question elicited the widest degree of variance and disagreement among respondents. Twenty-four percent (n = 6) felt the job market was decreasing, 36 percent (n = 9) responded that they felt the archaeological job market was increasing, and 40 percent (n = 10) felt the job market was static (Figure 8). These differing attitudes toward the job market may be caused by geographic variables in that surveyed institutions were located in eight different states including Utah, Colorado, Nevada, Idaho, California, Arizona, Wyoming, and New Mexico. State and federal policies, as well as state economies, play a part in the amount of CRM work being performed in different areas.

In fact, when the opinions about the archaeological job market were separated by state, some interesting patterns appeared. Although the number of responses from states other than Utah and Colorado were low, only one institution in a state other than Utah reported an opinion of decreasing opportunities in the job market (Figure 9). Institutions in California and Wyoming both reported increasing job opportunities while Idaho reported a static job

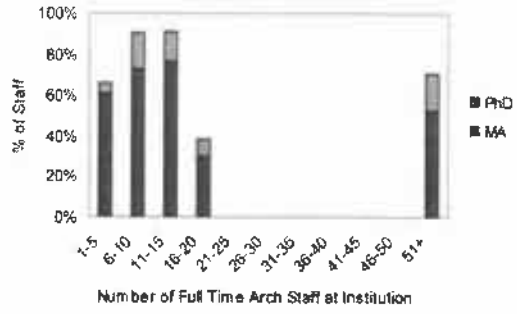

Figure 5. Average age of archaeologists according to Yoder's and Zeder's data. (Zeder's percentages are advanced 10 years and do not account for entering or leaving the profession)

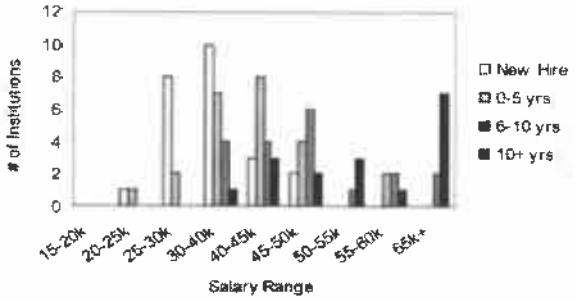

Figure 6. Salary range of individuals at CRM firms in the Utah area

market. Colorado, New Mexico, and Nevada reported mixed opinions of an increasing or static job market, Utah was the only state to report all three opinions, and the one institution from Arizona that responded indicated that job opportunities were decreasing. Unfortunately for archaeologists in Utah, five out of the nine institutions that responded indicated decreasing job opportunities within the state.

After determining opinions about the job market direction, the survey asked why the respondents felt the way they did. In general, those who responded that the job market was increasing said that it was doing so because of energy exploration (oil and natural gas) and more federal agencies following the law. Those who said the market was decreasing implied that it was doing so because of a weak economy and that federal money was being directed toward other priorities. Those who said the job market was static gave a number of various reasons. As was expected, it appears that the CRM job market is directly dependent on national and state economies and regulations.

CONCLUSION

Using the data collected from this survey we are able to paint a portrait of an "average" CRM firm in the Utah area. The average institution is relatively small, employing between 1-5 full time professional archaeologists and the same number of part-time archaeologists. It has been in existence for more than 20 years and has experienced around 25% growth in that time. It hires new full-time professional archaeologists occasionally, maybe every couple of years. Most of its full-time archaeologists have Master's degrees, although there may be one PhD holder at the company and possibly a full time archaeologist with only a BA. Most of the full-time archaeologists

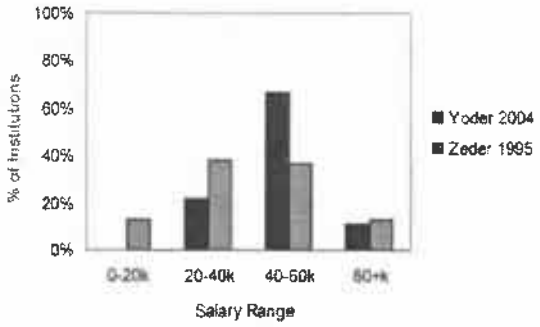

Figure 7. Comparison of Utah area with national salaries

Figure 8. CRM job market trends as perceived by archaeologists in the Utah area

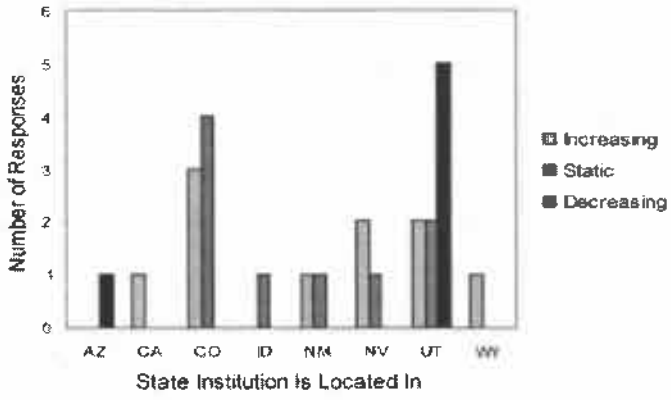

Figure 9. CRM job market trends as perceived by archaeologists in individual states

at the average firm are between 30-50 years old, and there may be a few more men employed than women. Most of the archaeologists working for the firm do not think that it particularly matters from what institutions someone received their higher education, but they do look for experience in CRM work, good writing skills, and the abilityto get along with others when they consider hiring new employees. The average firms' salaries are variable, but generally range between $25-65,000 a year, depending on how long an employee has worked at the firm and what responsibilities they may have. Finally, the owner or operator of the firm believes that his or her employees are satisfied with their career choice and their jobs are secure.

By identifying and quantifying these issues within cultural resource management, this analysis has tried to provide important information for students who will soon be entering the contract archaeology world, as well as for professionals who are already there. It is hoped that students and professionals alike will be able to use this information to make informed choices in their archaeological careers.

ACKNOWLEDGEMENTS

This article was made possible by the individuals who completed and returned the surveys that were sent to their institutions. I thank these individuals for taking the time to do so. I also thank Jim Allison for offering comments on the original draft of this paper and Rich Talbot for giving advice on the content of the survey.

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[1] Zeder's "Private" employment categories are defined by her as, "independent consultant, private firm, and private foundation" (1995:46).

[2] Two mistakes were made on the survey questions, so that one salary range category included 30,001-40,000 (not 30,001-35,000 and 35,001-40,000 as it should have), and a 60,001 – 65,000 category was not included.

Spotten Cave, during excavation. Courtesy The Museum of Peoples and Cultures. Slide 1999.SC.20827

SPOTTEN CAVE RE-VISITED: A RE-ANALYSIS OF THE PROJECTILE POINT ASSEMBLAGE

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Spotten Cave (42UT104) is located near Santaquin, Utah. It was excavated in the 1960s, and is one of two recorded cave sites in Utah Valley. As such, the site can clarify some questions concerning the general chronology and cultural occupation of the cave and Utah Valley. Spotten Cave yielded a large number of projectile points, ceramics, and perishables. With a few exceptions, little has been said about the artifact assemblage from Spotten Cave. Re-analysis of the projectile point assemblage enables a discussion of Spotten Cave's chronology, its stratigraphic zones, and updated information concerning its projectile point assemblage.

INTRODUCTION

Spotten Cave is a significant site for many reasons: first, it is the only cave site excavated in the Utah Valley lowlands (Janetski 1990) second, it is a dry cave with excellent preservation and third, it contains rare Archaic deposits. Presence of Archaic deposits is a distinction shared with few documented sites in the Valley; American Fork Cave being one of the others. Also, Spotten Cave has contributed to the chronology of Utah Valley by providing one of the earliest carbon 14 dates recovered in the Utah Valley.

The yield of artifacts recovered from Spotten Cave was significant. It contained ceramics, sherds, perishables, chipped stone, stone tools, and a burial. The projectile point assemblage from Spotten Cave was sizeable. The points are typical of generally accepted types in the Eastern Great Basin (Holmer and Weder 1980; Holmer 1986). The projectile points from Spotten Cave were first discussed by James Mock (1971), and more briefly in two articles by Joel Janetski (1990; 2001). As part of his thesis, Mock analyzed the projectile point assemblage from Spotten Cave and assigned an alpha-numeric designation to each projectile point, categorizing them into "types." Unfortunately, many of these types share similar morphological characteristics making it difficult to distinguish one from another. In addition to creating his own types, Mock also failed to include photographic examples of his "types;" instead, he provided poorly rendered and sometimes inaccurate drawings (Janetski 2001). In order to make the projectile point assemblage from Spotten Cave useful for cross-site comparison and dating, the points have been re-analyzed and typed following Holmer and Weder (1980) and Holmer (1986).

Figure 1. Map of Utah Valley showing location of Spotten Cave

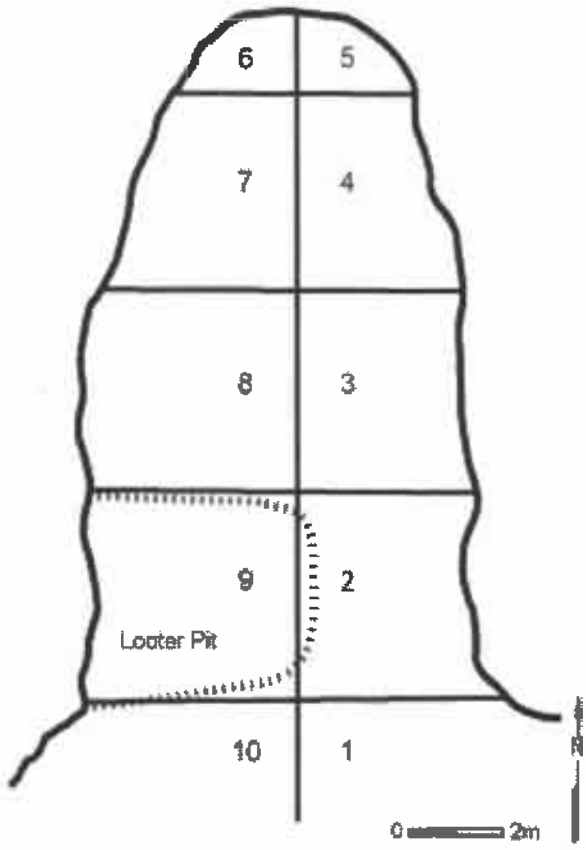


Figure 2. Plan view map of Mock's excavation.

Spotten Cave: A Brief History

Spotten Cave is located at the south end of Utah Valley (Figure 1), two and a half miles from Santaquin, Utah. Spotten Cave is situated on Long Ridge in the Goshen Valley, south of Utah Lake in the lower edge of the Upper Sonoran life zone.

At the time of excavation, the cave was on the land of Thomas J. Spotten, a local farmer. According to Mock, the cave was known by locals as "Indian Cave." In 1960, the cave was brought to the attention of Brigham Young University's Department of Anthropology, and a 3ft by 2ft test trench was dug by Carl Jones. In 1961, Harvey Taylor and Jay Woodard expanded Jones' test trench, but did not take the trench to the floor of the cave (Mock 1971:3). The trench was not backfilled. Local knowledge of Spotten Cave and its artifact potential, led vandals to expand the 1960 and 1961 test trenches.

