PREHISTORIC PIÑON ECOTONE SETTLEMENTS OF THE UPPER REESE RIVER VALLEY, CENTRAL NEVADA

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ABSTRACT

An archaeological survey was conducted to define the prehistoric settlement pattern operating in the Reese River Valley, central Nevada. A series of potential site "loci" were initially predicted using several geographic microtopographic criteria. Then a 12-mile-long strip of piñon-juniper woodland was surveyed for archaeological sites. A total of 65 prehistoric sites was located and mapped along the piñon ecotone, and more than 450 time-sensitive artifacts were recovered from these sites. The archaeological sites occurred at the predicted locations more than 95 percent of the time, demonstrating the validity of the polythetic criteria.

INTRODUCTION

The Reese River Ecological Project set out in 1968 to examine, among other things, the prehistoric settlement pattern in the Reese River Valley of central Nevada. A specific study area was selected about 30 miles south of Austin, Lander County (fig. 1). The initial objective was to determine how well Julian Steward's theory of historic Shoshonean cultural ecology (Steward, 1938) explained the prehistoric archaeological record. After two years of fieldwork at Reese River, we determined that Steward's theory did seem to hold for the prehistoric past. Steward's theory was not proved, of course; the research simply failed to turn up prehistoric manifestations that were inconsistent with Steward's interpretations. This phase of investigation has been summarized in Thomas (1971a, 1973, 1974b).

A second, more comprehensive theory evolved from this initial phase of work at Reese River. The new theory attempted to explain the overall patterns of prehistoric settlement patterns that spanned some 4500 years:

> The Reese River Subsistence-Settlement System is defined for the Medithermal *Period* at the Reese River *Locality* . . . [and] is characterized by two types of settlements. The *Shoreline Settlement* consists of a series of sites located on a permanent water source within a lower sagebrush-grass lifezone . . . [comprised] of massive linear scatters of artifacts, generally parallel to the flowing source of water. No consistent locus of habitation was re-occupied; apparently campsites were situated near scattered caches of seeds . . . The *Piñon Ecotone Settlement* corresponds to Steward's winter village sites . . . [which] were located in stands of piñon and juniper trees, often on long, low ridges which fingered onto the valley floor . . . the precise locus of winter habitation varied from year to year; this fluctuating locus can perhaps be planned up to three years in advance . . . it is suggested that about five families lived on each ridge-top, but there might be several such ridge-top villages within a one mile radius . . . the Reese River system is really based upon a dual central base pattern, since habitation alternated between the two settlement types, depending upon the seasonal available resources . . . this adaptation, as "on the fence" compromise between wandering and sedentary life, seems to provide the flexibility required for success in a situation such as the central Great Basin. [Thomas, 1973, p. 173]

The second phase of investigation at Reese River set out to test this theory using fresh, independent data.

The present report describes the second aspect of archaeological research at Reese River. Specifically, we shall examine piñon ecotone settlements in some detail. The procedure is relatively straightforward: isolate the critical determinants of settlement pattern from the 1969-1970 survey data, then predict the location of piñon ecotone camps in unsurveyed areas, and finally generate field data to see how well the theory explains the unknown.[1]

[1]In a preliminary paper summarizing this research (Williams, Thomas, and Bettinger, 1973) we stressed the importance of testing statistical hypotheses on independent data. In the same volume, LeBlanc (1973) argued that independent evidence was not logically

ACKNOWLEDGMENTS

We are particularly grateful to the late Prof. Julian H. Steward, for his assistance throughout the project. Without his rigorous fieldwork and continued interest in Great Basin research, this project could not have been attempted.

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The following participated in the 1969 University of Nevada summer field course in archaeological methods:

Claudie Calonge	Sue Matson
Ann Crooks	Helene Rouvier
Mike Dinning	Bob Schultz
John Horn	John Sears
Linda Hochede	Dwight Simons
John Howe	Linda Smith
Lynn Hubbard	Randy Susman
Robert Kautz	Linda Therkorn
R. G. Matson	Trudy Thomas

The following participated in the 1970 summer course in archaeological methods, sponsored by the University of California, Davis:

Mark Amara	Bruce McVicker
Dan Andrews	Monica Manners
Barry Borden	Cathy Moore
Nichole Boucher	Fred Munday
Barry Broadhurst	Ellen North
Marie Channon	Ann Rockwell
Carol Conoboy	Tod Ruhstaller
John Conoboy	David Shefrin
Peggy Eby	Carol Sprague
Sharon Emmick	Hilary Stecher
Susan French	Ann Steinbrugge
Karen Gustafson	Randy Susman
Steve Hayden	Sandee Susman
Greg Jackman	Trudy Thomas
Robert Kautz	Susan Turner
Chester Linderman	Terry Zontek

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Robert Angel	Judith Madden
Heidi Auerbach	Susan Osburn
Jane Browne	William Palm
David Burton	David Paxson
Janet Cornish	John Pousson
Margaret Ehmann	Kathy Litton
Laura Heeger	Trudy Thomas
Deborah Helms	Mark Vosk

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essential to hypothesis-testing, and following his lead, Spaulding (1973) cited our research as imposing unnecessary scientific strictures. Our response was based on the premise that there is a fundamental difference between testing universal hypotheses, LeBlanc's principal concern, and testing statistical hypotheses. Specifically, confirmation of universal hypotheses is firmly grounded in logical principles combined in an ideally error-free process. Statistical testing, on the other hand, invariably involves the concept of error. Consequently, a large part of statistical theory and procedure are devoted to maintaining this error within acceptable limits. The post hoc testing process advocated by Spaulding violates several basic assumptions routinely stipulated in statistical tests, leaving the error factor largely uncontrolled. It is primarily on this ground that we reject post hoc statistical testing as a legitimate scientific procedure.

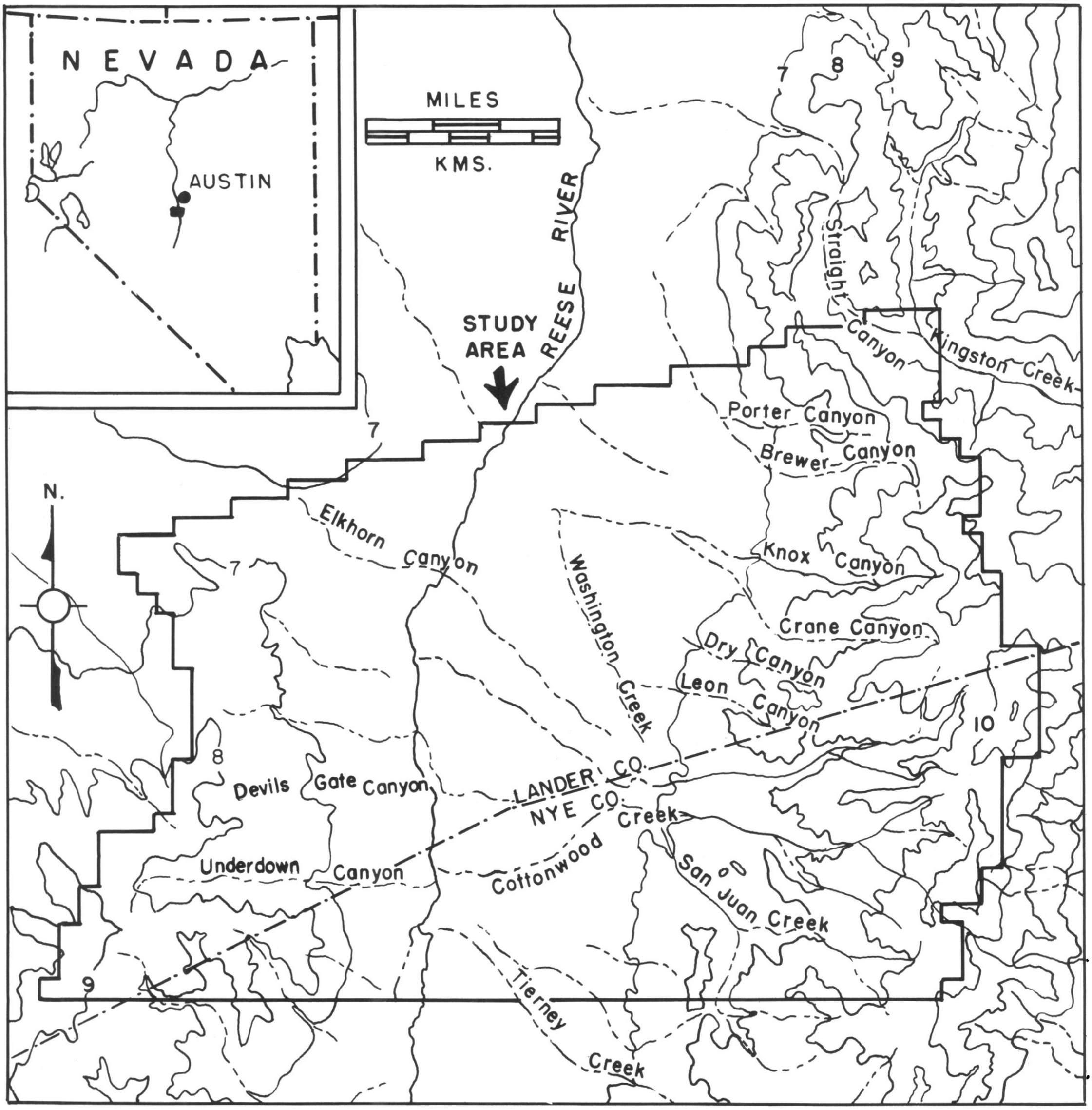

FIG. 1. Topographic map of Reese River study area. The Shoshone Mountains are to the west, the Toiyabe Range to the east. The pie-shaped transect denotes the 1969-1970 survey area. The 1971 settlement pattern survey was confined to the Toiyabe portion of the original transect (see details in figs. 2 and 3).

As outlined above, the second phase of Reese River research was concerned with defining the precise articulation between prehistoric piñon ecotone camps and specific environmental parameters. How are sites located with respect to distinctive landforms and crucial resources? The remainder of this paper presents the data generated from our survey of piñon ecotone sites and their attendant resources. In addition, we hope to clarify a couple of issues and misunderstandings raised in a preliminary summary of this project (Williams, Thomas, and Bettinger, 1973).

Throughout the research in the Reese River Valley, much of our thinking about piñon winter sites focused on their nearly perfect association with the lower sagebrush-grass/piñon-juniper woodland ecotone. We think there are important reasons for selecting ecotones as settlement locations. Selection may be due to the unique biotic characteristics of the ecotones. As widely recognized by ecologists, the contact zone between biotic communities may exhibit unusual diversity of species and increased natural productivity–particularly among animal species. Such factors could conceivably attract aboriginal occupation; we think not in the Reese River case. The Reese River piñon-juniper woodland shows little, if any, tendency toward increased species diversity. The contact between zones comprises little more than a typical sagebrush-grass association with the addition of two arboreal elements, piñon (*Pinus monophylla*) and juniper (*Juniperus osteosperma*). Similarly, stands of the dietary plant staples, principally piñon and ricegrass (*Oryzopsis hymenoides*), range from depauperate to only moderately abundant, and none of the aboriginally important animal species reaches its highest density in this contact zone. In addition, Vita-Finzi and Higgs (1971) have questioned the basic assumption that ecotones are important at all as site determinants. They argued that the location of sites on ecotones is often fortuitous, reflecting a primary adaptation to a zone that is habitable only at its contact with another zone, or which is so small that no point within it is far separated from surrounding zones. Lakeshores, riverbanks, and desert oases each consist in whole or in part of ecotones, yet the fundamental motivation for placing settlements at these locations might have little to do with their role as ecotones. In addition, Vita-Finzi and Higgs (1971) and Lee (1969) have pointed out that hunter-gatherers seldom restrict subsistence activities to the immediate vicinity of their settlements, but rather use these settlements as base camps to exploit large tracts of the surrounding territory. Failure to recognize the importance of this exploitation area, termed "site catchment," will lead to overemphasis of the specific site locality and its ecotone.

When viewed from the perspective of exploitation area, the preference for the lower sagebrush-grass piñon woodland ecotone at Reese River can be interpreted merely as providing ready access to both these major communities. This pattern of mixed site catchments is consistent with the unspecialized, broad-spectrum subsistence adaptation and settlement strategy which Steward depicts for ethnographic groups in the Reese River and elsewhere (Steward, 1938, pp. 101, 104).

OPERATIONAL AND POLYTHETIC DEFINITIONS

At the outset, we were faced with a situation common to many field archaeologists. After years of working in an area, we intuitively thought we knew where unknown sites "ought to be." Given an archaeologically unexplored area within the general region, we believed that our cumulative experience enabled us to predict where most of the sites would occur. Before testing this intuition, we conferred with the late Julian Steward:

> In my own fieldwork I made it a point to go over the root areas and the camping areas with my informant. It was commonly possible to verify the location of campsites and winter settlements by the presence of artifacts, particularly pottery which I believe implies some

> stability . . . May I venture a couple of suggestions about the prehistoric settlement patterns . . . it would be most profitable to ascertain the specific factors determining winter settlement locations and then explore such places to see whether they were indeed utilized. I have always regretted that I did not have the time to do this to a much greater extent but what little I was able to do, I invariably found signs of occupation where the critical factors came together. These are reasonable access to pinenuts, a piñon-juniper belt which supplied firewood and preferably a stream for water or else higher altitudes where snow could be obtained [Julian Steward, personal commun., 1971].

Steward's beliefs coincided with ours, that rather specific factors determined the winter village locality. Where such factors co-occurred in nature, one could expect to find an archaeological site.

To predict locations of piñon ecotone camps is difficult because so many environmental factors are involved: amount of exposure, distance to the piñon groves, proximity to water, distance to the valley floor, plus the microtopographic variations of the sites. Because no single criterion or set of criteria seemed to provide clear-cut predictions of site location, we elected to use a "polythetic" definition. The polythetic concept was initially proposed by Beckner (1959) and was later refined by Sneath (1962). The essence of polythetic procedures is that several variables are incorporated in one definition, but concern is with the overall implications of all variables, rather than any specific variable. The several variables in a polythetic definition must satisfy two important criteria: (1) All the defined objects must exhibit most of the characteristics stated in the definition. (2) Each of the defining variables must characterize most of the defined objects. The polythetic concept and our rationale for using it has been detailed elsewhere (Williams, Thomas, and Bettinger, 1973).

The task then became to specify our criteria precisely enough so they could be used in actual fieldwork. Reviewing our previous survey data, we found several common denominators that were present at most piñon ecotone settlements. 1) Most sites were situated on long ridges that extended far onto the valley floor, although several sites were situated on gentle saddles between low piñon-covered knolls; 2) the habitation sites were generally quite flat and smooth, although access to the sites was often steep; 3) the winter sites were in the low foothills, 4) within the piñon-juniper community; 5) close to the modern piñon-juniper ecotone; finally, the sites had 6) relatively easy access to either springs or flowing streams, but as is true of many hunter-gatherer settlements, the foragers had preferred to camp 7) a discreet distance from the water source. Unlike many modern campers, the Shoshoni realized that to see and hunt game animals, one must avoid the watering areas as much as possible.

The first step was to decide what constitutes an archaeological site. At this point, we could have rigorously defined a site as a "scatter of prehistoric cultural debris which extends over a discernible extent (at least x square meters) and consists of a density of at least y cultural items per square meter." At the time, however, we lacked the quantitative survey data necessary for a serviceable definition of a site, so we elected to rely upon our experience to tell us when we encountered a site in the field. We recorded an archaeological site whenever we thought one occurred. We believe that this procedure, although subject to later refinement, in no way hampered our work. We neglected no archaeological sites in the area and, furthermore, we believe that any qualified visiting archaeologist would be equally capable of locating these same sites in practice.[1] We have discussed the logic of leaving some primitive terms undefined in Williams, Thomas, and Bettinger (1973, pp. 225-227).

[1]In actuality, we used a simple field definition of site as any discrete locality (e.g., a segment of a ridge, a clearing, a saddle, etc.) containing more than one category of artifacts or features (e.g., points, ceramics, house rings), or more than one representative of any category of features or artifacts except debitage, this category requiring at least 10 examples to qualify as a site. This definition would be quite useless along the Reese River where frequently shifting prehistoric settlements have left linear artifact-scatters lacking clear-cut "sites," but worked reasonably well in the piñon-juniper community where the same specific locality was apparently repeatedly used over thousands of years. Despite its utility, we continue to be uneasy about this definition and would like to stress that it is a tentative measure.

On the basis of previous surveys in Reese River we could now define the seven variables that seemed particularly critical for determining settlement pattern:

f_1 The locus should be on a *ridge* or *saddle.*

f_2 The ground should be *relatively flat.*
"relatively flat" $\leqslant$ 5 percent

f_3 The locus should be in the *low foothills.*
"low foothills" $\leqslant$ 250 meters above the valley floor

f_4 The locus should be within the modern piñon-juniper lifezone.

f_5 The locus should be *near* the extant piñon-juniper ecotone.
"near" $\leqslant$ 800 meters.

f_6 The locus should be *near* a semipermanent water source.
"near" $\leqslant$ 1000 meters.

f_7 The locus should be some *minimal distance* from this source.
"some minimal distance" $\geqslant$ 100 meters.

These figures were estimated from past field experience without benefit of measurement.

To this point we have a set of partitive f-variables, operationally defined yet unrelated in a holistic manner. One could combine the seven variables into an inclusive definition of all potential piñon ecotone areas by simply requiring that all seven variables measure positively for all sites—yet this situation would suffer from all of the woes inherent in monothetic definition. We prefer to consider archaeological sites as operationally polythetic, assuming no *sine qua non* variables. Accordingly, we define a potential habitation locus.

Group K (the set of all potential piñon ecotone habitation loci in the upper Reese River Valley) is defined in terms of a set G of properties $f_1, f_2, \ldots f_7$ such that:

1. Each locus possesses a large ($n \geqslant 5$) number of the properties in G.

2. Each f-variable in G is possessed by large numbers of these loci.

Additionally, for the potential loci to be considered fully polythetic:

3. No f in G is possessed by every locus in the aggregation.

We have chosen the figure 5 of 7 as an arbitrary starting point subject to verification and refinement by later field work.

An earlier discussion of these polythetic variables has been criticized on the grounds that the variables are not mutually exclusive (Gorman, 1974, p. 522). Specifically, it is argued that two of the variables ("locations near the piñon ecotone" and "locations within the piñon-juniper woodland") are nested and fully redundant. This is clearly not the case, since by definition the piñon-juniper woodland can constitute only 50 percent of the area "near" the piñon ecotone, the remaining 50 percent of the lower sagebrush-grass community that borders the lower edge of the piñon woodland; conversely, by actual measurement, the area near the piñon ecotone entails but 25 percent of the total piñon-juniper woodland. The two variables are, of course, partly logically correlated to some degree, but nothing in the original definition of the polythetic concept (Beckner, 1968, pp. 22-25) or subsequent applications of it (Sokal and Sneath, 1963; Sneath and Sokal, 1973) excludes the use of such characters. Quite the contrary, Sneath and Sokal outlined the conditions under which such characters can and should be used.

"When a character *2* depends in part upon another character *1*, the decision whether to employ *2* as well as *1* will depend on the nature of the factors other than *1* that affect *2*. If to the best of our knowledge, these factors reflect heritable variations, we would include *2* . . . when we have evidence that more than one factor affects two correlated characters within a study, regardless of whether this evidence comes from within the study or outside, we would include both characters." (1973, pp. 104-106)

We believe there is strong evidence that factors affecting the two variables in question are quite different. The advantage of camping near the ecotone would be to exploit two contiguous lifezones from a single location. But the decision to actually camp within the piñon-juniper woodland refers only to the sources within that single zone, including advantages of shelter, fuel, and food. That these two factors are logically related in some way is irrelevant archaeologically.

It is also important to note that our polythetic definition in no way negates subsequent statistical analysis of the data. The statistical tests that follow reflect only the goodness of fit between some predicted and actual site locations. The polythetic concept only implies a specific relationship between a set of characters and a rigorous definition. Individual site locations are not polythetic, but a large enough sample of sites tends to exhibit polythetic qualities with regard to specific environmental variables.

Note that two discrete populations are involved. There is the population of all piñon-gathering sites in the Reese River Valley. These are the actual archaeological sites. The polythetic definition sets out a second population, the population of all potential habitation loci in the same area. This population was defined by a polythetic combination of strictly topographic, noncultural variables. The fieldwork was designed to establish whether the population defined by cultural criteria is isomorphic with the population defined by natural variables. Are the potential loci acceptable predictors of archaeological sites? Is the reverse also true?

PROCEDURES

Prior to actual fieldwork, the potential site loci were plotted on stereoscopic pairs of aerial photographs and USGS topographic quadrangles. A "locus" occurs whenever at least five of the seven polythetic criteria are satisfied. A total of 74 such localities was identified. This list was not considered exhaustive; its purpose was to simplify the survey by designating areas for intensive examination. The survey was carried out by two teams of 10 members each. Daily, each team surveyed a designated parcel of land containing one or more potential site locus. Each locus was checked for evidence of prehistoric use, and the balance of the parcel surface surveyed for other localities exhibiting at least five of the seven polythetic criteria, and for archaeological sites occurring outside potential loci. In this way, the entire area shown in figures 2 and 3 was surveyed; we are confident that the 65 archaeological sites located during our intensive survey comprise virtually all the sites within these boundaries.

Each locus was recorded, regardless of whether or not a site was present. The following attributes were noted: *Landform*: whether a ridge, saddle, or other landform; *Surface slope*: when a site was present, this was measured from the geographic center of the artifact scatter to its margin at its steepest point; in localities lacking archaeological sites, the margin was considered to lie 10 meters from the center of the locality. Percentage of slope was measured by a hand-held Brunton clinometer sighted at an object of equivalent height at the locality margin. *Distance above valley floor, biotic community* (piñon-juniper woodland), *distance from piñon ecotone*, and *distance to semipermanent water source* (in terms of minimal and maximal limits) were measured from USGS Quadrangle maps, which plot the distribution of piñon-juniper woodland and semipermanent water sources.