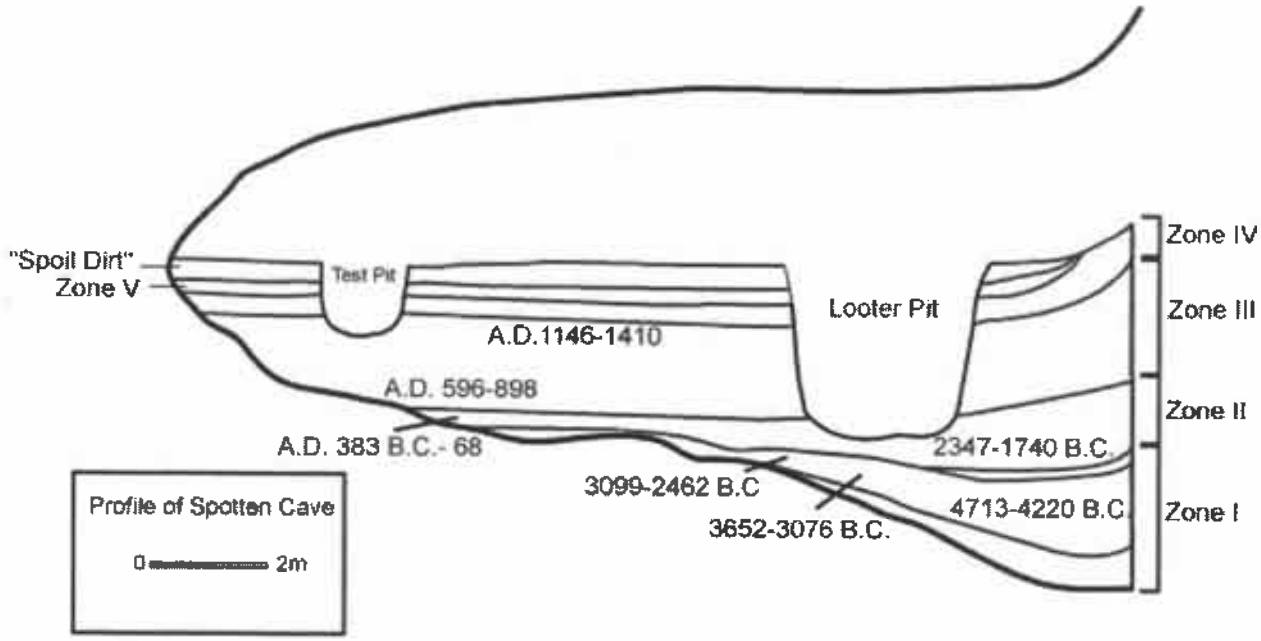


Figure 3. Cross-sec tion of Mock's excavation and cultural zones.

It was not until 1964 that serious excavation of the site began. James Mock, a graduate student from BYU, excavated the site intermittently until 1969 (Mock 1971: 1-5). Between 1964 and 1969, Mock completely excavated the cave.

Throughout the excavation, Mock encountered several problems. Since Spotten Cave was a dry cave, deposits were for the most part, loose aeolian sediments. These sediments were instable and made profile maintenance and stratigraphic interpretation difficult. Various methods were implemented to stabilize the profile, but all methods failed and profiles regularly collapsed. The fragile condition of sediments, vandalism and bioturbation made the excavation of Spotten Cave a daunting task (Mock 1971:49-51). Because of these problems, the provenience and stratigraphic relationships of artifacts recovered from the cave were (and still are) difficult to understand.

Discussion of Stratigraphic Zones

Despite the difficulties associated with excavating Spotten Cave, and the questions surrounding artifact provenience, some stratigraphic integrity does exist. Spotten Cave was divided into ten six-foot by

six-foot squares and five "cultural zones" (Figures 2 & 3). The cultural zones were designated based on artifacts recovered from each layer (Mock 1971: 45, 54-60).

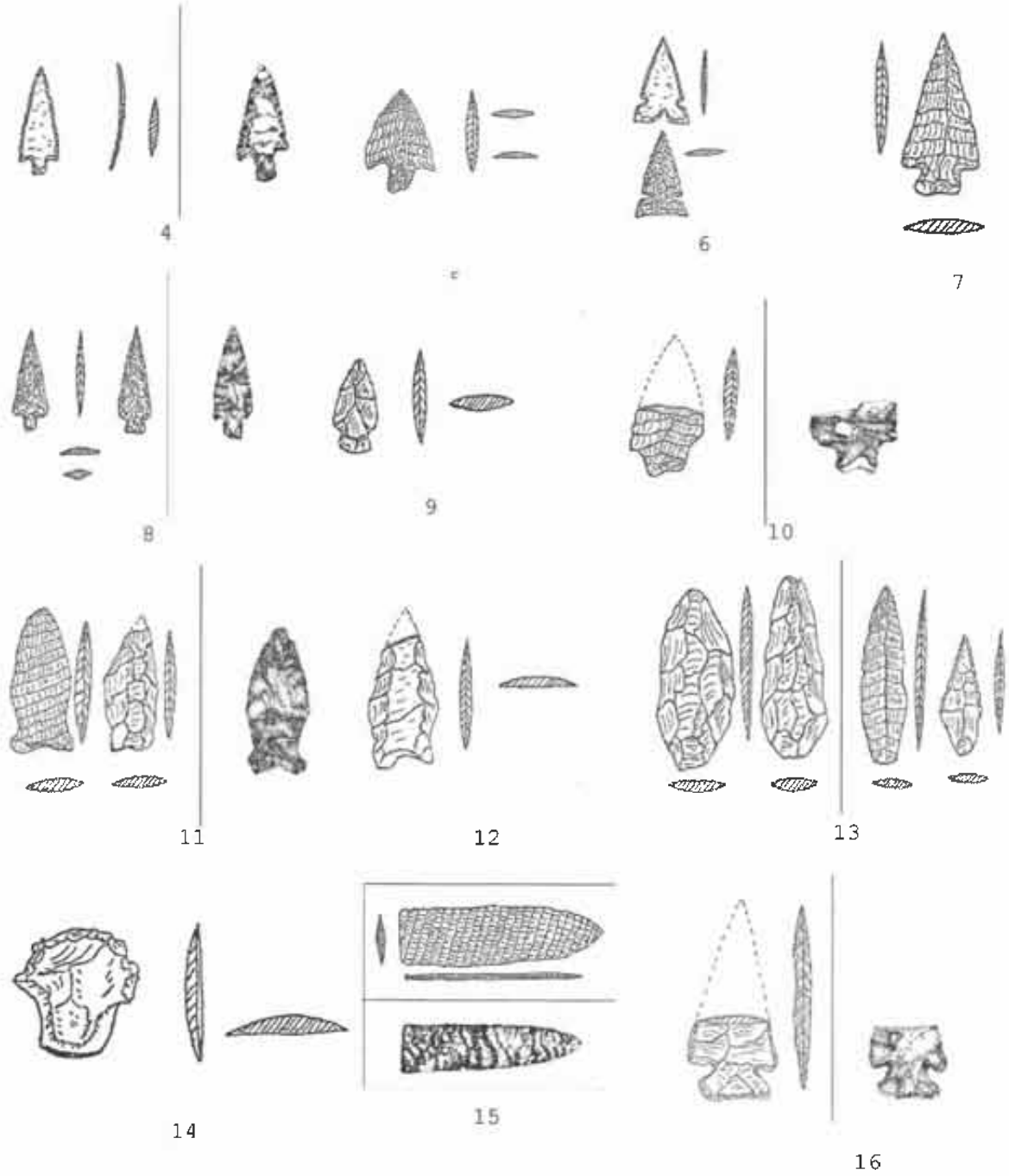
Above the five cultural zones was a layer of looted sediments that Mock called "Spoil Dirt" (Mock 1971:60). This "Spoil Dirt" consisted of animal and vandal disturbed sediments. Artifacts from the "Spoil Dirt" were collected despite unknown provenience. Zone V was the most chronologically recent zone and consisted of two strata. The lower stratum consisted of hard-packed sheep manure. The upper stratum was composed of light gray aeolian deposited soil mixed with vegetal matter, manure, and large pieces of roof-spall (Mock 1971:60). Numerous historic and prehistoric artifacts were recovered from this zone.

Zone IV consisted of a thin layer of horse manure and yellow loess and contained several Late Prehistoric artifacts. Zone IV was separated from Zone III by a stratum of decayed organic matter. Sediments in Zone III were dark gray and deposited by aeolian action. Mock does not discuss the exact number of strata defined in Zone III, but mentioned that several strata contained ash (Mock 1971:59). A large amount of organic material was recovered from Zone III including corn cobs and cordage. Zone II consisted of only one stratum full of aeolian deposits ranging in color from dark gray near the mouth of the cave, to dark brown near the back of the cave (Mock 1971:59). Among these aeolian deposits, a small amount of decayed organic material was present. This organic material varied in colors of pink, orange, and black.

Zone I consisted of four strata. The top layer was composed of approximately three inches of decayed organic matter that was found only in squares one and ten (Figure 2). The second layer was a thick deposit of reddish-brown aeolian deposits; many vegetal remains were also found in this layer. The third layer was thin, composed of sand and reddish brown in color. The fourth or bottom layer was composed of lacustrine gravel and non-cultural fresh water snail shells which may have been deposited during the Provo stage of Lake Bonneville. This layer is the oldest in the cave (Mock 1971:55-57).

Chronology

Carbon-14 dates were obtained from three of the five zones in Spotten Cave (Mock 1971: 61-85). No dates were recovered from Zones IV or V due to human and animal disturbance. I re-calibrated the dates Mock provided using an online calibration program supplied by the University of Washington (Stuiver et al. 1998a). Charcoal samples were taken from hearths in Zone I and Zone II to obtain dates. Organic material and a piece of wood were used to obtain dates for Zone III. The dates, projectile points, and ceramics are summarized below (Table 1, Table 2).



Figures 4- 16. Mock's original Alpha-Numeric Type Illustrations. 4. Type 1a; 5. Type 1b; 6. Type 1c; 7. Type 1d; 8. Type 1e; 9. Type 1f; 10. Type 1g; 11. Type 1h; 12. Type 1i; 13. Types 1k and 1l; 14. Type 1n; 15. Type 1o; 16. Type 2c

Table 1. Carbon 14 Dates from Spotten Cave

Zone	Radio-Carbon Age	2-Sigma Calibrated Date
III	730 ± 90 BP	A.D1146-1410.
III	1310 ± 90 BP	A.D. 596-898.
II	2110 ± 100 BP	383 B.C.– A.D.68
II	3600 ± 110 BP	2347-1740 B.C.
I	4200 ± 120 BP	3099-2462 B.C.
I	4640 ± 120 BP	3652-3076 B.C.
I	5580 ± 120 BP	4713-4220 B.C.

Table 2. Ceramics Recovered from Spotten Cave

Ceramic Type / Provenience	Great Salt Gray	Sevier Gray	Snake Valley Gray	Sevier Red on Gray	Knolls Gray	Shoshone ware	Total
Spoil Dirt	14	1	5	0	3	1	**24**
Zone 5	13	2	6	0	0	0	**21**
Zone 4	12	1	2	0	3	0	**18**
Zone 3	136	12	51	2	29	0	**230**
Zone 2	2	0	0	0	2	0	**4**
Zone 1	1	0	0	0	1	0	**2**
Total	**178**	**16**	**64**	**2**	**38**	**1**	**299**

Figure 17.
Possible late Paleoindian point

Figure 18.
Pinto point

Figure 19. Humboldt point

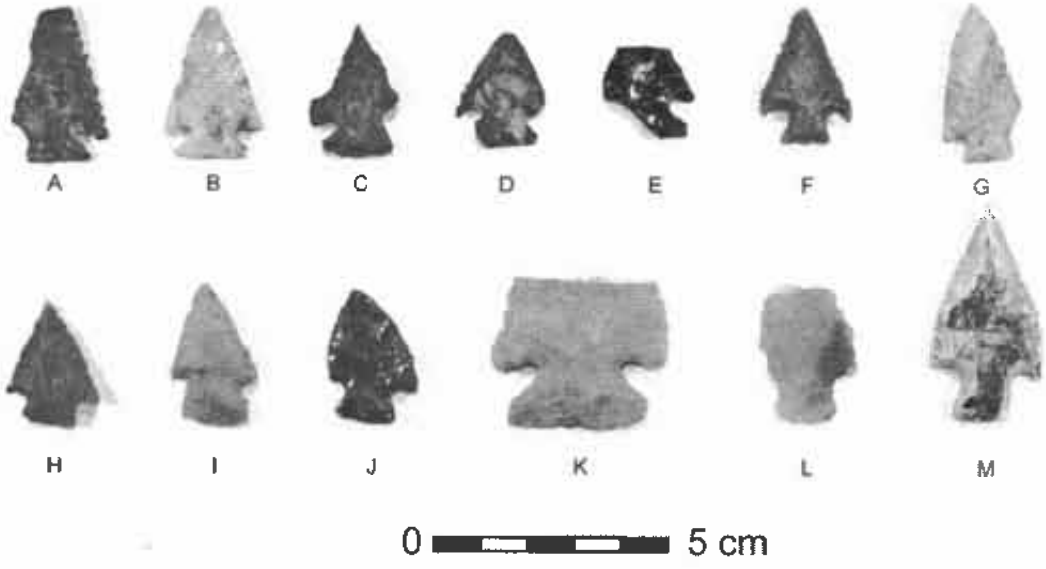


Figure 20. Elko Corner-notched points

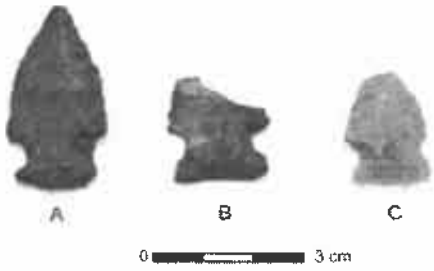


Figure 21. Elko Side-notched projectile points

Figure 22. Northern Side-notched projectile point

It is evident that the majority of ceramic types recovered from Zone III are Fremont; however, Fremont ceramics are found in all levels of the site, indicating that mixing occurred. Despite this mixing, the C-14 dates are consistent and range from oldest at the bottom, to most recent at the top, indicating some stratigraphic integrity.