We noted first if there was an archaeological site on each locus. Then the major characteristics of each site were recorded. Site area was determined by the extent of surface scatter. Because it was impractical accurately to map each site, we "estimated" the site area by first measuring the long and short axes (using a 50-meter tape) and then multiplied their product by 0.75. We think these estimates are sufficiently accurate for survey purposes; greater accuracy would probably have tripled the costs of the survey. This procedure has been criticized by Gorman (1974, p. 522) who suggested that our data are "contaminated" and that the resulting statistical analysis is "questionable." Gorman, it seems, not only misunderstands the nature of archaeological sites, but the nature of measurements as well. Three variables are involved here: site length, site width, and site area. The first two determine the third. Because each variable involves a ratio level of measurement, "accuracy" is an operational, rather than a logical matter. The last significant figure is always an estimate. One could, if necessary, determine the length of a site down to 0.01 meter. Or 0.0001 meter, if desired. But the archaeological site in this case is a thin lithic scatter, and such accuracy is spurious. What we did—and what we would do again in similar circumstances—is judge the "approximate" lengths and widths, then correct for the curving edges. Would Gorman be surprised that our sites are not perfectly rectangular? The resulting area "estimate" is accurate enough for our purposes. But even if more accuracy were demanded, an "estimate" would still be involved. Lengths, as ratio level variates, must always be "estimated" because we must always round off the answer.

A sketch map was then prepared of each site, locating its margins with respect to major landform, noting cultural features (such as house rings) and nonportable artifacts (such as grinding stones). All the time-sensitive artifacts were collected together with a grab sample of other artifacts. The nature of the remaining debris was noted but not collected.

The 65 archaeological sites located in this survey are presented herein. Two of the more important sites, Mateo's Ridge and Flat Iron Ridge are discussed in detail and the remaining sites are summarized. Once the supportive data are present, we shall discuss how well the polythetic definitions worked in predicting archaeological site locations.

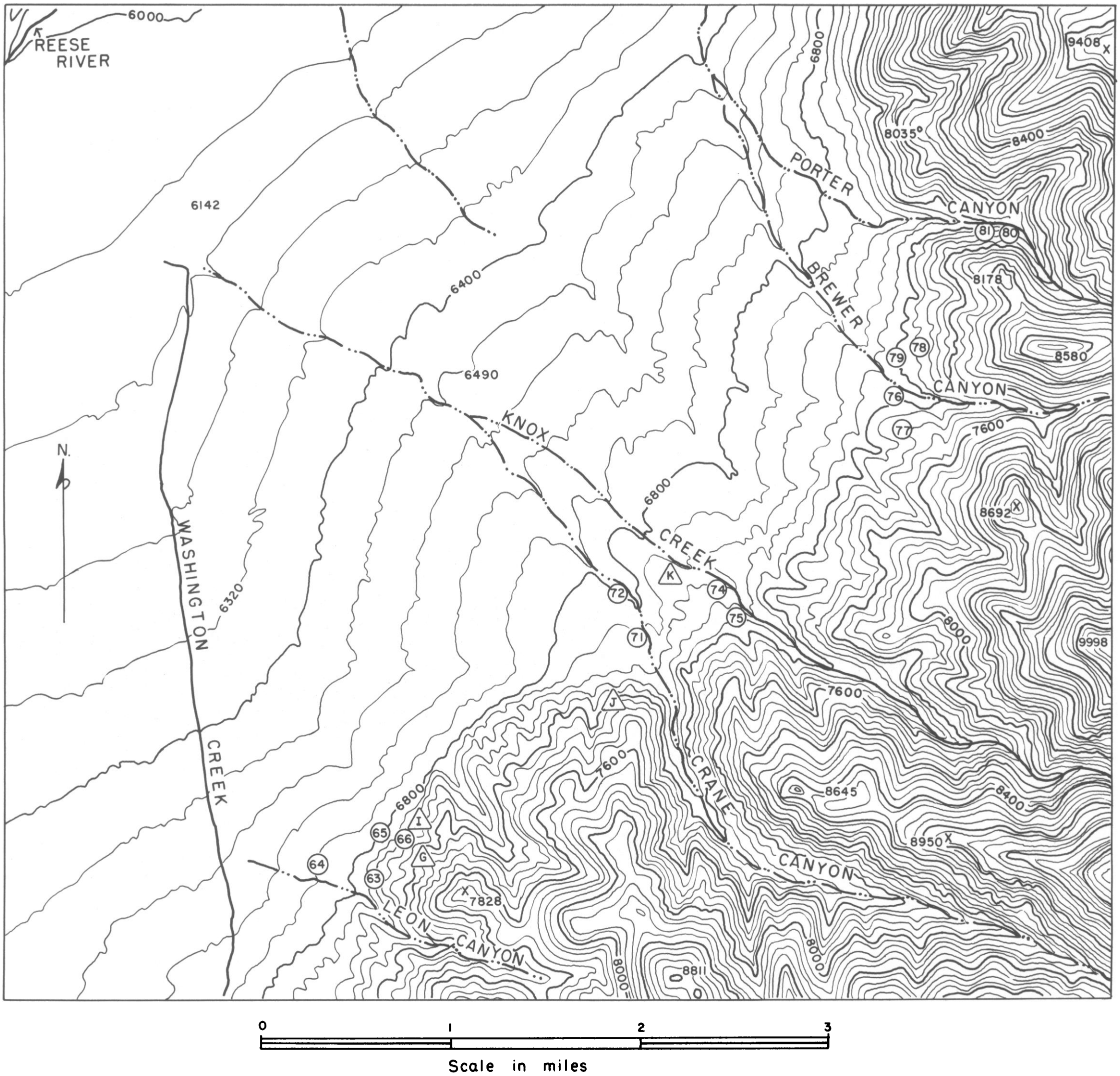

FIG. 2. Archaeological site map, western flank of the Toiyabe Range, central Nevada. Numbers represent archaeological sites, letters denote potential site "loci."

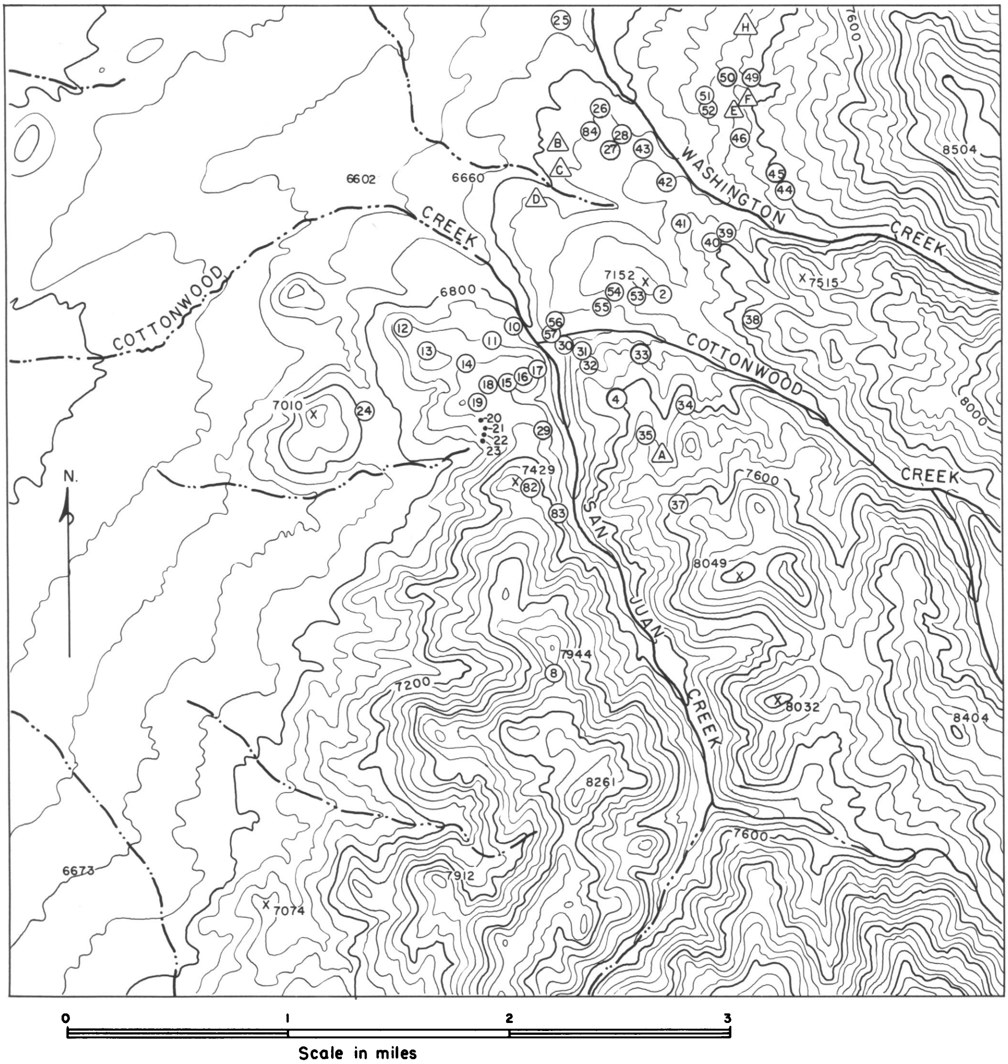

FIG. 3. Archaeological site map, area immediately to the south of figure 2.

MATEO'S RIDGE SITE

BRIAN W. HATOFF AND DAVID HURST THOMAS

Mateo's Ridge (26-Ny-307) is perhaps the most significant archaeological site located in the piñon ecotone survey. The site is geographically more extensive than the other 64 sites, and the archaeological materials are notably more dense than elsewhere in the vicinity. The site is situated on a broad, east-west trending saddle overlooking Cottonwood Creek. Mateo's Ridge is denoted by "2" on figure 3. Cottonwood Creek joins San Juan Creek approximately 1 km. west of Mateo's Ridge and continues to flow northwesterly onto the valley floor where it ultimately joins the Reese River.

This site is named after Mateo Orzero, a pioneer rancher and prospector who came to the Reese River Valley from Genoa, Italy, in 1863. Shortly thereafter, Orzero erected a small cabin on the lower margin of the ridge figure 4. This

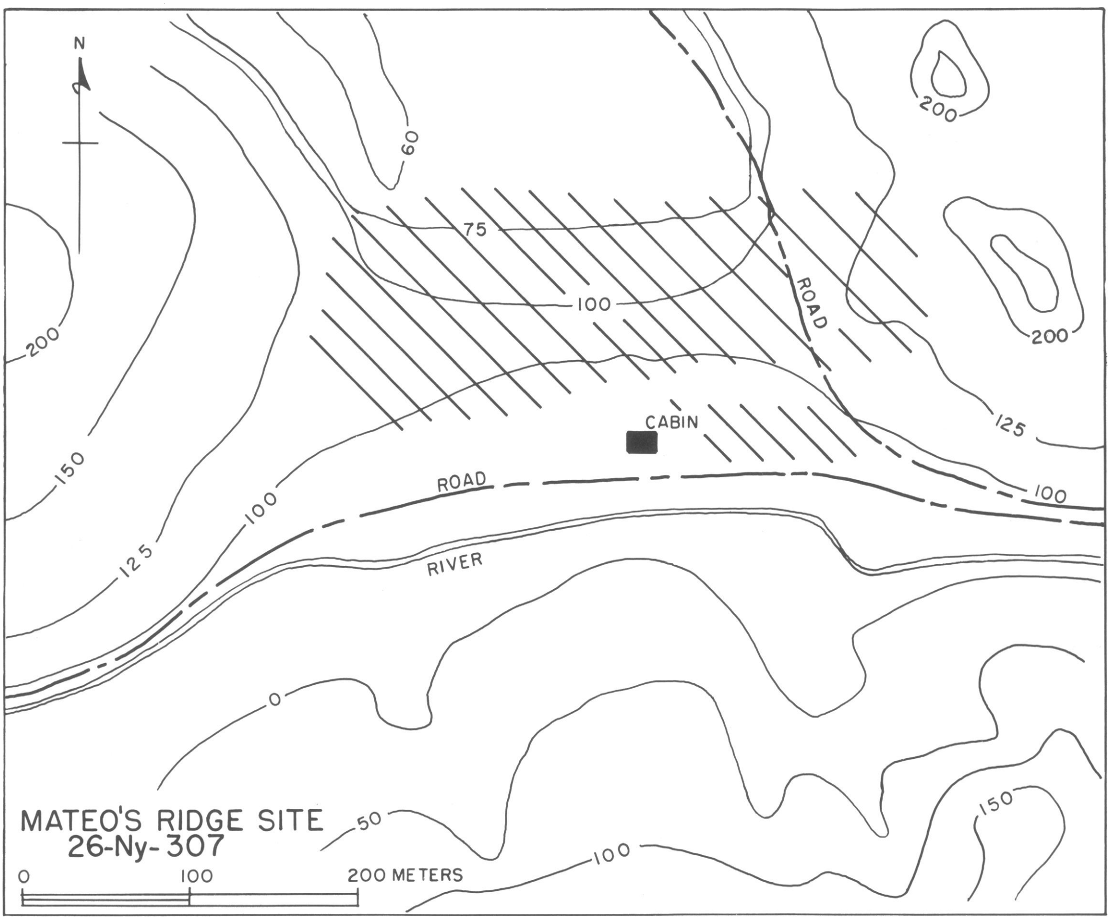

FIG. 4. Topographic map of the Mateo's Ridge site. Contours to arbitrary zero point. Hachured zone denotes extent of prehistoric artifacts. Cabin not to scale.

cabin was still standing when we began work on the site (figs. 5 and 6), but by August, 1975, the cabin had been almost completely destroyed by vandals, perhaps for the century-old timbers.

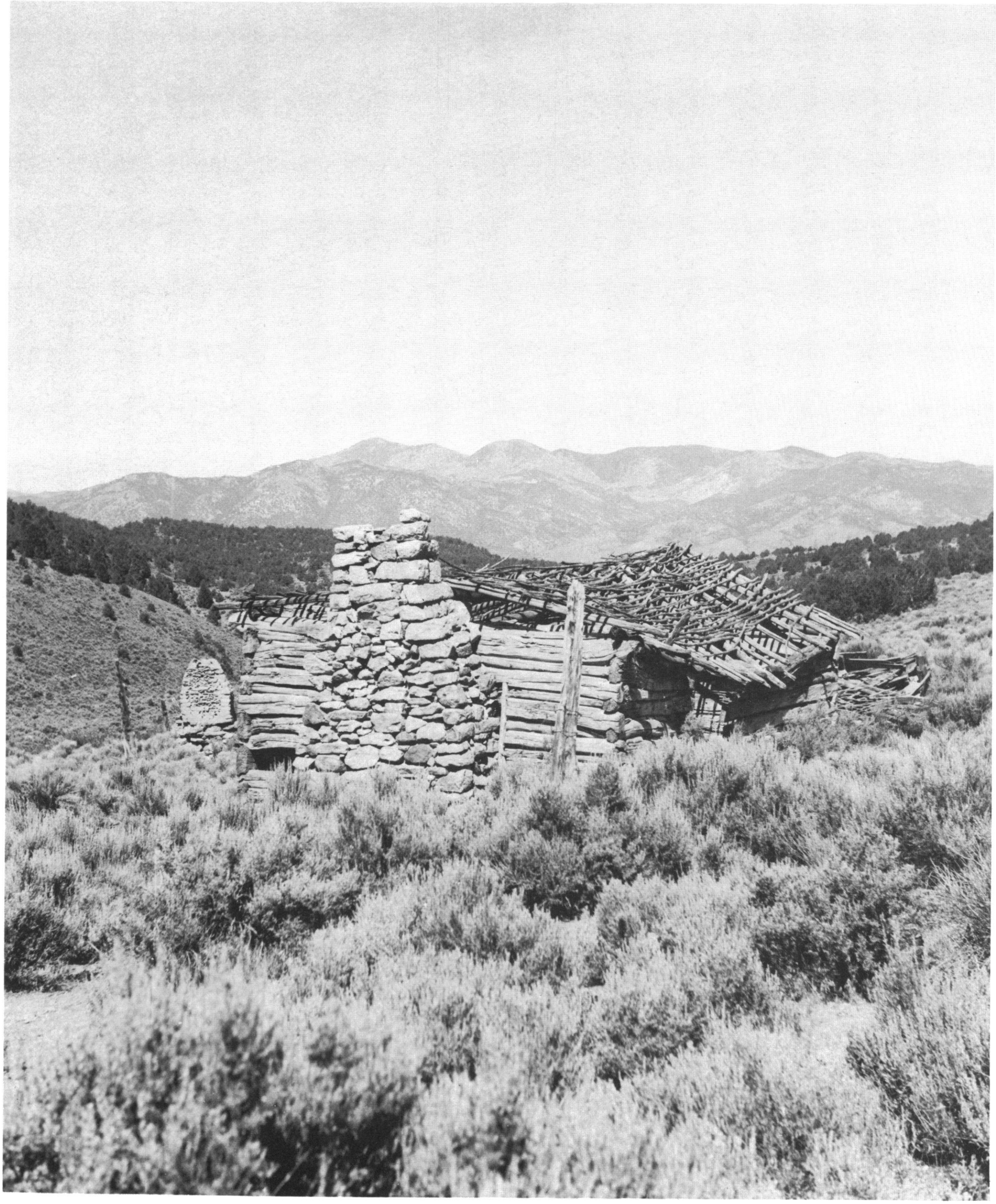

FIG. 5. Mateo Orzero's cabin, looking west.

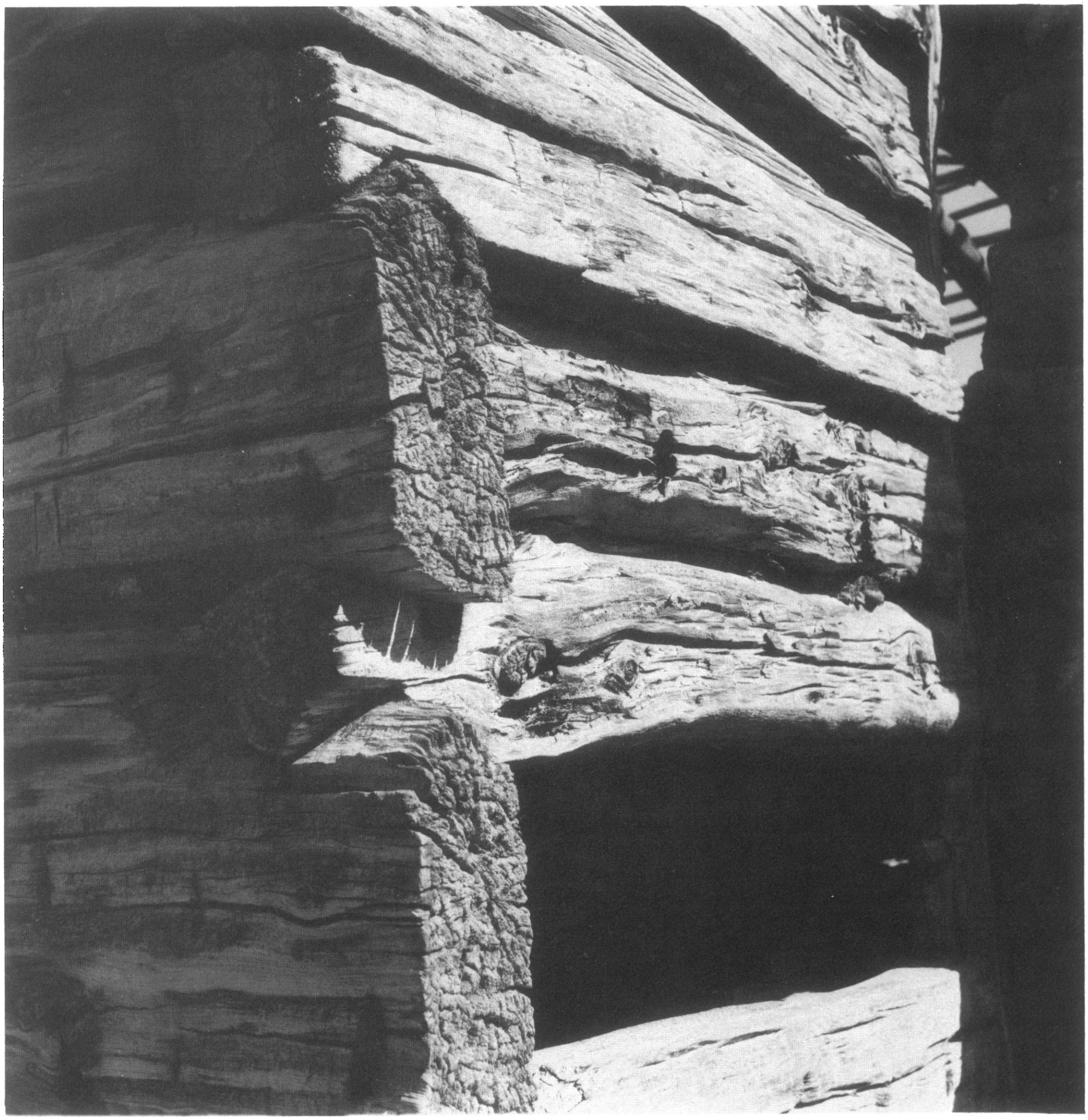

FIG. 6. Detail of construction of Mateo Orzero's cabin.

Tradition has it that Orzero, a short, heavy-set man, operated a mine somewhere in the vicinity of Cottonwood Creek. It is also said he lived with a nephew and that Orzero married a Shoshoni woman. Some locals think that the cabin was used for a time as a trading post when the Shoshoni camped on the nearby saddle. The abundant historic artifacts of this period lend some credence to this notion. Mateo Orzero died at the age of 72 in October, 1908. He was taken from Cottonwood Creek to nearby Austin for burial. His obituary appeared on the front page of the *Reese River Reveille* on October 17, 1908.