PROJECTILE POINTS

According to Mock, between 94 and 113 projectile points were recovered from Spotten Cave, however, this analysis only found 88.

The discrepancy between my total (88) and Mock's totals (94 or 113) may be due to a number of reasons. Several of the specimens originally classified as projectile points are not typed as such in this analysis. Moreover, there are discrepancies between the original report and Field Specimen logs and some of the points may have been lost, misplaced, or labeled incorrectly.

Here, projectile points are defined as tools that have been bifacially thinned and notched, or otherwise prepared for hafting. Type designations follow definitions created by Holmer and Weder (1980) and Holmer (1986). Where possible Mock's original designations are reconciled with current Eastern Great Basin projectile point types, although some interpretation of Mock's terminology and classifications was required in order to reconcile his types with accepted types.

Towards this end, some of Mock's original illustrations are provided, with his original type description. Mock did not provide specimen numbers for the figures he included in his thesis, and some of the illustrations are not up to modern standard. Therefore, new illustrations by Michelle Knollare provided with the original illustrations, when possible. These drawings and photographs provided later in the paper will enable the reader to see the diverse range of projectile points in this collection.

Alpha-Numeric Types

Mock describes Type 1a (Figure 4) as having an "elongated triangular blade…The edges of the blade are straight to slightly convex…notches are diagonal to the longitudinal axis of the point. They are usually quite deep…the stem is small and narrow (Mock 1971: 93-95)". In the current analysis all points designated as Type 1a are considered Rose Spring points because they closely resembled the description of Rose Spring points found in Homer and Weder (1980).

Mock describes Type 1b (Figure 5) as "a wide triangular blade…the blade edges are straight to convex. The notches are diagonal to the longitudinal axis of the point. The distal points expand outward more than they do in Type 1a. The stem is constricted where it joins the blade (Mock 1971:96)".

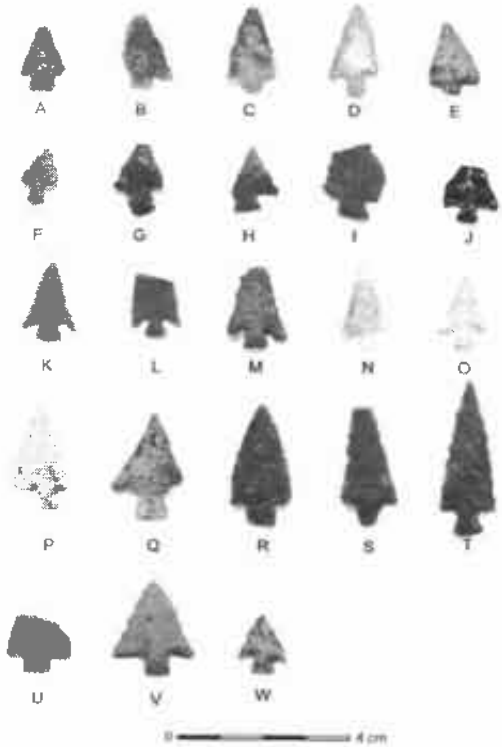


Figure 23. Rose Spring projectile points

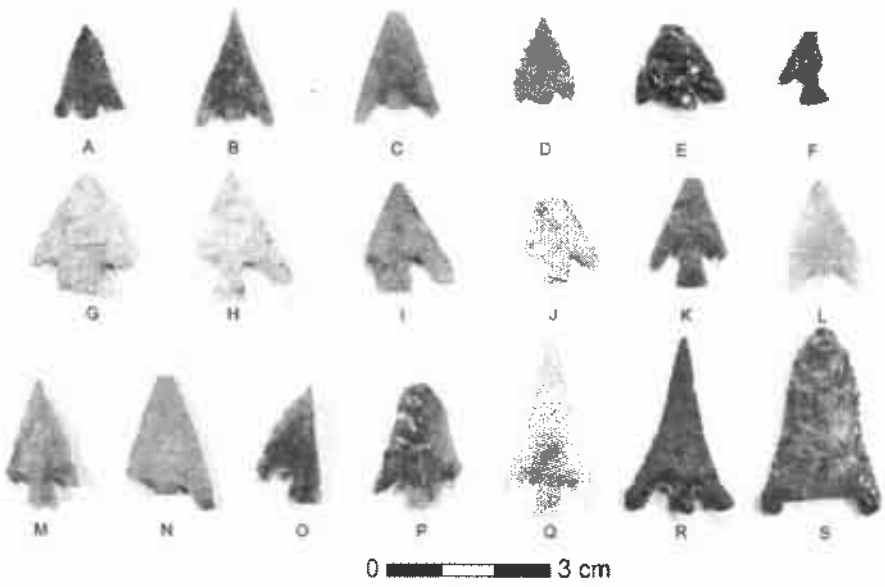


Figure 24. Eastgate projectile points

This is similar to the description of Eastgate points found in Holmer and Weder (1980) and all Type 1b points are considered Eastgate points.

Type 1c is described as having a "symmetrical triangular blade… [with] parallel side-notches with a deep basal notch…The base is the widest part of the point (Mock 1971:91)" (Figure 6). Mock's illustration of Type 1c resembles a classic example of a Desert Side-notched point and a possible Sierran sub-type of the Desert series. Unfortunately, neither of the points which Mock illustrated as Type 1c were found in the current museum collection.

Mock describes Type 1d (Figure 7) as ranging "from a wide to an elongated triangle…the notches range from deep to mere indentations in the side of the blade…the base on some specimens is as wide as the widest part of the blade" (Mock 1971: 98).

Type 1e (Figure 8), "has a blade that ranges from elongated to triangular…The base ranges from convex to straight. The stem ranges from small to medium and is usually constricted where is joins the blade. The shoulders are usually horizontal (Mock 1971:99)". In the current analysis, Types 1d and 1e are considered Rose Spring points because of their similarities in morphology to Type 1a as well as descriptions in Holmer and Weder (1980).

Type 1f (Figure 9) points are "usually short with a wide symmetrical triangular blade…The base of the stem ranges from convex to straight…The stem is usually constricted where is joins the blade. The shoulders usually slope downward toward the blade" (Mock 1971:101). The illustration Mock provided closely resembles a point in the assemblage that is classified as a small side-notched point in this analysis.

Type 1g is described as having "a wide symmetrical triangular blade…the base of the stem is generally concaved and beveled down to a sharp edge. The stem is straight and small in comparison to the blade (Mock 1971:102)" (Figure 10). This may be a Pinto Shouldered point (cf. Holmer 1986).

Type 1h is "generally lanceolate…The base is concaved with the proximal point being somewhat wider than the blade. There are no shoulders and the edges of the blade are convex (Mock 1971:103)". Type 1h is difficult to reconcile. In Mock's illustration (Figure 11), he includes two seemingly different points. One of the points is lanceolate in form with a concave base with tangs that extend outward. The other appears to be a biface. The lanceolate shaped point with outward extending tangs may be a Pinto point, but an exact designation is difficult.

Type 1i has a "base [that] is deeply concaved which produced proximal points that have been called "swallow tailed". There is no stem but shallow side-notches occur just above the distal points that could be called notches (Mock 1971:104-105)".

Figure 25. Uinta Side-notched projectile point

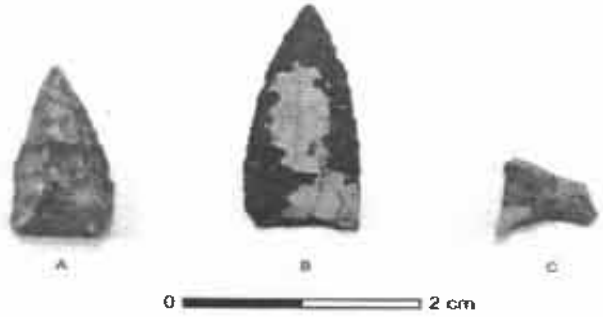


Figure 26. Cottonwood Triangular projectile point

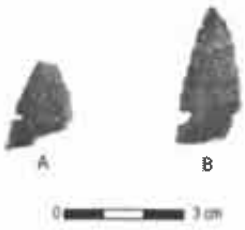


Figure 27. Desert Side-notched projectile points

Figure 28. Small side-notched projectile point

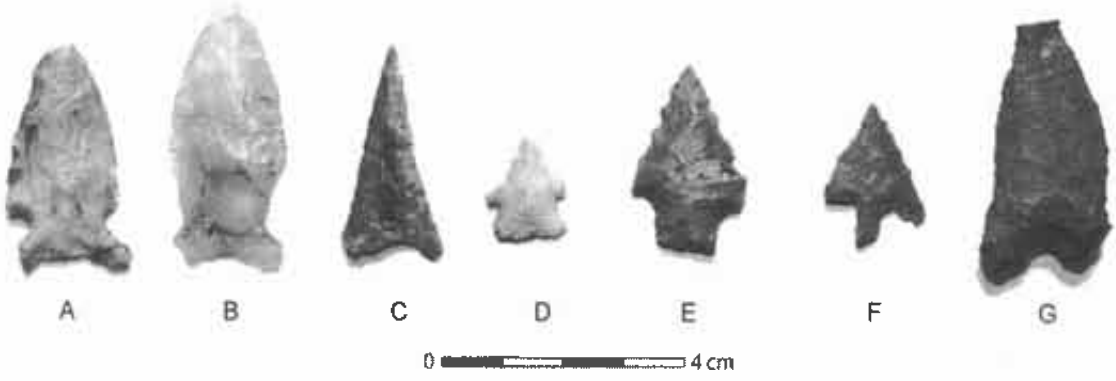


Figure 29. Unidentified projectile points

The description of 1i also resembles a Pinto shouldered point, but the illustration does not (Figure 12). In addition, no point matching the description or illustration is currently found in the assemblage.

Types 1j, 1k, 1l and 1m are not projectile points at all, but rather bifaces. Mock describes them as "stemless…[ranging] from triangular to lanceolate. Bases are …convex, concaved, and straight" (Mock 1971:106-107,110). Mock's depictions of Types 1j, 1k, and 1l are all similar: Figure 13 illustrates Mock's Types 1k and 1l. Type 1n is described as "shovel-shaped… [with a] concave base. The stem is straight…the blade is rounded somewhat like a shovel (Mock 1971:110-111)" (Figure 14). This is not a projectile point, but rather a small scraper with a stem, possibly for hafting.

Type 1o (Figure 15) is described by Mock as "a long slender blade…3 inches in length…the edges of the blade are straight until they curve inward forming the point"(Mock 1971: 112). The base of Type 1o is missing, making typing impossible. Due to its lanceolate shape and flaking patterns however, it could be a Late Paleoindian point.

Mock describes Type 1p as "miscellaneous specimens…[they] represent only fragments of projectile points that could not be identified" (Mock 1971:112) Mock included no figures representing Type 1p. Mock's Type 2c is a large Elko-Corner notched point (Figure 16).

RESULTS

Eighty-nine percent of the total projectile points are made of chert, 8 percent are made of obsidian, 2 percent are made of quartzite, and 1 percent are made of unknown material.

Possible Late Paleoindian (n=1). One large biface, described as possible Late Paleoindian (Janetski 2001:20) was recovered from Spotten Cave (Figure 17). Mock refers to this point as an Angostura point, commonly found in the Great Plains (Mock 1971:112). This biface measures 8 cm long, 2 cm wide at the broken base, and 1 cm wide at the distal end and is made of black chert. The proximal end of this biface is missing, making typing this point impossible. The flake scar pattern on this point is significant; several of the flake scars extend across the whole face of the biface in what could be described as "ribbon flaking." The large, apparent lanceolate shape, and flake scar patterning suggests this is a Late Paleoindian point.

Pinto (n=1). One Pinto point was found at Spotten Cave (Figure 18). This point is made of opaque white chert with red specks. It is the proximal fragment of what appears to be a Pinto shouldered point.

Humboldt (n=2). Both of the Humboldt points are made of chert (Figure 19*a-b*). One point is made of opaque white chert with some pink and brown specks, and the other is made of black and dark red chert. One point is complete and one is a proximal fragment but the flake scar pattern and base shape seem consistent with Humboldt morphology (Figure 19*a*).