Scattered about Mateo Orzero's cabin is the debris one expects from such a subsistence farm: rusting farm implements, broken furniture, broken porcelain, and glass fragments. To the east of the cabin is a large wall built of local stone (fig. 7). Approximately 125 meters long, the wall stands somewhat less than a meter high. Local tradition has it that a blind man named Shaw constructed the wall in about 1880. But we

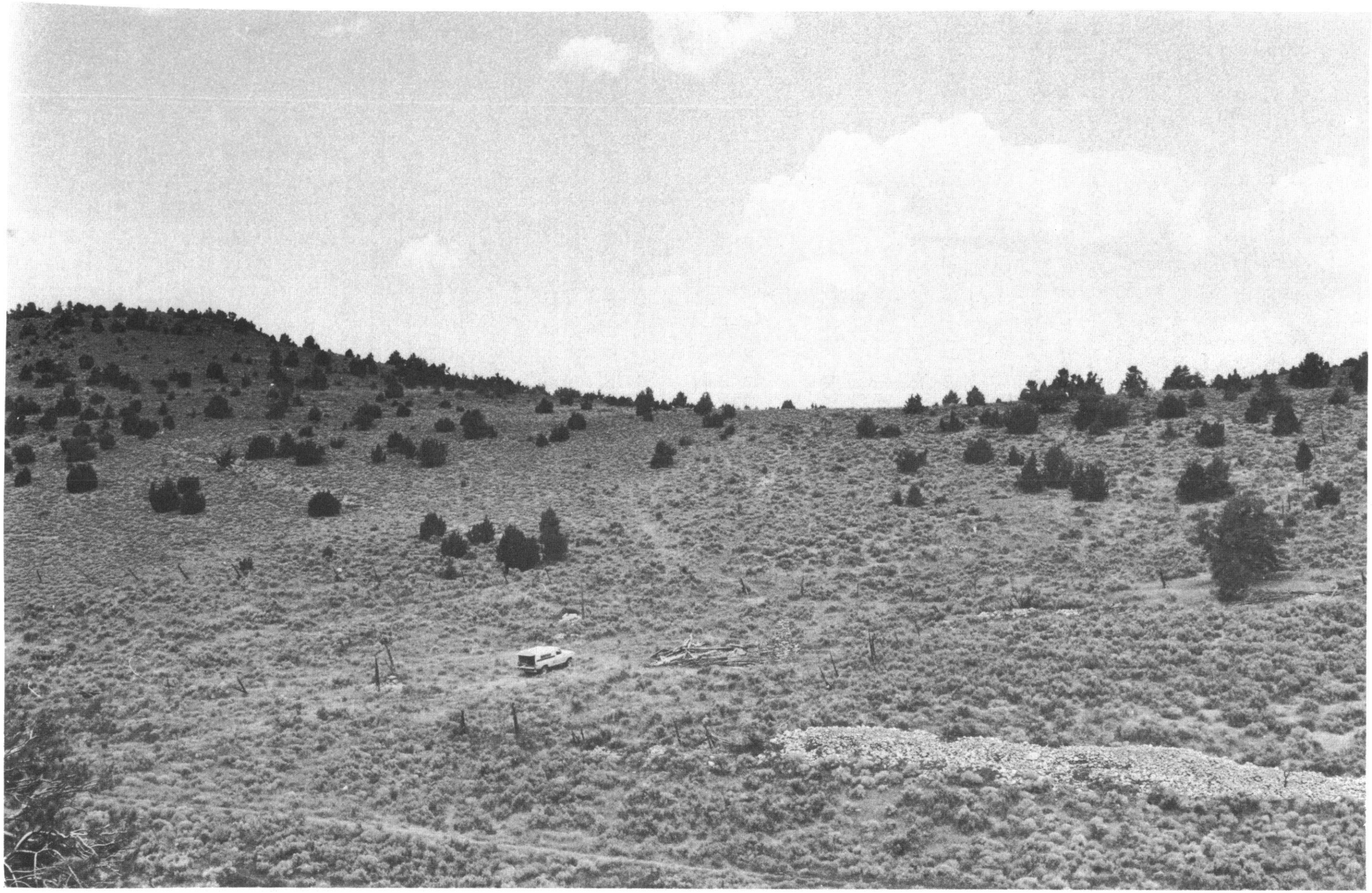

FIG. 7. Overall view of Mateo's Ridge site, looking north. Note stone wall to right, and ruins of Mateo's cabin near pick-up truck. Prehistoric artifacts occur along entire horizon of picture.

must note that somewhat similar features have been found elsewhere in the Toiyabe Mountains, features that we interpret as prehistoric hunting fences. The Mateo's Ridge wall is notably higher and thicker than hunting fences described by Thomas and McKee (1974). The only other historic feature on the ridge is a brick chimney, all that remains of another structure that once stood about 25 meters west of Mateo's cabin.

The archaeological site tends to follow the upper boundary of Mateo's Ridge, measuring approximately 300 meters north-south by 600 meters east-west (fig. 4). The surface is littered with discontinuous scatter of both historic and prehistoric artifacts, glass, and lithic debris.

We believe that the density and extent of archaeological materials at Mateo's Ridge dictated a somewhat different recovery strategy than that used at the other Reese River ecotone sites. A 10-meter grid system was imposed over the entire ridge (fig. 8), and all cultural materials were collected within these 10-meter square tracts. The grid system extended from a 600 meter east-west baseline that marked the northern boundary of the collection area. More than 400 of the 10-meter square tracts were completely collected during two seasons of fieldwork. A 50-meter wide border was then established about the perimeter of the collection area. This border was also gridded into 10-meter quadrants, and a 10 percent random sample was selected for complete collection. This procedure insured that the main body of the site was totally collected, and then randomly selected border quadrants were sampled. These marginal areas yielded relatively sparse cultural materials, demonstrating the validity of our arbitrary site boundary.

VERTICAL DISTRIBUTION OF ARTIFACTS

As is true of most piñon ecotone sites, the Mateo's Ridge campsite rests upon a fairly stable lithosol. The shallow nature of lithosols and the absence of any well-defined midden mitigates against significant subsurface concentrations of artifacts or debitage. To test this assumption, exploratory excavations were conducted in two quadrants: 204 and 197. All test units reached sterile parent material within 10 cm. from the surface. On the surface of tracts 204 and 84 we found unmodified flakes, one modified flake, one typable projectile point, two projectile point bases, one projectile point tip, two bifacially flaked tools, and one drill; cultural material recovered in subsurface excavations was limited to an occasional flake.

In the apparent absence of any significant subsurface deposition or meaningful stratigraphy, an additional check was conducted to determine the relative stability of the landform. The Great Basin is subject to periodic freeze-thaw cycles during winter, ground saturation and surface overflow during intense summer rainfalls, deflation, and other less significant erosive forces, such as trampling by cattle. To arrive at a rough determination of the cumulative effects of these forces quadrant 125 was 100 percent collected during the first field season. The following season the same quadrant was re-collected, with the following results:

	Season 1	Season 2
Unmodified Chippage	128	16
Modified Chippage	2	0
Other Artifacts	0	0

Although this simple observation is not an absolute test of landform stability, it does indicate a slight exposure of limited subsurface materials. In all probability, some surface materials are buried by erosional forces acting on this shallow lithosol. We think these forces effectively limit any temporal inferences based on artifact depth from surface or stratigraphic context. In the absence of any significant subsurface cultural deposit, the analysis of materials has been limited to archaeological materials collected from the surface.

ARTIFACTS RECOVERED FROM MATEO'S RIDGE SITE

Projectile Points. More than 1300 artifacts were recovered from the Mateo's Ridge site. In fact, Ny-307 produced more artifacts than all the 64 other piñon ecotone sites combined. More than 600 of these artifacts were fragments of broken projectile points. For decades, projectile points have served as the major temporal indicator for archaeological sites of the Great Basin. In fact, the cultural chronology of the prehistoric Desert West consists of little more than changing projectile point forms.

Projectile point typology is thus of great interest to Great Basin archaeologists. Such typologies have traditionally been a matter of experience, feel, and intuition. We think it fair to say that

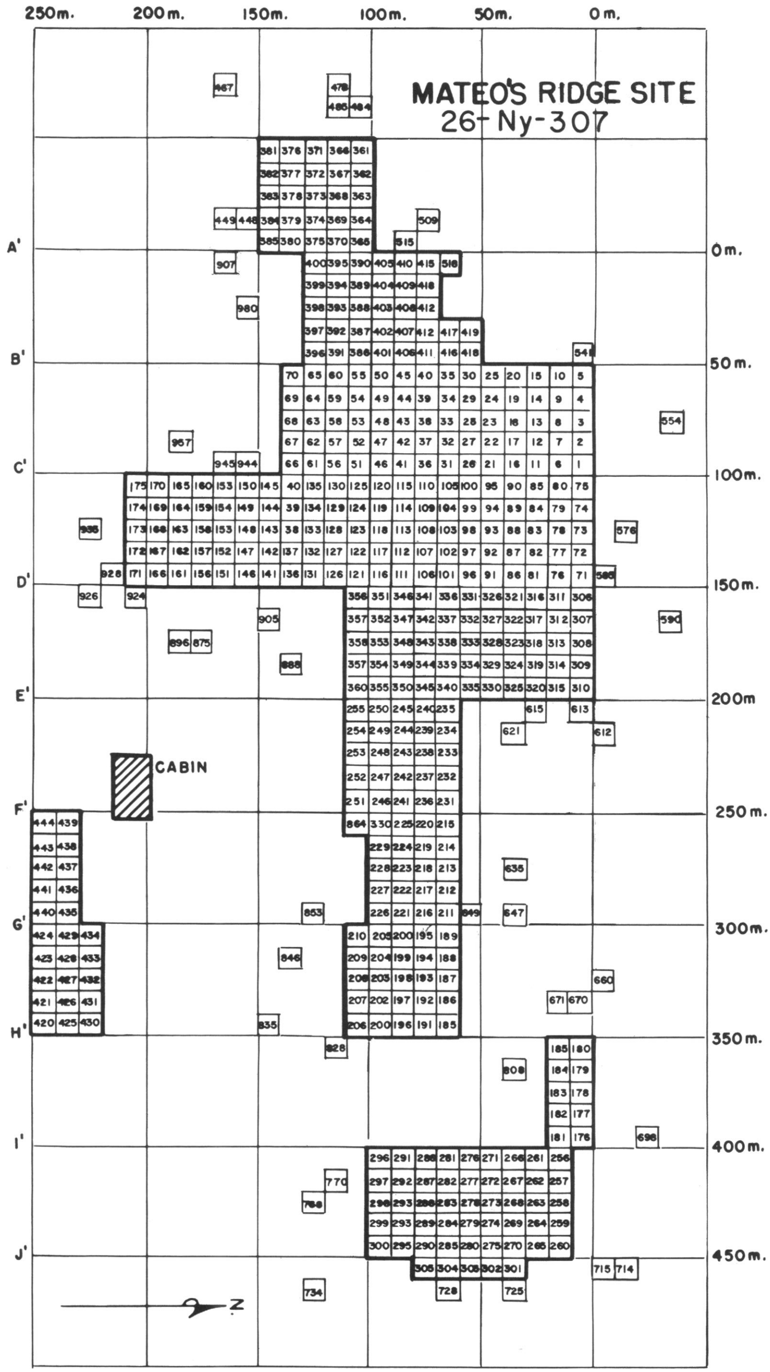

FIG. 8. Grid map of Mateo's Ridge site. All numbered quads were totally collected.

most archaeological typologies are an outgrowth of sheer familiarity with data: Systematic measurement and analysis is generally eschewed in favor of more intuitive, more impressionistic methods. This procedure has certain unquestionable advantages. Large collections can be rapidly analyzed in the laboratory; amateur's collections of artifacts can be perused, photographed, and even analyzed in the field, without lengthy laboratory sessions. But the signal advantage of an intuitive typology is that it works. Prescient Great Basin archaeologists of the 1950s and 1960s have constructed quite satisfactory spatial-temporal frameworks by relying upon strictly impressionistic typologies.

But there is a major disadvantage to this approach: *communication.* Archaeologists working alone or in small enclaves can quite handily group artifacts into rather consistent typological categories. But intuitive classes almost invariably fail when transferred to the minds and laboratories of others. The question always lingers: How do I know that your types are the same as mine? As long as one operates strictly within the realm of impressionistic typology, this doubt can be erased only by recourse to original specimens. Now, a certain degree of museum-hopping is probably unavoidable, but there is a contradiction within a system that insists on the one hand for publication of one's data, yet also grounds its classifications in criteria that can never be published. Intuitive criteria will always defy adequate publication because they exist only in the minds of their creators.