Elko Corner-notched (n=13). Eleven of the Elko Corner-notched points are made of chert ranging in colors from opaque white to dark red (Figure 20*a-m*). Two of the points are made of obsidian: one is dark black obsidian and the other is mahogany obsidian. The mahogany obsidian contains no specks of black at all. One proximal fragment of a point is especially large, with a maximum width of 36.1mm, a base width of 29.4, and a maximum thickness of 5.8 mm. Due to the deep corner notches and general morphology of the point it has been identified as an Elko Corner-notched point (Figure 20*k*).

Elko Side-notched (n=4). Only three of the five Elko Side-notched points are illustrated because one of the points was very fragmented (Figure 21*a-c*). Of the four Elko Side-notched points, three were made of dark red and red-orange chert. One of red chert points is dark red in color along the proximal end; the rest of the point is a light beige color. This deep red hue may indicate some sort of thermal alteration (Figure 21*b*). One point is made of light pink quartzite.

Northern Side-notched (n=1). The proximal end of a Northern Side-notched point was recovered from Spotten Cave (Figure 22). It is made of a gray-yellow chert and has two deep side notches.

Rose Spring (n=26). Twenty-four of the Rose Spring points recovered are made of chert in various colors: gray, opaque white (two of these are speckled with black and red), reddish pink, light brown, translucent white, purple, and red translucent. Two of the Rose Spring points are made of obsidian; one is light gray translucent obsidian and one is of opaque black obsidian. Twenty-three of the twenty six points are pictured (Figure 23*a-w*). The points not pictured were too fragmentary to represent the Rose Spring type. All of the points in Figure 23 possess stems. The notches range from shallow to deep, and are generally situated in the corners of the points. While I have decided to type all of the points in the collection as Rose Spring, I feel that there are some differences in point morphology among these points. As illustrated in Figure 23, it is obvious that some of the points are longer than others, possess deeper corner-notches and distinct stems.

This is especially evident in three points (Figure 23*l,m,t*). Other points in Figure 23 are shorter with shallow notches and thick square stems (Figure 23*u-w*). These differences made categorizing the points difficult; however, I feel that the best classification for these points is indeed Rose Spring. The points illustrated in Figure 23, while slightly different, do show a continuum. All of the points have corner notches and stems, and the general morphology is the same.

Eastgate (n=20). Nineteen of the twenty Eastgate points are made of chert (Figure 24*a-s*). The colors of chert are: yellow chert, reddish chert with black inclusions, white opaque chert white translucent chert, gray chert, dark purple chert, pink and gray chert, red and yellow chert with black "mossy" inclusions, light brown chert, and white opaque chert with pink striations. One of the Eastgate points is made of mahogany obsidian. Several of these points are missing tangs, stems, or distal ends (Figure 24*e,f,j,l,n,o,s*). After careful analysis, it has been determined that these are indeed Eastgate points. One point is not pictured due to its fragmented nature and inability to accurately represent Eastgate points.

Uinta Side-notched (n=1). Only one Uinta Side-notched point was recovered (Figure 25). It is made of red-orange chert and has two distinct side notches.

Cottonwood Triangular (n=3). All of the Cottonwood Triangular points are made of chert (Figure 26). One point is made of pink chert, and the other is made of dark gray chert (Figure 26*a,b*). This point appears to have a light beige colored cortex which may indicate that it was never completed. The third point is made of gray chert and is a proximal fragment. The base of this point is concave, showing that among the Cottonwood Triangular type, some variability exists, especially in the proximal ends(Figure 26*c*).

Desert Side-notched (n=1). One fragment of a Desert side-notched point was found in my analysis. This point is made of reddish-pink chert. Though fragmentary, this point clearly possesses one complete side notch, and remnants of the basal notch and other side notch can be seen. Another side-notched point is present in the collection and while it does not possess a basal notch, it may be a Sierran sub-type of the Desert Side-notched type (Figure 27*ab*).

Small side-notched (n=1). One small side-notched point made of obsidian was found at Spotten Cave. It is difficult to type due to its small size and non-descript morphology (Figure 28).

Unidentified Points (n=13). Ten of these points are made of chert in various colors. One point is made of obsidian, one is made of black basalt, and one is made of brown quartzite. Seven of the thirteen points are pictured (Figure 29*a-g*). The six that are not pictured are so fragmentary that they cannot be identified.

The seven points pictured are more complete and may provide some clues as to their types based on morphology. This analysis could not assign a specific type for these points. One point is made of cream colored chert. It has been broken a few times and perhaps re-worked (Figure 29*a*). The tangs are thin and there is no basal notch to speak of. Another point (Figure 29*b*) is made of white and yellow translucent chert and has a bifurcated base with tangs that flare away from the point.

One projectile point in particular deserves some discussion; it is made of light pink chert and covered in red ochre (Figure 29*c*). Red ochre is only present unifacially. This is the only projectile point recovered from Spotten Cave with red ochre on it. This point has one complete tang and the other is broken; in addition, the proximal end is completely broken off, which may indicate that this point was stemmed. The rest of the points (Figure 29*d-g*) appear to be re-worked or unfinished.

Seven projectile points were recovered from the level that Mock designated as "spoil dirt". Since this level was heavily disturbed by looting and historic livestock activity, there is no integrity for this level. Points recovered from this level were kept and catalogued but lack provenience. One Elko Corner-notched point and one unidentified point were recovered with no provenience. Points from the intact strata are discussed below.

Zone V

Zone V was the most chronologically recent zone, containing two Elko series projectile points and two Rose Spring projectile points. The presence of livestock manure in this zone casts doubt on its integrity.

Zone IV

Livestock manure was also found in this zone, therefore, to some degree, the integrity of this zone may also be questioned. Eight projectile points were recovered from this zone: one Desert Side-notched point, one Cottonwood Triangular point, one Uinta Side-notched point, three Rose Spring points, one Elko series, and one unidentifiable point.

Zone III

Forty-three points were recovered from this zone. Two Cottonwood Triangular points, sixteen Rose Spring points, three Eastgate points, one Northern Side-notched point, ten Elko series points, one Pinto Series point, one possible Late Paleoindian point, one small side-notched point and seven unidentifiable points.

Zone II

This zone contained only one stratum and was full of aeolian deposits. Eighteen projectile points were recovered from this zone. Of the eighteen points, two are Rosegate points, nine are Eastgate points, three are Elko Series points, and two are Humboldt points. Two unidentifiable points were recovered from this zone.

Zone I

Six projectile points were recovered from this zone. Of the six, four are Eastgate points, and two unidentifiable points. The distribution of projectile points in the strata shows that mixing is a problem and that the stratigraphic integrity of this zone may be questioned. Because of the dates recovered from this level, it would be expected that all of the points recovered from this level would be Archaic points, but this is not the case. Table 3 provides a summary of all projectile points from Spotten Cave.

Table 3. Projectile points recovered from Spotten Cave.

Provenience / Projectile Point Type	Late Paleoindian	Pinto Series	Humboldt	Elko Corner-notched	Elko Side-notched	Northern Side-Notched	Rose Spring	Eastgate	Uinta-side notched	Cottonwood Triangular	Desert Side-notched	Small side-notched	Unidentified	Total
Provenience Unknown				1									1	2
Spoil Dirt							5	1						7
Zone V				1	1		2							4
Zone IV				1			3		1	1	1		1	8
Zone III	1	1		8	2	1	15	3		2	1	1	7	43
Zone II			2	2	1		2	9					2	18
Zone I								4					2	6
Total	1	1	2	13	4	1	26	20	1	3	2	1	13	88

DISCUSSION

It is apparent that mixing occurred in this site. The majority of the points are found in Zone III regardless of type. Zone III contains Cottonwood Triangular, Rose Spring, and Eastgate points. These point types are consistent with dates recovered from Zone III; however, Northern Side-notched, Elko Series, Humboldt, Pinto and Late-Paleoindian points were also found in this Zone. One would expect that Late-Paleoindian and Archaic points would be found in Zones I or II and that Rose Spring and Eastgate points would be found higher up, in Zones III or IV. This is obviously not the case (Table 3).

During the excavation, problems with collapsing profiles could have contributed to the mixing of the cultural zones. It is more likely however, that bioturbation from animals and humans was the strongest factor in mixing the depositional content of the cave. Prehistoric inhabitants may have dug pits, created hearths, and otherwise altered the depositional layers in the cave.

The presence of horse and sheep manure could indicate that these animals churned up some of the strata, especially of Zone V and IV. The most significant damage however, may have been done by burrowing rodents. Mock found a cache of domestic peach pits in a rodent burrow in Zone II, and a pack rat midden containing a fragment of newspaper dated 1872 in Zone III (Mock 1971: 69, 75). Looting may have also played a part in mixing the sediments of Spotten Cave. Prior to Mock's excavation, Spotten Cave was well known by locals (Mock 1971:1). They knew that this cave was full of cultural deposits, and a large looter pit was present in Spotten Cave when Mock began excavation (Figure 2). In his thesis, Mock expresses frustration for the looting and vandalism that occurred while the excavations were in progress (Mock 1971:5).

These impacts make reliance on Carbon-14 dates and the diagnostics recovered from this cave vital if Spotten Cave's chronology is to be understood correctly. As illustrated in Table 1, the dates recovered from each zone are consistent, ranging from the oldest to the most recent. This is significant; demonstrating that despite mixing, the dates recovered from each zone follow a distinct pattern. When these dates are compared with the projectile point and ceramic assemblages, a general chronology of Spotten Cave emerges.

Dates and diagnostics indicate that the cave was definitely occupied from the Archaic period to the Late Prehistoric period. The cave may have been occupied during the Late Paleoindian period due to the presence of the possible Late Paleoindian point, but the dates do not support a Late Paleoindian occupation, and it is possible that this point was found and curated by Spotten Cave's later inhabitants.

Questions concerning the stratigraphic integrity of Spotten Cave will never completely be answered but with the combination of carbon 14 dates and re-analysis of all recovered diagnostics, issues concerning the age and occupation of the cave have become more clear.

CONCLUSION

I have provided a re-analysis of Spotten Cave's projectile points, a reconciliation of Mock's alpha-numeric system with current projectile point types, and accurate graphic representations of the projectile points recovered from the cave. In addition, I have discussed the stratigraphic integrity of the site and determined that despite mixing, some stratigraphic integrity exists.

The temporal and cultural depth of Spotten Cave is significant. The projectile point assemblage ranges from possibly Paleoindian to Late Prehistoric. This temporal range, which has been defined by the projectile points, ceramics, and carbon 14 dates may aid in further understanding the pre-history of Utah Valley; especially concerning the occupation of a dry cave. It is clear that Spotten Cave was heavily occupied during the Formative period (Zone III); and it may be suggested that use of the cave tapered off in the Late Fremont and Late Prehistoric periods. This is evidenced by the general absence of side-notched points and Late Prehistoric ceramics in Spotten Cave.

The diachronic sequence of projectile points recovered from Spotten Cave is consistent with the Carbon 14 dates. The chronology established through Carbon 14 dates and artifact cross-dating can only be added to as its other data sets are analyzed and reported. The Spotten Cave assemblage contains a rich botanical, faunal, and fiber perishable collection, the analysis of which could provide improved insights into the prehistory of Utah Valley. Continued study and analysis of the artifact assemblage from one of the few dry cave sites in Utah Valley will significantly contribute to the archaeological record and literature of Utah Valley archaeology.

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PREHISTORIC BEDROCK MORTARS IN SOUTHEASTERN UTAH

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Four bedrock mortars have recently been located at two sites (42Sa22846 and 42Em3127) on lands managed by the Bureau of Land Management (BLM) in southeastern Utah. With a few exceptions, southeastern Utah is a poorly researched area where archaeological evidence of Fremont and Great Basin peoples is interwoven with evidence of Northern Anasazi and American Southwest occupations. These bedrock mortars are located in the edge of pinyon-juniper plant communities on low-angle bedrock, directly adjacent to sagebrush and grassland flats. The bedrock mortars are found in sites with long-term occupations that span the mid- to terminal Archaic.

INTRODUCTION

Bedrock grinding features, both metates and mortars, are common throughout the American Southwest and Great Basin. Although bedrock mortars are common throughout much of the southern and western portions of North America in California (Wlodarski 1982), New Mexico (Pick 1999), Texas (Boyd 2002; Kirkpatrick 1978; Shawn 1971), and Mexico (Boyd 1996, 2002), they are unreported from sites in southeastern Utah. Mortars tend to be typologically associated with the processing of specific plants, as with acorns in California (Wlodarski 1982) and mesquite seedpods across the lower Southwest (Schneider 1996). In the same sense, metates and grinding implements in the American Southwest tend to be associated with the processing of corn (personal communication, John Jones 2004). However, it is implicit in all instances that mortars are also utilized to process any number of edible plant parts into flour, and process small animal bone into meal (Osbourne 1998). The fact that mortars are useful in processing a wide array of items in the general subsistence system of prehistoric peoples suggests that they might be spread more widely across the landscape than is currently reported in the literature.

Stone mortars are time intensive to create, whether fashioned directly with a specific final form in mind, or by repeated use of a convenient natural depression (Osbourne 1998). Heavy time and energy investments during the creation and use-life of bedrock mortars suggests that many subsistence items were gathered in the nearby environment, and brought to an often visited processing location. As such, the location and utilization of bedrock mortars in prehistoric subsistence systems is telling regarding the continuity and productivity of provi-

sions in nearby environments. Thus, the building of mortars into exposed portions of bedrock indicates landscape loci where prehistoric people would return on a regular, if not predictable, basis for subsistence needs.

It is therefore important to note that four bedrock mortars have been recently located at two sites on lands administered by the BLM in southeastern Utah. The following portion of this report is dedicated to descriptions of the mortars as well as the sites they are found on. The site descriptions include preliminary environmental and cultural/temporal information gleaned from surface survey data. That is followed by an abbreviated discussion regarding the role that non-portable resource processing equipment may have played in the subsistence systems of diverse groups of prehistoric peoples. The reporting and future analysis of bedrock mortars in southeastern Utah is important for archaeological research in an area that was a prehistoric patchwork of cultural identities.

SITE 42SA22846

Site 42Sa22846 was first recorded in the mid-1990s during a development project survey and revisited in 2004 by archaeologists employed by the Bureau of Land Management (BLM) – Moab Field Office (MFO). Site 42Sa22846 is located in the southeastern portion of Utah, south of the La Sal Mountains between Moab and Monticello, at an elevation of 6,500 feet. Surrounding the site are mesas, incised canyons and linear cliffs that are characteristic of the Utah portion of the Colorado Plateau and the Paradox Basin (Black et al 1981; BLM 1997). Most of the local rainwater run-off is short-lived and stream flow is intermittent. Permanent water can be currently found at two springs or seeps located two, two-and -a-half and kilometers from the site. Erosional channels cut through many portions of the landscape, with shallow gullies and washes along the mesatops, benches and ridges, while deep arroyos cut 10-20 feet through portions of the valley floor. The mostly alluvial soils in the valley range from loamy clay to sandy gravel, and tend towards moderate to strong alkalinity (BLM 1997). Today, sediment on the valley floor and gentle bottom slopes supports low sagebrush communities interspersed with rabbitbrush, wheat-grass and Indian ricegrass. Site 42Sa22846 sits along a northeast-to-southwest running finger ridge that protrudes onto the valley. Mixed pinyon and juniper woodland dominates on the finger ridge as well as on the steeper valley slopes and mesa tops.

Of particular note at 42Sa22846 is a pair of round bedrock mortars (Figure 1) located 2.13 m apart. The mortars are built into a sandstone outcrop on the northwest facing edge of the finger ridge. The southern mortar has an average diameter of 25.5 cm, is 8 cm deep and has a U-shaped bottom (Figure 1B). The northern mortar has an average diameter of 34.5 cm, and is 11 cm deep with a U-shaped bottom (Figure 1A). The northern mortar has an eroded bedrock crack running across its center, which currently acts to drain precipitation from the bowl's center. Sloping grooves along the internal walls and the relatively rough bottom (as compared to the grinding

surface of metates) of the two mortars are suggestive of both the use-wear and original construction of the grinding features (Figure 1A & B) (Osbourne 1998). It is likely that the mortars were constructed by pecking and hammering at the original sandstone outcrop to create a depression. That depression was then continually enlarged and/or deepened during its use-life by the pounding and circular grinding motions of plant and animal processing.

Site 42Sa22846 contains a diverse lithic assemblage that includes projectile points, bifaces, groundstone, bedrock mortars, multiple concentrations of lithic debitage, and dispersed oxidized sandstone that is suggestive of hearths onsite. The largest lithic concentration was located towards the middle of the site on a small knob between two ephemeral washes and contained the majority of artifacts including an end-battered cobble, 3 diagnostic points including a re-sharpened San Jose point (4,000 – 1,500 B.C.), the basal fragment of a Durango Notched point (2,500 – 400 B.C.) and a San Pedro point (1,500 – 300 B.C.) (Justice 2002). Although jasper of varying quality is available in the local canyon system, most of the lithic debitage material is from non-local sources.

While no structural evidence exists on the surface of the landform for habitation of the site other evidence including the presence of labor intensive grinding features, dense lithic scatters and a diverse array of lithic tools are reminiscent of other habitation sites in southeastern Utah (Pollock 2001, Richens and Talbot 1989). Further, site 42Sa22846 is located within 200 meters of numerous other sites on the same finger ridge, some of which contain slab-lined hearths, middens and the remains of a pinyon nut cache. Any temporal association between the multiple sites on the finger ridge is speculative, as none of the sites have been excavated. However, the tight cluster and high number of sites on the small finger ridge are suggestive of high subsistence productivity in the local environment throughout the past.

SITE 42EM3127

After the identification of bedrock mortars at site 42Sa22846, BLM-Moab Field Office archaeologist D. Turnipseed directed the authors to two additional bedrock mortars recently noted in Emory County, UT. Site 42Em3127 was originally recorded and mitigated in 2003-2004 by Grand River Institute as part of a BLM development project. Site 42Em3127 is located west-northwest of Moab between Hanksville and Green River at an elevation of 5,280 feet. Topographically the area around site 42Em3127 is typical of the exposed low-angle bedrock and mixed grassland plains of southeast Utah located along the San Rafael Reef. Although seasonal run-off is short lived and numerous shallow gullies and washes cross the landscape, permanent water can be found at a nearby spring/seep located less than one kilometer from the site. Site 42Em3127 sits at the base of an exposed southeast facing bedrock slope that terminates on the fringes of a large alluvial-filled valley currently overlaid with aeolian dunes. A sparse population of dwarf pinyon-juniper interspersed with ephedra and blackbrush surrounds

the site. The soils directly adjacent to the site support sparse short sagebrush, antelope brush, and bitterbrush communities in a grassland environment dominated by rabbitbrush, wheat-grass and Indian ricegrass.

The mortars are built about 88 m apart from each other, in sandstone outcrops at the base of the exposed bedrock slope, along and within a modern erosional channel. The southern-most basin is 36 cm in diameter and has a U-shaped bottom that is 5.7 cm deep (Figure 2B). The northern-most mortar averages 36 cm in diameter and is 9 cm deep with a U-shaped bottom (Figure 2A). There are no internal grooves along the walls of either mortar although large pecking marks are evident on the bottoms of both. This is suggestive of the type of manufacture and the use-life of these mortars (Osbourne 1998) with less grinding and more pounding of the subsistence items than seen at site 42Sa22846. Further indications of mortar use are evident in modification of the adjacent bedrock at site 42Em3127 where either kneeling/standing and/or the brushing of meal back into the mortar have worn a subtle smooth band around each mortar. The outer edge of the worn area is indicated by arrows in Figure 2A & B and is further evidence of the long-term usage of both the mortars and the area.

Previous surface surveys of site 42Em3217 identified subsurface hearths, a semi-subterranean slab-lined feature identified as a possible pithouse, dense lithic scatters and a diverse array of lithic tools. The artifact assemblage noted during the original site survey includes 3 Fremont ceramic sherds, 4 projectile points dating from the mid to late Archaic (includes one identified Gypsum point), bifaces, groundstone, and multiple large lithic concentrations. Recovered materials from Grand River Institute's limited excavations include radiocarbon dates and bulk soil samples that are currently being analyzed and documentation is forthcoming (personal communication, Carl Connor 2004). The alluvial-filled valley and nearby permanent water source are both likely to have contributed to a highly productive grassland environment that was utilized on a regular basis by prehistoric peoples of the area. Site 42Em3127 is part of a large sprawl of sites that line the edge of the San Rafael Reef. Finalization of the excavation analyses and report will substantially assist in defining the temporal affiliation of this site as well as providing additional information regarding the role of the bedrock mortars in the subsistence strategy of the sites inhabitants.

BEDROCK MORTAR UTILIZATION

Both bedrock mortar sites in are located at the base of mesa and hill slopes, near drainages and alluvial/ aeolian soils in transitional ecological zones between pinyon-juniper woodlands and mixed sage-grassland flats. Since mortars can be used to efficiently process a wide array of plant and animal resources, the placement of non-portable subsistence processing equipment in areas of potentially high and/or mixed prehistoric environmental resource productivity is suggestive of their diverse role in past resource systems. For example, Indian ricegrass

(*Achnatherum hymenoides*) and Colorado Pinyon Pine (*Pinus edulis*) nuts are currently available in the environs directly adjacent to both sites. Although Indian ricegrass is certainly more prevalent at the Emory county site grasses may have been more common prehistorically around 42Sa22846 than the modern environment suggests since the current nature of the dominant sagebrush community is likely a product of modern chaining and seeding regimes as well as wild fire suppression that broke the cyclical nature of prehistoric grassland - sagebrush plains (Winter and Hogan 1986). Ethnographic accounts of pinyon nut processing suggests that very shallow slab metates were used for gently removing the hulls of previously roasted nuts (Madsen 1986), although the use of mortars in grinding the pinyon nuts into flour is also noted (Fowler 1986).

Dwarf oaks are found in the vicinity of site 42Em3127 (personal communication, Carl Connor 2004) and those bedrock mortars may have been utilized to process acorns in the same manner as acorns are processed in California and the western edge of the Great Basin (Fowler 1986; Wlodarski 1982). Grasses abound on the stable aeolian dunes next to site 42Em3127 and agave is prevalent on stable aeolian dunes on the mesa-top immediately above site 42Sa22846. While agave may or may not have been processed in the bedrock mortars, stable aeolian dunes are also one of the ideal locations for incipient agriculture and some Basketmaker II habitations are situated to effectively utilize these dune environs for dry farming (Matson et al. 1988).

The bedrock mortars found in southeastern Utah are morphologically distinct from bedrock grinding features in Mesa Verde associated with the processing of corn. Corn grinding features tend to be longer than they are wide and generally rectangular in appearance. These bedrock trough metates associated with corn agriculturists have been examined in the scores by researchers (personal communication John Jones 2004) and are often shiny, polished and smoothed from the back and forth motion of corn grinding. While it is unlikely that the bedrock mortars at sites 42Em3127 and 42Sa22846 were utilized for processing corn it should be noted that corn has been radiocarbon dated at a site just east of 42Sa22846 during the late Archaic at 160 B.C. (Jett 1991).

The above narrative is in no way intended as an exhaustive or comprehensive list of subsistence items that were processed in the bedrock mortars. Rather the description is meant to illustrate the usefulness of bedrock mortars placed in regularly productive transitional ecological zones. The full prehistoric utility of these four bedrock mortars should be approached through future palynological analyses. Botanical residues and prehistoric pollen from the bedrock mortars may be useful in reconstructing the prehistoric plant resource base as well as shaping our understanding of resources utilized by prehistoric people of the area as reliance on plant husbandry increases through time. As such, pollen washes of the two mortars at site 42Sa22846 are currently being analyzed by one of the authors. While the exposed environment in which the bedrock mortars are located may make the

recovery of botanical residues difficult, the rarity of these mortars in southeastern Utah suggests that such an undertaking may provide unique subsistence information for the region.