The remedy seems clearly to be a more objective method for typing the artifacts of archaeology. Although this is a rather large order, we think that the typological system applied to the Reese River artifacts provides a gesture in the proper direction. This approach to typology departs rather radically from conventional procedure, and we think a brief explanation of our typological methods is in order.[1]

We begin with the bald assertion that satisfactory operational definitions must specify the procedures through which the data have been processed. An operational definition of an archaeological typology must tell other archaeologists how they go about reproducing the categories (see Thomas 1976, pp. 13-18). Operations should be specified such that the same procedures could be repeated "in an unbiased manner by an intelligent person after a period of training" (Krumbein and Graybill, 1965, p. 69). As simple as this stricture might seem, the fact remains that few archaeological classifications make even the semblance of effort to specify operations involved or to assist colleagues in reproducing similar results given similar data.

An earlier paper by Thomas (1970) analyzed a sample of 675 projectile points from several key sites throughout the western Great Basin. The points were studied in order to determine just how the types were defined. The tacit assumption in this analysis was that the existing typology worked; that the point types did indeed have chronological significance. These 675 points were measured on the following operationally defined attributes[2]:

Distal Shoulder Angle–DSA (fig. 9). The Distal Shoulder Angle is that angle formed between the line (A) defined by the shoulder at the distal point of juncture and line (B) drawn perpendicular to the longitudinal axis (C) at the intersection of A and C. *DSA* ranges between 90 degrees and 270 degrees. If distal points are asymmetrical, the smaller value of *DSA* is measured. *DSA* is recorded to the nearest 5 degrees.

Proximal Shoulder Angle–PSA (fig. 9). The Proximal Shoulder Angle is that angle formed between the line (D) defined by the proximal point of juncture and line (B) plotted perpendicular to the longitudinal axis at the intersection of C and D. *PSA* ranges between 0 degrees and 270 degrees. If proximal points are asymmetrical, the smaller of *PSA* is measured. *PSA* is recorded to the nearest 5 degrees.

Shouldered. A point is termed shouldered if *DSA* and *PSA* can be measured. If these two angles do not apply, the point is termed unshouldered.

Basal Indention Ratio–BIR (fig. 9). Basal Indention Ratio is the ratio of the length of the longitudinal axis (L_A) to the total length (L_T) parallel to C, i.e., $BIR = L_A/L_T$. Basal Indention

[1] A provisional summary of this analytical method has been discussed earlier in Thomas (1970).

[2] These attributes rely upon reference points defined by Binford (1963).

Ratio ranges between .0 and about 0.90.

Length-Width Ratio–L/W (fig. 9). The Length-Width Ratio is the ratio of the total length (L_T) parallel to the longitudinal axis to the maximum width (W_M) perpendicular to E, i.e., Length-Width Ratio = L_T/W_M.

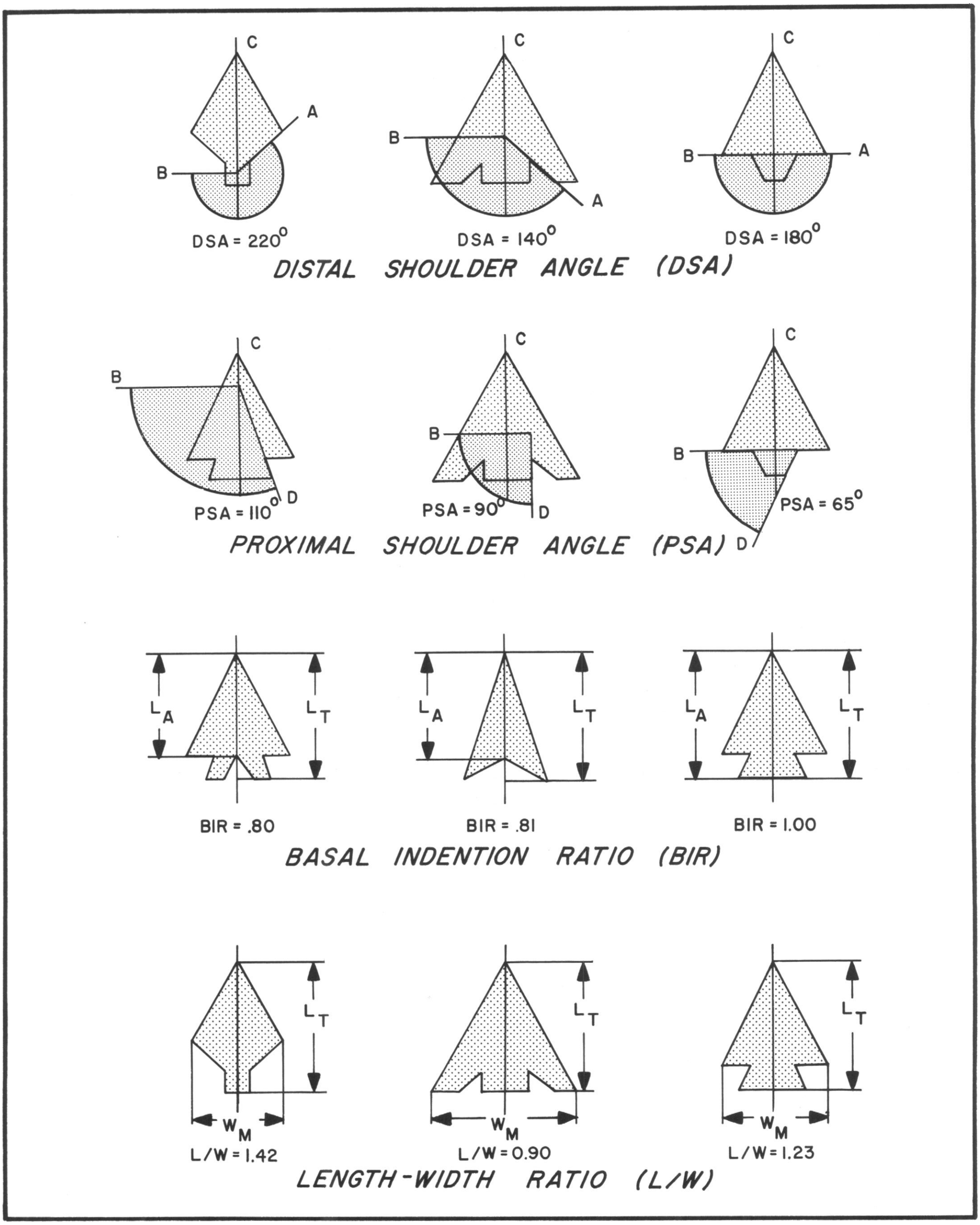

FIG. 9. Some projectile point attributes used in this study (after Thomas, 1970, fig. 2).

Notch Opening Index–NO (fig. 10). The Notch Opening Index is the radian measure of the arc of the notch opening. *NO* was obtained in this study by obtaining the difference between *DSA* and *PSA*.

Maximum Width Position–MaxWpos (fig.

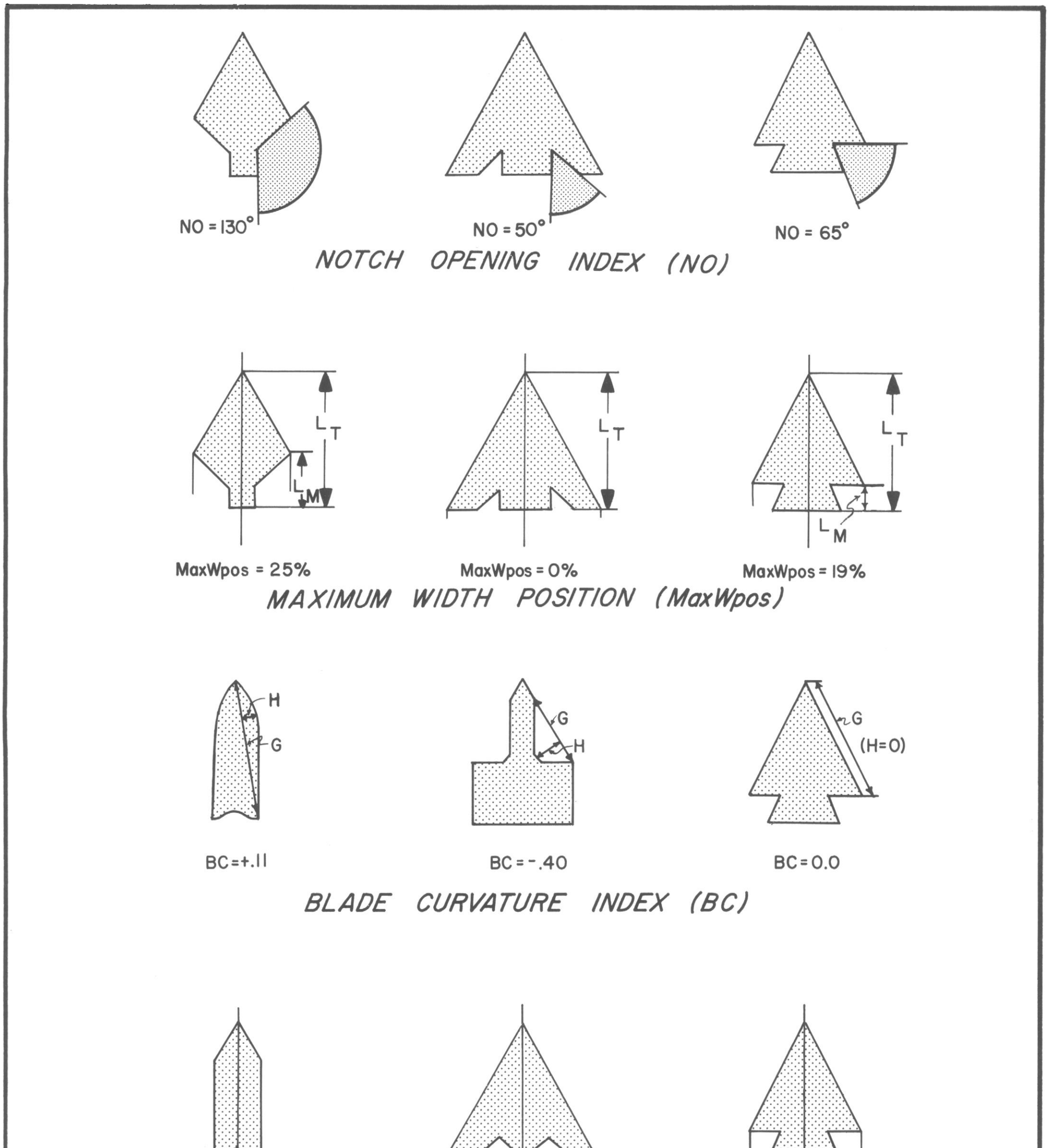

FIG. 10. Some projectile point attributes used in this study (after Thomas, 1970, fig. 3).

10). The Maximum Width position is the percentage of the total length between the proximal end and the position of maximum width (100 L_M/L_T). Range is generally between 0 and about 90 percent.

Blade Curvature Index–BC (fig. 10). The Blade Curvature Index is the ratio of the length of a line (G) from the tip of the blade to the most distal lateral portion of the base divided by the perpendicular (H) from *G* to the point of inflection of the blade, i.e., BC = H/G. A concave blade is assigned a negative value. If the blade is both concave and convex, the greater value of the Blade Curvature Index is applied.

Basal Width-Maximum Width–W_B/W_M (fig. 10). The Basal Width-Maximum Width Ratio is the ratio of the width at the widest portion of the base (W_B) to the maximum width (W_M). Range is from 0 to about 0.90.

These attributes are neither exhaustive nor universal. They simply describe some salient features. What is important is that these attributes have been defined in operational fashion. Most individuals, after a suitable training period, should be able to reproduce our observations.

These variables were measured on the test sample of 675 projectile points mentioned earlier, and confidence intervals computed to define reliable typological breaks. The following operational key has been devised to the projectile points of the western Great Basin (this key has been modified somewhat from Thomas, 1970):

KEY TO WESTERN GREAT BASIN PROJECTILE POINTS

1.	DSA and PSA not applicable to one or both sides (that is, the point is unshouldered)	2
	DSA and PSA applicable to at least one side (point shouldered)	8
2.	Basal width/maximum width ratio exceeds 0.90	3
	Basal width/maximum width ratio less than or equal to 0.90	5
3.	Weight exceeds 3.0 grams	4
	Weight less than 3.0 grams	*Cottonwood Series*
4.	Basal indention ratio less than 0.96	*Humboldt Basal Notched*
	Basal indention ratio greater than 0.96	*Biface* (not a projectile point)
5.	Weight exceeds 2.5 grams	6
	Weight less than or equal to 2.5 grams	7
6.	Basal indention ratio less than 0.98	*Humboldt Concave Base-A*
	Basal indention ratio greater than or equal to 0.98	*Biface* (not a projectile point)
7.	Basal indention ratio less than or equal to 0.98	*Humboldt Concave Base-B*
	Basal indention ratio greater than 0.98	*Cottonwood Series*
8.	Notch opening index greater than 60, and basal indention ratio less than 0.97 and weight exceeds 2.0 grams	*Pinto Series*
	Notch opening less than 60, and basal indention ratio greater than 0.98 or weight under 2.0 grams	9
9.	PSA greater than or equal to 130 and basal width/maximum width ratio greater than or equal to 0.90	10
	PSA less than 130 or basal width/maximum width ratio less than 0.90	12
10.	Weight less than or equal to 2.0 grams	*Desert Side-notched*
	Weight greater than 2.0 grams	11
11.	Notch opening index less than 20 and basal indention ratio less than 0.99	*Northern Side-notched*
	Notch opening greater than 20 or basal indention ratio greater than or equal to 0.99	*Elko Side-notched*
12.	PSA less than or equal to 100	13
	PSA greater than 100	18
13.	Weight exceeds 3.0 grams	14
	Weight less than 3.0 grams	15

14.	Basal indention ratio less than or equal to 0.89	*Bare Creek Eared*
	Basal indention ratio greater than 0.89	*Elko Contracting Stem*
15.	Basal indention ratio less than 0.90	*Gunther Barbed*
	Basal indention ratio greater than 0.90	16
16.	Basal indention ratio less than 0.96	*Eastgate Split Stem*
	Basal indention ratio greater than or equal to 0.96	17
17.	DSA less than or equal to 140	*Eastgate Expanding Stem*
	DSA greater than 140	*Rose Spring Contracting Stem*
18.	DSA greater than 195	*Rose Spring Side-notched*
	DSA less than or equal to 195	19
19.	Weight less than 3.0 grams	*Rose Spring Corner-notched*
	Weight greater than or equal to 3.0 grams	20
20.	Basal indention ratio less than or equal to 0.93	*Elko Eared*
	Basal indention ratio greater than 0.93	*Elko Corner-notched*

Since the original definition, this key has been applied to more than 4000 projectile points from sites throughout the Desert West. Although parts of this key will doubtless be modified and redefined for use in specific areas, experience has shown it to be a reliable method for operationalizing the typological procedure. A reasonably intelligent student can be trained to measure the relevant variables and to "type out" projectile points within a couple of hours. After a couple of days' practice, that student can classify artifacts in a manner every bit as valid as that of the most seasoned archaeologist. The key encounters its greatest difficulty with badly fragmented artifacts because estimates are required as to the original artifact form. But even given this difficulty, we have found that conscientious students can consistently produce typologies with better than 90 percent replicability. Although improvements must be made on the scheme, we think that this key has amply demonstrated its value in typology of artifacts from the Great Basin and elsewhere.

A total of 230 typable projectile points was recovered from the Mateo's Ridge site; these artifacts have been classified according to the criteria set out above (fig. 11).

Pinto Series		20
Elko Series		89
Elko Corner-notched	46	
Elko Eared	27	
Elko Contracting Stem	16	
Humboldt Series		29
Humboldt Concave Base-A	17	
Humboldt Concave Base-B	12	
Eastgate/Rose Spring Series		41
Eastgate Expanding Stem	15	
Rose Spring Corner-notched	24	
Rose Spring Side-notched	2	
Cottonwood Series		27
Desert Side-notched		19
Northern Side-notched		1
Unnamed types		4
Total Projectile Points		230

All of these projectile points have been illustrated in figures 12 through 23 and the measurements appear on table 1.

Projectile points are of great value in this context as time markers. Using the cultural phasing defined by Thomas for the central Great Basin, we see that the Mateo's Ridge site spans approximately a range of 5000-years' time.

Cultural Phase	Time Range	Number of Projectile Points
Devils Gate	3000 B.C.– 1500 B.C.	20
Reveille	1500 B.C.– A.D. 500	89
Underdown	A.D. 500– A.D. 1300	41
Yankee Blade	A.D. 1300– historic	46

These phase markers must be interpreted in a rather loose manner and detailed interpretations of occupational density would be grossly out of line. But the projectile points clearly indicate a long-range occupation of the Mateo's Ridge site, a pattern which, in fact is characteristic of the

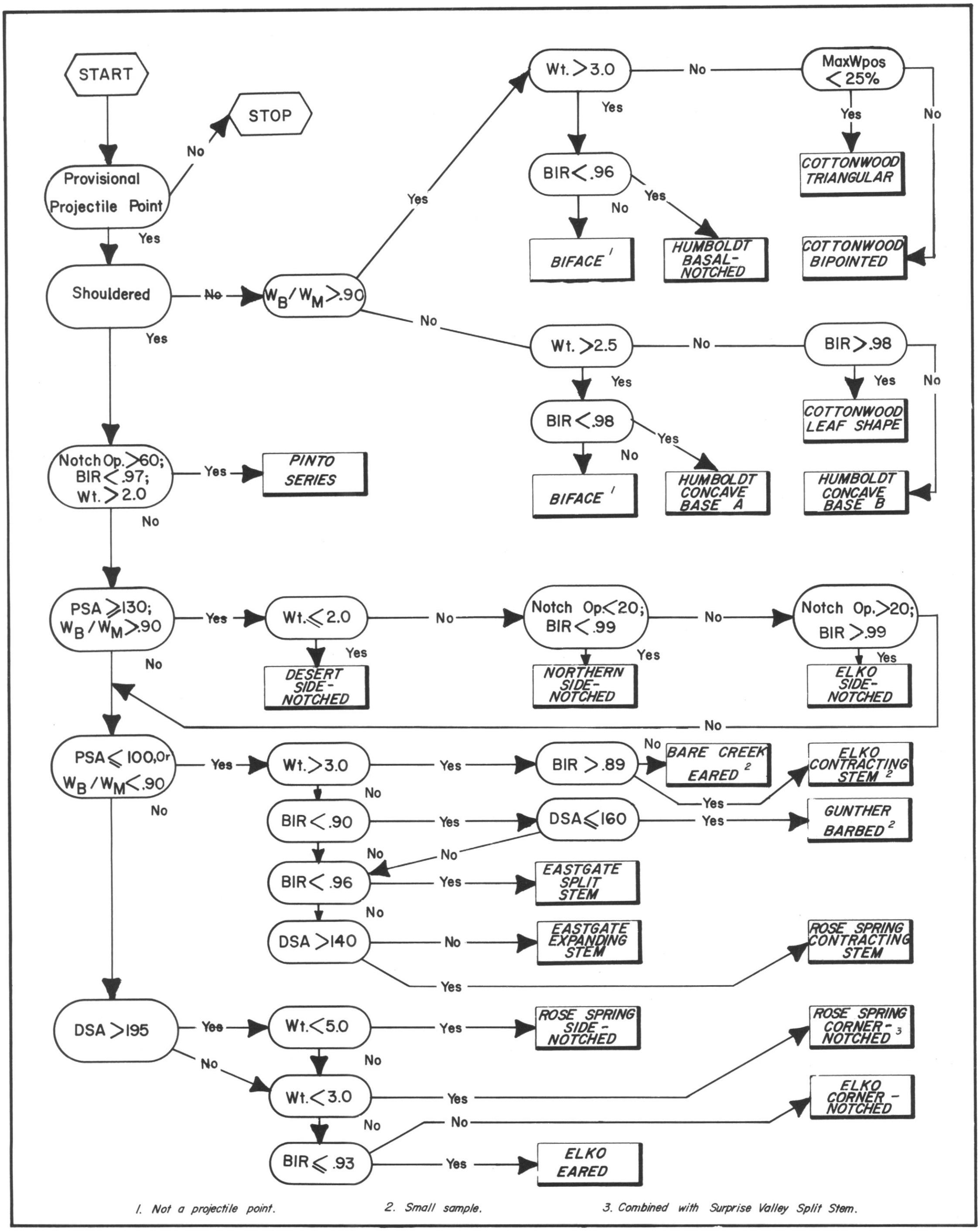

FIG. 11. Schematic representation of Desert West projectile point key (after Thomas, 1970, fig. 4).

TABLE 1
Attributes for Projectile Points from Mateo's Ridge
(Variates in parentheses are estimates for broken artifacts.)