PREHISTORIC OCCUPATION OF SOUTHEASTERN UTAH

The bedrock mortar sites in southeastern Utah are situated in areas where a complicated interface between several cultural groups was articulated over time. While southeastern Utah has both Ancestral Puebloan and Fremont material remains (Marwitt 1986; Geib et al 2001; Huckell 1996; Jennings and Salmon-Lohse 1981), research has been far from conclusive about definitive patterns of interaction along the cultural interface between the different groups. Some sites indicate intermingled occupation by Fremont and Anasazi groups (Jennings and Salmon-Lohse 1981; Madsen 1982) while other sites have remains more indicative of a single regional group whether that occupation was discontinuous or not (Chandler 1990; Geib 1996, Lupo and Wintch 1998; Richens and Talbot 1989). In either case, complex patterns of migration and population movement are indicated by the occupations. These same patterns seem to be indicated in the areas farther north where research has been less intensive, although the majority of sites appear to follow lifeways more closely parallel to Great Basin cultural groups (Marwitt 1986). The large roomblock pueblos typical of sedentary agricultural Anasazi peoples during Pueblo times to the south are not associated with site 42Sa22846, but the slab-lined hearths and dense scatters that can indicate Basketmaker II peoples are seen in the immediate area (Mueller and Landt 2004; Pollock 2001; Richens and Talbot 1989). Site 42Em3127 is located in an area with prevalent Fremont and Great Basin cultural materials (Geib et al. 2001). The discontinuity of cultural markers in the area and the lack of synthesized research to date make it difficult to place the bedrock mortars within any specific cultural milieu. While it seems fairly unlikely that bedrock mortars are strongly indicative of one particular cultural group or time period, these features are either frequently unnoticed by surveyors or are relatively unique in Utah, and thus their occurrence may be of import in unpacking the interface between different cultural groups.

Both of these mortar sites are in places where discontinuous occupation was coupled with a diversification of food foraging strategies. Eastern Great Basin literature indicates that while food production was undertaken in some areas, such a strategy may have been frequently abandoned in favor of broad spectrum hunting and gathering strategies (Jennings and Salmon-Lohse 1981). The potential resource failure associated with sedentary agricultural lifeways and dry-farming could be offset by diversifying resource procurement and utilization, particularly in areas where population densities were not so high as to have occupants locked into the landscape. This seems particularly true in regions of cultural overlap, where successful neighbors can serve as an example to groups who struggle with different resource strategies and thus provide an impetus for cultural change.

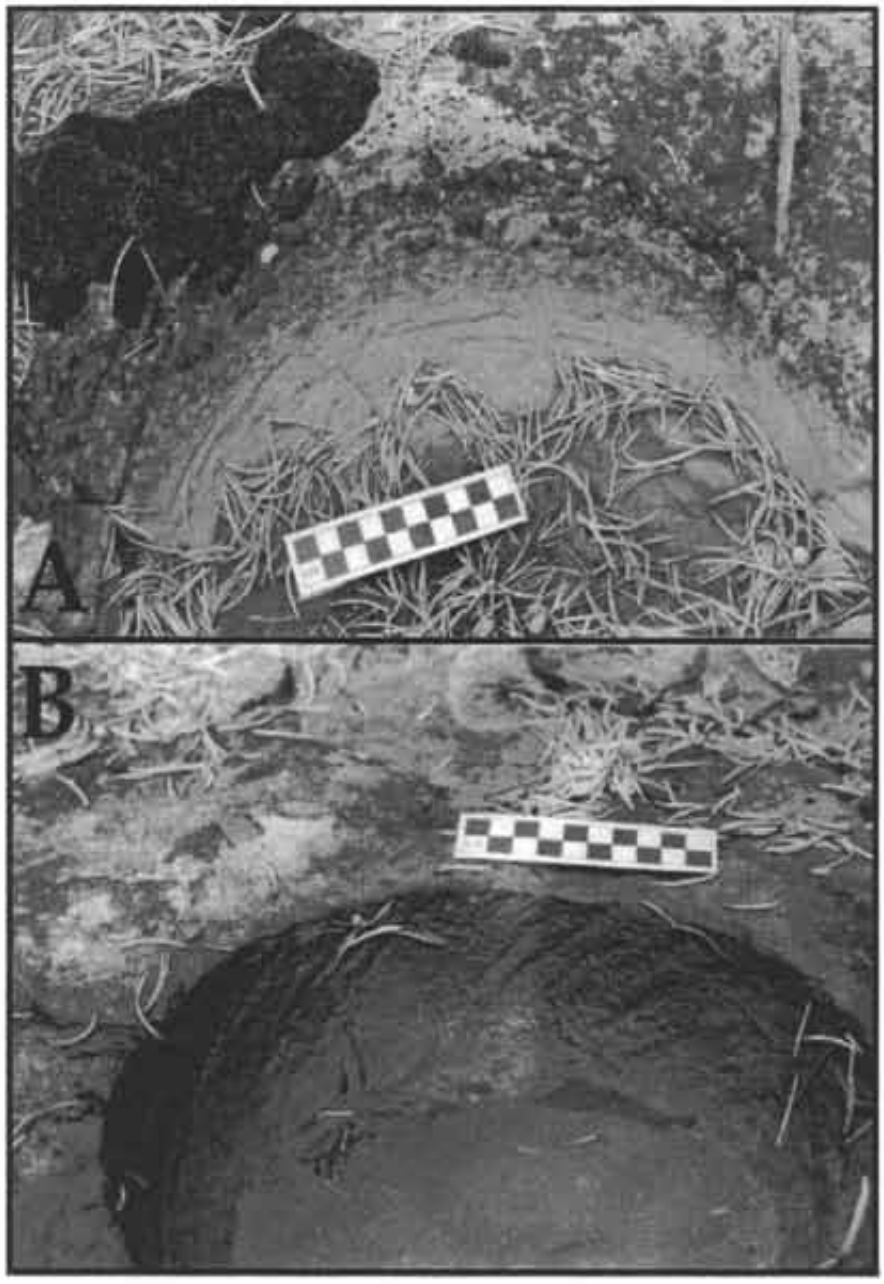

Figure 1: Photos of north (A) and south (B) mortar at site 42Sa22846

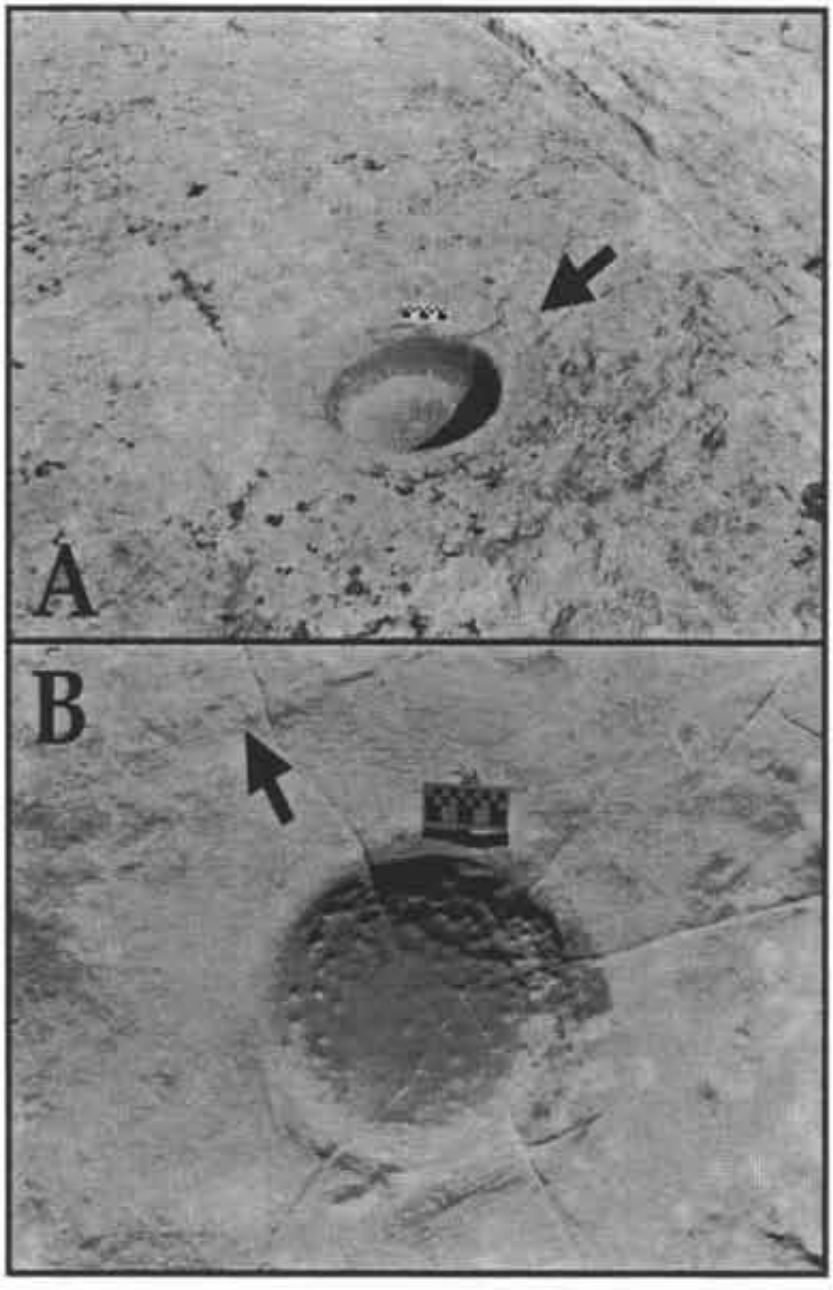

Figure 2: Photos of north (A) and south (B) mortar at site 42Em3127

CONCLUSIONS

Four bedrock mortars have been located at two sites on lands administered by the BLM in southeastern Utah. Both sites are located in places that utilize bedrock outcrops immediately adjacent to large expanses of grassland and pinyon-juniper woodland, with ephemeral drainages located close-by and where permanent water sources are within walking distance. The mortars are thus located in transitional ecological zones where multiple plant food resources could provide the basis for a fully hunter-gatherer lifeway or as a complementary component of a full or partial agricultural lifeway. Because excavation at or near 42Sa22846 has not occurred and the excavations at 42Em3127 are still being analyzed, firm dates of the sites' occupation(s) have not been established. However, the large number of surrounding sites and the potentially long-term occupation of those sites are suggestive of the productivity of the local environment and the relative frequency of occupation through time.

Bedrock metates are found throughout the Great Basin and Southwest areas at large, although the lack of reported round bedrock mortars in Utah appears to represent novel solutions to a diverse array of subsistence material processing problems. "Features, at whatever scale … not only provide a context for interpreting associated artifact assemblages but also shed light on occupation patterns, site use and function, and subsistence techniques (Shroedl and Coulam 1994:4)." While four bedrock mortars are unlikely to unravel the complexities of group identity, their locations within both the ecological and cultural landscape are representative of larger occupational patterns and subsistence strategies. As such, archaeologists are better able to consider larger scale cultural changes over time by including non-portable resource-processing equipment in examinations of the changing face of subsistence strategies.

ACKNOWLEDGEMENTS

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Archaeologists in the Sevier Desert. Courtesy Mountain States Archaeology, LLC.

AVOCATIONIST'S CORNER

RUNNING ANTELOPE: REVISITED

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INTRODUCTION

In 1993 I authored an article for the journal about a Haskett site entitled "Running Antelope: A Paleo-Indian Site in Northern Utah" (Russell 1993:79). Several years after its publication, it caught the attention of Dr. Bonnie Pitblado of Utah State University. At that time, she was a graduate student at the University of Arizona. Her purpose for contacting me was to examine the artifacts from the Running Antelope Site (42Bo538) and use the information in her Doctoral Dissertation. She sent five specimens from the site to Dr. Richard Hughes of the Geochemical Research Laboratory in Portola Valley, California for sourcing by x-ray fluorescence. She provided me with a copy of the data obtained by Dr. Hughes upon returning the specimens. In 2002 the Promontory/ Tübaduka Chapter of USAS obtained a grant from the Utah Division of State History for archaeological research by avocationalists. Some of this money was used to pay Dr. Hughes for sourcing specimens from various sites in Northern Utah. Five of these came from Running Antelope.

This report will present both sets of sourcing results from the Geochemical Research Laboratory, describe the specimens, and discuss what the results are possibly telling us. The first set (1) is those specimens sent by Dr. Pitblado (Hughes 1997) and the second set (2) is those sent by myself (Hughes 2002).

RESULTS

Table 1. Trace and Selected Minor Element Concentrations

Number	Zn	Ga	Rb	Sr	Y	Zr	Nb	Ba	Ti	Mn	$Fe_2O_3^T$	Fe/Mn	Source
1-2	45±6	17±3	189±4	38±3	17±3	104±4	21±3	nm	nm	nm	nm	nm	WHC
1-3	76±5	17±3	191±4	24±3	57±3	214±4	39±3	900±14	1252±22	3311±8	1.39±.08	46	UNK
1-4	49±5	15±3	193±4	38±3	20±3	109±4	18±3	nm	nm	nm	nm	nm	WHC
1-5	45±6	12±3	188±4	37±3	18±3	106±4	19±3	nm	nm	nm	nm	nm	WHC
1-6	43±6	15±3	119±4	67±3	29±3	84±4	9±3	1584±15	nm	nm	nm	nm	MAL
2-1	42±6	13±3	175±4	37±3	18±3	104±4	21±3	188±13	nm	nm	nm	nm	WHC
2-2	46±6	15±3	115±4	66±3	28±3	86±4	10±3	1587±14	nm	nm	nm	nm	MAL
2-3	46±6	12±3	110±4	63±3	24±3	80±4	14±3	1525±14	nm	nm	nm	nm	MAL
2-4	47±6	16±3	180±4	727±3	23±3	110±4	16±3	504±13	nm	nm	nm	nm	PS
2-5	39±6	15±3	110±4	62±3	23±3	77±4	10±3	1507±15	nm	nm	nm	nm	MAL

Note: Values in the table are in parts per million (ppm) except total iron (in weight percent) and Fe/Mn intensity ratios; + = estimate of x-ray counting uncertainty and regression fitting error at 300 and 600 (*) seconds livetime; nm = not measured. Specimen numbers are consistent with those used by Dr. Hughes.

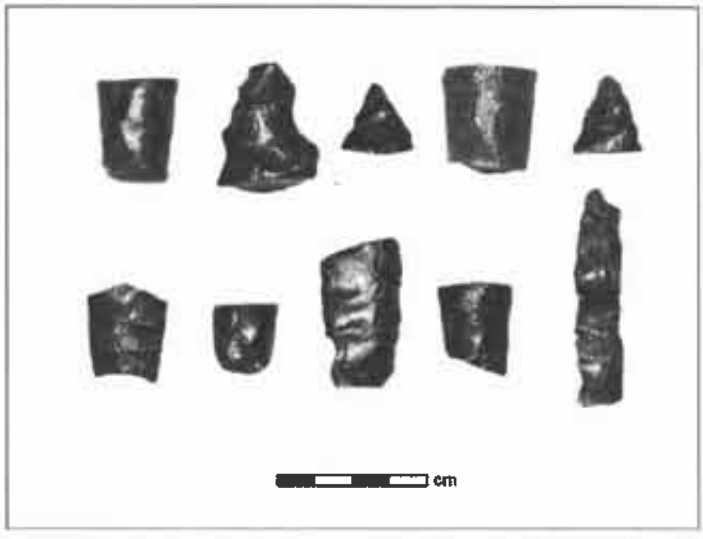

Figure 1. Samples submitted

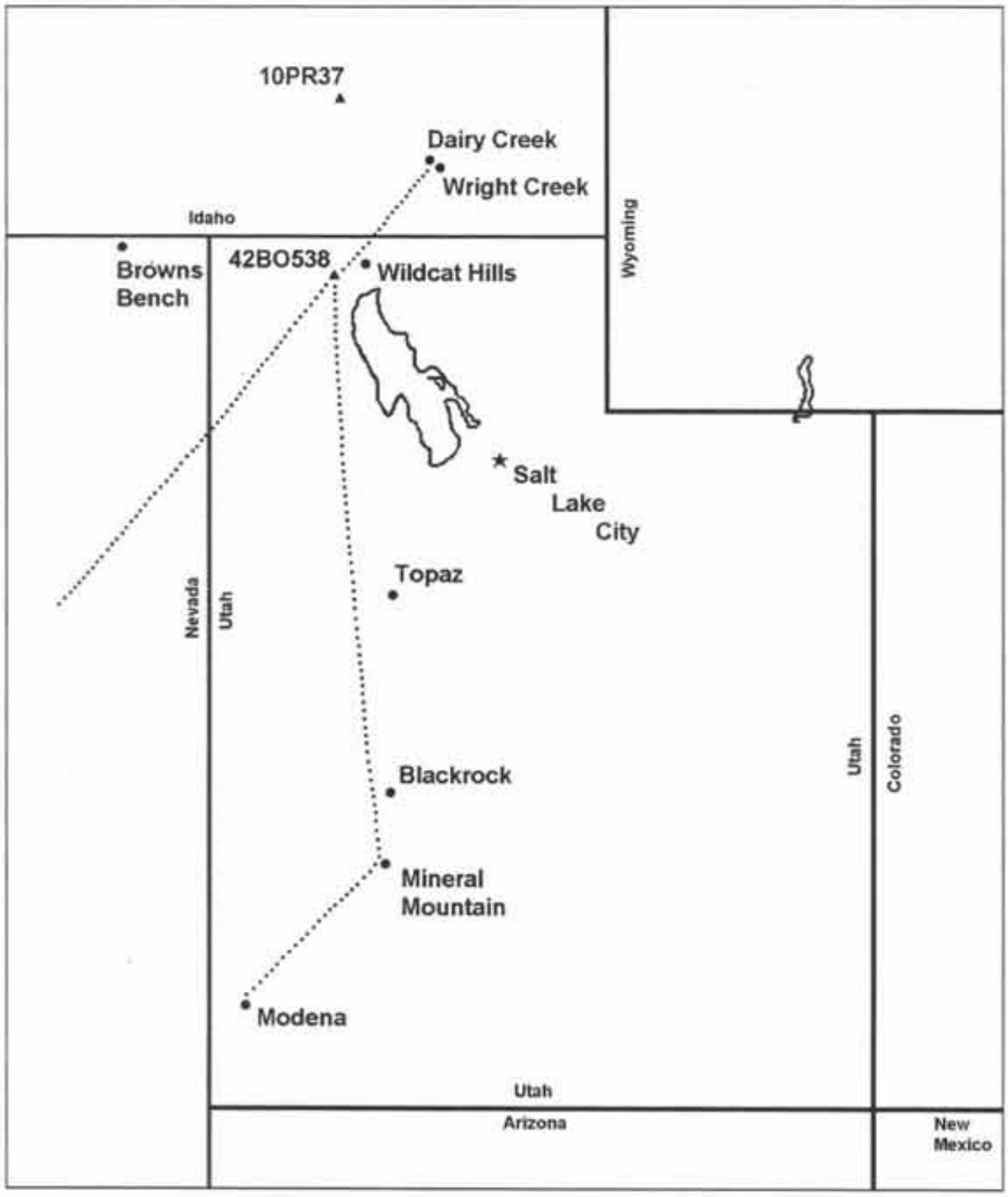

Figure 2. Map of locations discussed in text

SPECIMEN DESCRIPTIONS

The specimens (Figure 1) were examined to determine breakage characteristics. The types of specimens along with breakage characteristics indicate that the assemblage represents ten individual lanceolate points.

Specimen 1-2 represents a lower midsection. The upper break shows the scar of a hinge fracture and the lower break shows the scar of a lip fracture. Both would be the result of bending fractures (Whittaker 1994:161). The fragment has been retouched bifacially by pressure flaking and has ground edges. These characteristics indicate the impact of a hafted point. The obsidian is dark gray with some lighter gray bands, and extremely small ash inclusions that are typical of Mineral Mountain material.

Specimen 1-3 represents a tip. It shows large percussion flak scars, unfinished platform preparation, and a lip fracture. The fracture was probably due to a misplaced blow during percussion flaking that is represented by the crescent shaped edge bite out of the right edge (Whittaker 1994:191, 213). Although the material is not known, it is made from very opaque black obsidian with small ash like impurities throughout, very similar to Wildcat Hills obsidian.

Specimen 1-4 represents a tip. The break shows a lip fracture. The right edge is still somewhat ground which is probably the result of platform preparation. The left edge is sharp with a small semi-conic flake missing from the underside. This is probably the area of a blow that resulted in a bending fracture during percussion flaking. The material is very dark gray almost black opaque obsidian.

Specimen 1-5 represents a lower midsection. The upper break shows the scar of a lip fracture and the lower break shows a lip fracture. However, the lower break is not smooth and shows some shattering of the material probably due to compression from impact. With both edges heavily ground, this remnant is probably from a hafted point. It shows evidence of high quality percussion flaking techniques with retouch by pressure flaking. The material is gray marbled obsidian with some very small ash inclusions.

Specimen 1-6 represents a tip. Both edges are sharp and the break shows the scar of a hinge fracture. These indicate a finished to near finished tip fragment that resulted from vibration bending (Whittaker 1994:213). The obsidian is black, glassy, and somewhat transparent when held to a light. This is typical of obsidian in the Dairy Creek and Wright Creek areas of Malad, Idaho.

Specimen 2-1 represents a lower midsection. Both upper and lower fractures are neither a lipped, hinged, or straight fracture. They are somewhat shattered and would probably best be described as perverse (Whittaker 1994:163, 165). Both edges are heavily ground indicating that the fragment was part of a hafted point and therefore the fractures possibly resulted from impact. It shows a high level of quality percussion

flaking with pressure retouching. The material is very dark gray to black with some lighter gray banding. Ash inclusions are not visually apparent and the material seems extremely fine grained.

Specimen 2-2 represents a base. The break shows a lip fracture with some conic chipping on the surface of the cross section. Both edges are heavily ground. These characteristics suggest that it is a remnant of a hafted point after impact. The obsidian is black, glassy, and somewhat transparent when held to a light, typical of obsidian from the Malad, Idaho area.

Specimen 2-3 represents a lower midsection. The upper break shows the scar of a hinge fracture and the lower break is flat and straight. The left edge is quite ground with a large edge bite taken from the lower face. The right edge is sharp, well above the centerline with many pressure flaking scars on the underside. These characteristics indicate the remains of a point still being produced. The material is black and not quite opaque. When held to the light, some light can be seen though the edges.

Specimen 2-4 represents a lower midsection. The upper break shows the scar of a hinge fracture and the lower break is oblique and somewhat lipped and shattered. Both edges are heavily ground. These characteristics suggest that it is a remnant of a hafted point after impact. It is black but not opaque. Light can be seen through the edges giving it a somewhat banded or laced appearance.

Specimen 2-5 represents the edge or "burin" of an upper midsection (Waldorf 1984:47) and appears to be the remains of a hafted point that has suffered impact burination (Whittaker 1994:165). The obsidian is black and nearly opaque, however, light can be seen through the thin edges.

DISCUSSION

Haskett points were first discovered near American Falls Reservoir in the mid 1960's (Butler 1978:64). In addition to the American Falls site (10PR37) and Running Antelope, other Haskett points have been reported at sites near Tonapah, Nevada (Hutchinson, 1988:305, Price and Johnston 1988:240; Tuohy 1988:221). In the 1993 Running Antelope article it was suggested to search for more Haskett sites from American Falls Reservoir in a southwest direction into Nevada (Russell 1993:85). However, the sourcing data so far obtained suggests that the people associated with Running Antelope took a different route (Figure 2). In fact, it supports the findings of Dr. Pitblado who stated that for five study regions between the Great Plains to the Great Basin; mobility for raw material generally followed a north-south axis (Pitblado 1999:334).

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BOOK REVIEWS

From Hunters to Homesteaders: Recent Encounters with Past Communities in Utah's West Desert, edited by Heather K. Stettler and Matthew T. Seddon. Published by Kern River Gas Transmission Company, SWCA Environmental Consultants and Alpine Archaeological Consultants, Inc. 2005. ISBN 1-931901-14-7. 128 pages with many maps, photographs and an interactive CD ROM.

Reviewed by: **Ronald J. Rood,** Antiquities Section, Salt lake City, UT 84101

The science of archaeology is a publicly funded pursuit here in North America. When you put gas in your car, pay your water bill, buy a lift ticket at your favorite ski area, or pay your natural gas bill, a bit of that money goes to funding archaeological work. That is just the way it works under our current laws pertaining to cultural resources. The recent Kern River natural gas pipeline through Wyoming, Utah, Nevada and California encountered hundreds of prehistoric and historic archaeological sites. Major excavations were completed at a number of sites in Utah by archaeologists from SWCA Environmental Consultants of Salt Lake City and Alpine Archaeological Consultants of Montrose, Colorado. Their technical reports on these excavations include volumes of detailed descriptions, analysis and inferences they have made about the prehistoric peoples of Utah and the places they lived.

In *"From Hunters to Homesteaders"* archaeologists from SWCA and Alpine have put these thousands of pages of detailed information from the technical reports into a format that the general public will appreciate, understand and use. Producing a document for the public at large is no easy task but editors Stettler and Seddon of SWCA have pulled an amazing amount of material together in *Hunters to Homesteaders* detailing the archaeological work completed along the Kern River pipeline through Utah.

This volume provides the reader an attractive, well-written, jargon free, and informative narrative about the project, the pipeline, the archaeology, and why the archaeology was done and why that is important. There is a detailed section about the federal and state laws that pertain to archaeological resources, and then detailed sections about the particular sites that were investigated during the project. No stone is left unturned in this volume with well constructed discussions about what was previously known, why some sites are excavated and why some were not and yes, why and how some sites are considered to be important or significant and why others are not.

Hunters to Homesteaders provides the amateur archaeologist, the professional and the lay-reader a far reaching and encompassing view of the world of cultural resources management, and the science of archaeology. Step by step, the reader is introduced to the concepts of time, prehistoric cultures, how sites are found, how they are professionally excavated, how the material remains are analyzed and how the archaeologist derives information about the past from the artifacts recovered from the site. All aspects of archaeology are covered and special attention is paid to the long processes of laboratory work and curation and why those aspects are so terribly important.

The personal touch of the essays within the volume *"A day in the life of an archaeologist,"* and *"A day in the life of a PI"* present the reader with the real-world view of the daily grind of a large-scale CRM project. Clint Lindsay's essay called *"How archaeological sites get their names"* is an informative and funny look inside the mind of the field archaeologist and the sometimes-twisted sense of humor archaeologists develop after months and months in the field. For the avocational reader or the person reading about archaeology for the first time, it is clear that archaeology is a whole lot of fun and archaeologists, while learning about the past in a scientific manner, generally have fun doing it.

The section entitled *"Excavation, data analysis and reporting"* provides the reader with the nuts and bolts of archaeological research. It is an excellent chapter. Complete with detailed descriptions and excellent photographs, the reader is walked through the process of doing archaeology. The methods are explained and the types of artifacts are described in detail with easy to understand text, line drawings and photographs.

The final chapter *"What we learned"* gives a summary of the conclusions and inferences drawn from the work and it appears we learned quite a bit. Questions about raw materials used during prehistoric times, settlement patterns, paleoenvironments, house styles and interactions between different cultures are discussed. The archaeological record from historic sites in the west desert demonstrates the economic diversity needed by Euro American settlers to survive. The story of the Hansen's at the Wellington Town site brings clearly illustrates how artifacts, when found in context and interpreted with other artifacts and sources reflect human behaviors.

Hunters to Homesteaders comes with an interactive CD ROM that provides excellent information about the science of archaeology (Archaeology 101) and games that will appeal to kids and perhaps some adults too. Teachers will especially find the cross-words and word games useful in social studies curriculum and vocabulary lessons and these are especially appropriate for 4th grade lessons where students get a taste of Utah's prehistoric past. My favorite game on the CD is the "concentration" game modeled after the old TV Game Show. Although I was terrible, it might be a fun way to introduce artifact types to kids and the behaviors they represent. I strongly

recommend *Hunters to Homesteaders* to 4th and 7th grade teachers who focus on archaeology in their lessons. At the same time, the writing style and prose of this volume makes it appropriate for adults, avocational archaeologists and yes, even the professional.

The editors provide an extensive list for further reading and this is subdivided into useful categories like "General Archaeology" or "Ceramic Analysis." There is abundant information and internet links provided on the laws that govern archaeological resources, archaeological sites to visit in Utah, information on jobs and careers in archaeology (Shovelbums.org) and links to archaeological societies like the Utah Statewide Archaeological Society (utaharchaeology.org) and the Utah Rock Art Research Association (utahrockart.org) where people interested in archaeology can learn more and most importantly, get involved with archaeology. These types of information are especially important and unfortunately are often lacking in archaeological reports prepared for a lay audience.

I may have had some professional qualms about the implementation of the treatment plan for the Kern River Project and the site selection process, but that aside; I found nothing to grouse about with *Hunters to Homesteaders*. I liked it and strongly recommend it to avocationals and professionals and especially to professionals tasked with producing a public document for any CRM project, large or small. I'll go so far as to say that *Hunters to Homesteaders*, along with works by Wright and Silversmith (2001) and Janetski (1997) should serve as templates for further public products.

The information in the book and on the CD ROM is a great resource for teachers and I'll be passing this volume out to every 4th grade teacher I can contact in Utah. Kern River, SWCA and Alpine are to be congratulated for an excellent contribution to public archaeology.

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Greater Mesoamerica: The Archaeology of West and Northwest Mexico, edited by Michael S. Foster and Shirley Gorenstein. University of Utah Press, Salt Lake City. 2000. 307 pages, 135 figures, 3 tables. $65.00 *cloth*
Reviewed by: **Walter A. Dodd**, California State University, Fresno. Fresno, CA 93740-8001

Archaeological field studies in North America have been chiefly conducted north of the international boundary that separates the United States and Mexico, and have also focused on southeastern Mexico and nearby Guatemala. The intervening region of west and northwest Mexico, on the other hand, represents a vacuum in knowledge that, until recently, has drawn limited interest. The new book *Greater Mesoamerica* brings together the varied research findings of many of the principal scholars, both Mexican and American, who are now doing significant research in this relatively unexplored area.

The resulting volume has several goals: (1) summarize, analyze, and synthesize old and new data obtained through fieldwork; (2) convey the intellectual excitement of current research problems; (3) remove the west and northwest Mexican region from the shadows of its better known neighbors to the north and south, through careful reconstruction of both its internal cultural development and external connections; and (4) argue that the region is more or less an integrated extension of Mesoamerican themes, but that its local evolutionary histories are different in character and deserving of study in their own right.

There are 15 chapters in the book. Chapters 2 through 7 are devoted to the archaeology of west Mexico, which largely encompasses the present-day states of Jalisco, Michoacán, Guanajuato, Colima, and Nayarit. Chapters 8 through 14 deal with northwest Mexico, as defined by the states of Sinaloa, Zacatecas, Durango, Chihuahua, and Sonora. The book is fittingly dedicated to one of the contributors, J. Charles Kelley, a life-long pioneer in the prehistory of northwest Mexico who died in 1997.

The opening chapter lays out a common thread that unifies all articles in the collection. Shirley Gorenstein and Michael Foster review the ways in which "Mesoamerica" has been spatially and conceptually defined, and argue that a reevaluation of the meaning and use of the term is long overdue. They give a clarion call for a more balanced inquiry into what constitutes the Mesoamerican phenomenon, one that requires both local and distant human interactions across a much larger tract known as "Greater Mesoamerica." In their view, the region was not a cultural backwater, but instead played a fundamental role in synergistic processes that led to

more complex social formations both within and outside the region. It is apparent that socioeconomic and ideological changes were internally and externally driven across the entire Greater Mesoamerican landscape.

All of the book's authors provide evidence to support this basic premise. Complex behavioral and material histories, which evolved in a bewildering array of natural and cultural environments, are individually documented in each article. These include: the interesting Chupícuaro manifestation along the Río Lerma in Guanajuato (Charles Florence); the Bajío and Tunal Grande areas north of the Lerma (Beatriz Braniff C.); the distinctive Teúchitlan tradition of the lake districts in Jalisco (Phil Weigand); the fascinating Tarascan state on Michoacán's Central Plateau (Helen Perlstein Pollard); diverse marine adaptations associated with embayments of the South Coast (Joseph Mountjoy) and mangrove swamplands of the Northwest Coast (Stuart Scott and Michael Foster); the ecologically transitional valleys of southern Zacatecas between the Bajío and Chalchihuites zones (Peter Jiménez Betts and Andrew Darling); and the great desert and mountain traditions of Mexico's arid north, such as Loma San Gabriel,/Chalchihuites (Michael Foster), Paquimé (Ronna Bradley), and Trincheras/ Huatabampo/Rîo Sonora (María Elisa Villalpando).

Two chapters in the book emphasize single topical problems that are more specific in content, and thereby depart from the sweeping-style surveys of the aforementioned sections. In one article, J. Charles Kelley presents an intriguing hypothesis or model to explain how Mesoamerican influences permeated west and northwest Mexico. The lynchpin of his hypothetical argument is the notion of a network of foot traffic (and water transport in some places) that would have carried Mesoamerican-inspired goods and ideas from a Valley of Mexico heartland to the northwestern frontier and beyond. Solid ethnohistoric data exist to bolster Kelley's proposal of human carriers bearing burdens. In a second article, J. Charles Kelley and Ellen Abbott Kelley recount their captivating quest to decipher how one complex feature—a pecked cross-circle—functioned at a Classic period Chalchihuites site in western Zacatecas. They present a very convincing case for one potential way that a calendrical-astronomical setup might have operated over a 400-year period, and they cite several compelling lines of evidence to implicate Teotihuacano foreigners in the sophistocated planning and execution of the system. Significantly, the programmatic work of the Kelley's is experimental by design and alert to the dynamic aspects of past behavior.

If one steps back and looks at the collective efforts that make up this edited volume in its entirety, it can be concluded that *Greater Mesoamerica* does succeed on several counts. It presents a wealth of space/time data to illustrate that evolution has indeed occurred; in essence, "what" has transpired in many different environmental contexts is made abundantly clear, although the questions of "how" and "why" it turned out that way is considerably more tenuous. One of the encouraging trends in the archaeology of this region is that topics and problems have been formulated to stimulate debate on a number of issues. For instance, Ronna Bradley pays particular

attention to research problems that have generated considerable controversy over the last four decades in Chihuahua (e.g., understanding the nature of Casas Grandes, *cerros de trincheras*, early agriculture, etc.). It is also noteworthy that several researchers have begun to carry out regional survey programs (e.g., Whalen and Minnis in the Casass Grandes hinterland, Hard and Roney along the Río Casas Grandes, etc.) that go beyond the site-oriented approach.

Michael Spence, in the concluding chapter, argues that recent archaeological fieldwork in west and northwest Mexico has also succeeded in generating revolutionary new perspectives. He observes that researchers who work in this area of Mexico are freeing themselves (and others) from the straight-jacketed conventions of *centralismo*, in which the Mexican frontier and hinterland are essentially denied both a supporting role in the evolution of Mesoamerican civilization and a central role in their own societal development. He also questions the utility of concepts like "core" and "periphery" and whether they are really reflective of past reality. Spence's comments are evocative of acentrism, a long held tenet in evolutionary biology, whereby no one system assumes a "higher," "more advanced," "superior," "progressive," or "centralized" position with respect to others.

Despite the fact that an impressive evolutionary record has been generated for the region, and that new perspectives are being used to analyze it, there are other counts on which the research falls short. Most studies are still typological rather than populational in focus, and the tendency persists to want to pigeonhole things into categories or labels. The majority of research has also concentrated on stratified/civilized societies, and less so on the simpler Paleoinidan, Archaic, and early Formative occupations. At the same time, Spence seems justified in condemning those who would indiscriminately ascribe cultural developments in west and northwest Mexico to the diffusional or colonial influence of Teotihuacán, especially when solid evidence is lacking. Some investigators also add that caution must be used in getting the facts right and in making certain interpretations (e.g., Spence argues that accurate dating procedures continue to be necessary for the valid reconstruction of cultural sequences, Villalpando notes that it may be difficult to establish that houses were contemporaneous, etc.).

A more important shortcoming, however, is that there is almost no general theory development, and there are few testing regimes that can lead to falsification of hypothetical claims. The usual custom is to advance an intuitive explanation without any recourse to testing one's ideas or positing a theoretical justification for them (there are many such ideas in this book); in the absence of test procedures or theoretical warrants, they are merely "just-so" stories. I continue to believe that Charles Darwin laid out the definitive paradigm for doing research in the biological and historical sciences, and yet most archaeologists remain ignorant of Darwinian concepts and how they can be applied to the interpretation of their data. Most archaeological accounts gloss over variation, stress adaptation rather than selection, assume that goal-direction (human intent) is equivalent to selection, or confuse proximate causation with ultimate causation.

Faced with the challenges of interpreting a magnificent evolutionary record, archaeological investigators who work in west and northwest Mexico now have the opportunity to begin exploring new theoretical and methodological vistas. They can take pride in the fact that they have a wonderful material record that presents many formidable patterns in need of explanation. The detection of patterns, and the inference of testable Darwinian explanations to account for them, is the first step on the road to becoming a true historical science. As archaeological inquiry matures here, the entire expanse of Greater Mesoamerica promises to become one of the great testing grounds for hypotheses about behavioral and artifactual evolution. This is an exciting prospect for archaeologists who do research in this part of the world, and indeed for all anthropologists in general.

INSTRUCTIONS TO AUTHORS

UTAH ARCHAEOLOGY is published annually in the first quarter of the year following the issue date of the journal (e.g., *Utah Archaeology 1999* appears in March 2000). The journal focuses on prehistoric or historic archaeological research relevant to Utah. Articles must be factual with some archaeological application. We seek submissions from authors affiliated with government agencies, cultural resource management firms, museums, academic institutions, and avocational archaeologists equally.

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