Spec. No.	Quad	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR1091	2	P	(45.0)	(40.6)	(29.0)	14.7	4.5	140	80	3.2		Chalcedony
RR1101	3	ECS	(40.0)	(40.0)	26.5	9.0	5.6	170	70	4.1	6.0	Vein quartz
RR1108	6	DSN	(25.2)	(22.0)	(16.0)	(16.0)	2.5	–	180	0.5	–	Chalcedony
RR1109	6	EE	(24.0)	(21.7)	15.2	15.2	4.6	–	125	0.8	>3.0	Obsidian
RR1110	6	P	(36.0)	(33.6)	(24.0)	14.2	5.4	215	115	4.2	–	Rhyolite (sil.)
RR1113	7	RSCN	(28.0)	(28.0)	12.4	(9.0)	3.2	180	155	0.9	1.0	Chalcedony
RR1114	7	ECN	(35.0)	(34.6)	23.4	(16.0)	4.5	155	115	1.5	3.2	Chalcedony
RR1123	8	ECN	(41.0)	(41.0)	26.1	17.5	4.5	145	120	4.0	7.8	Chalcedony
RR1131	50	EsES	(29.0)	(29.0)	12.0	7.6	4.1	115	100	1.5	2.0	Obsidian
RR1146	51	EsES	(34.0)	(34.0)	19.0	(8.0)	3.8	125	(105)	2.2	2.6	Rhyolite
RR1183	56	ECN	(38.0)	(38.0)	(27.0)	(17.8)	6.3	160	140	2.0	6.0	Chalcedony
RR1189	57	HCB-BN	(35.0)	(33.0)	(17.5)	(17.5)	5.5	–	–	2.3	4.0	Chalcedony
RR1190	57	EE	(46.0)	(42.0)	(28.8)	24.0	5.0	170	135	4.0	8.0	Chalcedony
RR1191	57	ECN	(45.0)	(45.0)	(27.0)	15.5	4.8	160	110	3.0	4.0	Quartzite (sil.)
RR1192	57	ECS	(38.0)	(38.0)	(34.0)	12.5	7.1	185	75	2.8	4.0	Chalcedony
RR1214	10	ECS	(45.0)	(45.0)	(29.0)	10.6	6.0	140	70	4.1	8.0	Rhyolite
RR1218	11	Cot	27.5	24.6	(13.3)	(13.3)	6.2	–	–	2.2	2.4	Chalcedony
RR1235	12	ECN	(41.6)	(39.7)	22.5	16.1	4.5	150	120	3.5	3.8	Chalcedony
RR1255	20	RSCN	(29.0)	(29.0)	18.9	8.7	3.4	140	110	1.8	2.0	Obsidian
RR1265	21	EE	(37.0)	(34.0)	(18.0)	(11.0)	5.2	170	140	1.4	3.1	Chalcedony
RR1282	22	ECS	(34.0)	(34.0)	(20.0)	7.7	4.6	145	100	2.4	3.5	Chalcedony
RR1307	23	HCB-B	26.2	25.3	11.7	8.0	5.3	–	–	1.4	–	Obsidian
RR1320	24	HCB-B	(26.0)	(24.4)	12.0	10.5	4.5	–	–	0.7	–	Chalcedony
RR1332	25	EE	30.9	29.8	21.4	20.7	4.8	160	120	3.4	–	Chalcedony
RR1333	25	RSCN	(29.0)	(29.0)	19.5	8.2	3.7	135	115	1.7	2.5	Chalcedony
RR1334	25	HCB-BN	38.7	33.5	18.4	17.8	3.9	–	–	4.1	4.2	Chalcedony
RR1353	27	Cot	(29.3)	(27.5)	(13.5)	(13.5)	5.3	–	–	1.3	2.0	Chalcedony
RR1415	32	ECN	(34.0)	(33.6)	(25.0)	18.9	5.0	140	135	1.2	3.5	Chalcedony
RR1486	36	EE	(39.0)	(36.0)	25.3	(16.7)	4.7	125	115	2.6	3.5	Chalcedony
RR1487	36	Cot	(28.0)	(25.3)	(16.0)	(16.0)	3.3	–	–	1.0	–	Chalcedony
RR1493	37	ECN	(32.0)	(32.0)	24.0	(13.0)	4.8	160	120	2.4	4.0	Chal. (sil. brec.)
RR1494	37	EE	(46.0)	(42.9)	23.5	(17.0)	5.6	185	115	5.3	5.8	Rhyolite
RR1508	38	HCB-A	(42.0)	(39.0)	15.0	15.0	4.5	–	–	2.0	3.5	Chalcedony
RR1535	39	EsES	(32.0)	(32.0)	(25.0)	(25.0)	3.7	105	80	1.7	2.8	Rhyolite (sil. ?)

TABLE 1 – (*Continued*)

Spec. No.	Quad	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR1536	39	DSN	35.9	34.7	12.7	12.7	4.5	170	170	2.0	–	Chalcedony
RR1549	100	Cot	–	–	–	–	2.4	–	–	0.5	–	Quartzite (sil.)
RR1552	100	DSN	(23.0)	(20.4)	(12.0)	(12.0)	3.0	180	175	0.8	1.1	Rhyolite
RR1554	100	DSN	19.0	17.2	10.4	7.0	2.7	190	–	0.5	0.7	Chalcedony
RR1557	100	DSN	25.5	22.0	13.3	13.3	4.5	180	130	1.1	1.1	Chert
RR1579	104	ECS	(58.0)	(58.0)	(35.0)	19.9	8.6	205	100	8.2	11.0	Quartzite (brec.)
RR1592	106	ESN	(25.0)	(25.0)	19.7	19.7	6.4	190	170	2.4	2.6	Rhyolite
RR1604	109	Cot	(22.8)	(22.3)	8.0	8.0	2.8	–	–	0.5	–	Chalcedony
RR1606	109	Cot	(26.0)	(24.0)	15.0	14.5	4.5	–	–	1.3	–	Chalcedony
RR1612	109	Cot	13.1	12.5	10.4	10.4	2.5	–	–	0.2	–	Obsidian
RR1623	110	DSN	19.0	16.0	11.5	11.5	3.0	200	155	0.5	–	Rhyolite
RR1641	194	EsES	(24.0)	(24.0)	(19.0)	11.9	3.0	110	100	1.0	2.5	Rhyolite
RR1645	194	EE	(27.0)	(24.0)	(21.0)	(21.0)	3.7	170	155	1.6	3.5	–
RR1655	200	Cot	25.0	24.0	11.0	11.0	5.7	–	–	1.8	2.0	Rhyolite (?)
RR1682	204	ECN	(30.0)	(29.5)	(22.0)	(14.0)	8.8	–	115	1.2	3.5	Chalcedony
RR1701	207	ECS	(36.0)	(36.0)	19.9	11.1	5.0	165	60	2.5	>3.0	Rhyolite
RR1732	210	HCB-BN	(39.9)	(36.1)	22.8	22.8	5.2	–	–	3.3	–	Chalcedony
RR1770	237	RSCN	(24.0)	(24.0)	(19.0)	9.9	3.8	105	100	0.7	–	Chalcedony
RR1773	237	ECS	(35.0)	(35.0)	27.2	8.7	5.3	190	70	1.9	>3.0	Chert
RR1792	238	ECN	(40.0)	(40.0)	21.1	14.0	5.1	150	120	4.0	5.3	Chalcedony
RR1835	247	ECN	(30.0)	(28.5)	(24.0)	12.6	3.8	130	105	2.2	3.1	Rhyolite
RR1845	249	HCB-A	(35.0)	(34.0)	(26.5)	(16.0)	7.0	–	–	3.1	–	Chalcedony
RR1869	252	ES	(28.0)	(28.0)	25.3	13.4	3.7	155	145	2.0	3.0	Rhyolite (sil. ?)
RR1870	252	EE	(38.0)	(34.0)	(27.2)	(21.7)	4.5	–	–	2.4	5.0	Chalcedony
RR1873	252	ECN	(40.7)	(40.7)	25.5	17.5	4.8	140	120	4.2	5.0	Chalcedony
RR1877	254	DSN	15.7	14.0	12.3	12.3	3.0	170	160	0.9	–	Vein quartzite
RR1884	255	HCB-B	(25.0)	(23.2)	12.7	(9.2)	3.5	–	–	0.7	1.2	Chalcedony
RR2113	N.P.	DSN	20.0	20.0	4.2	6.4	3.7	200	>130	0.5	1.0	Chalcedony
RR2115	N.P.	ECN	(34.0)	(34.0)	(20.0)	12.9	4.6	165	140	2.1	>3.0	Chalcedony
RR2116	N.P.	P	40.0	38.4	28.8	14.8	5.9	190	105	4.4	–	Rhyolite
RR2117	N.P.	P	(37.0)	(32.6)	(26.0)	11.7	5.0	160	95	1.9	–	Chalcedony
RR2118	N.P.	HCB-A	(49.0)	(48.5)	21.7	13.6	7.8	–	–	9.4	10.0	Chert
RR3040	63	ES	(31.0)	(31.0)	(23.3)	11.9	4.9	165	80	1.3	>3.0	Chalcedony
RR3041	63	RSSN	(40.0)	(34.8)	25.0	23.0	5.3	215	115	3.2	3.6	Rhyolite
RR3077	69	RSCN	(26.0)	(26.0)	(22.0)	(19.0)	3.4	145	140	0.6	2.5	Chalcedony
RR3061	66	Cot	(34.0)	(29.6)	(17.8)	(17.8)	6.3	–	–	1.3	–	Rhyolite

TABLE 1 – (*Continued*)

Spec. No.	Quad	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR3067	67	ECS	(37.0)	(37.0)	19.3	9.2	5.4	165	100	2.4	>3.0	Rhyolite
RR3068	67	Cot	(32.0)	(30.8)	14.5	14.0	3.7	–	–	1.2	2.0	Rhyolite
RR3088	71	HCB-A	(34.0)	(30.6)	16.4	12.6	4.5	–	–	1.4	2.9	Chalcedony
RR3149	83	HCB-BN	(38.0)	(35.9)	(21.0)	(21.0)	6.4	–	–	2.2	3.1	Rhyolite
RR3163	84	Cot	18.0	18.0	13.0	–	2.7	–	–	0.4	–	Chalcedony
RR3167	85	P	(41.0)	(37.0)	(31.0)	17.0	4.1	145	80	2.4	4.0	Chalcedony
RR3168	85	EsES	(30.0)	(30.0)	(24.0)	10.4	4.6	115	90	1.8	>3.0	Chalcedony
RR3174	86	RSCN	(28.0)	(28.0)	(19.0)	(11.0)	3.8	140	110	1.2	2.6	Chalcedony, (opal.)
RR3181	87	EE	(36.0)	(33.0)	(27.0)	(16.0)	5.6	185	105	2.0	4.2	Chert
RR3188	88	P	(37.0)	(33.0)	–	12.7	5.6	185	75	0.8	3.5	Rhyolite
RR3193	89	ECN	(35.0)	(35.0)	(23.0)	(18.0)	4.5	165	125	1.8	3.0	Chalcedony
RR3197	89	RSCN	(23.0)	(22.6)	(19.0)	(10.7)	4.0	135	135	1.0	–	Chalcedony
RR3232	94	EsES	(25.0)	(25.0)	(19.0)	18.0	3.4	130	60	0.4	1.2	Chert
RR3252	97	EE	30.0	27.0	22.2	(15.4)	7.3	170	105	3.0	–	Rhyolite
RR3261	98	EsES	(31.0)	(31.0)	18.5	12.2	3.0	120	100	1.5	1.8	Chalcedony
RR3275	124	DSN	(23.0)	(23.0)	16.0	16.0	3.8	205	175	0.6	1.0	Rhyolite
RR3280	126	ESN	(27.0)	(25.8)	16.4	16.4	4.4	(200)	155	1.0	2.0	Chalcedony
RR3287	130	P	(45.0)	(41.9)	24.0	17.5	8.4	175	100	7.0	–	Rhyolite
RR3289	130	Cot	(30.0)	(28.0)	(16.0)	(16.0)	4.7	–	–	1.6	2.0	Rhyolite
RR3296	131	ECS	(36.0)	(36.0)	23.0	10.2	5.9	165	60	3.0	–	Chalcedony
RR3312	137	Cot	(25.0)	(23.4)	12.5	12.3	4.4	–	–	1.0	1.5	Chalcedony
RR3325	141	RSCN	(31.0)	(31.0)	18.5	13.2	4.0	190	105	1.5	1.8	Chalcedony (opal.)
RR3326	141	ECN	(33.0)	(31.2)	24.0	19.3	5.2	(170)	125	2.5	–	Chalcedony
RR3332	144	ECN	(39.0)	(39.0)	(26.0)	(15.0)	4.4	155	105	2.8	–	Chalcedony
RR3336	145	Cot	(32.0)	(30.0)	12.0	12.0	4.2	–	–	1.2	–	Chalcedony
RR3340	150	ECN	(38.0)	(38.0)	(27.0)	(18.0)	5.4	175	125	3.6	–	Rhyolite
RR3344	152	EE	(36.0)	(31.0)	(28.0)	(11.0)	4.7	(150)	(110)	3.6	4.6	Chalcedony
RR3356	158	DSN	13.6	12.4	11.7	11.7	2.0	185	140	0.1	0.1	Chalcedony
RR3357	158	DSN	18.5	16.5	10.7	10.7	2.8	180	150	0.6	0.6	Obsidian
RR3358	158	CotLS	28.7	28.7	16.3	10.5	5.8	–	–	2.3	–	Rhyolite
RR3359	158	ECN	(38.0)	(38.0)	21.6	16.5	5.1	155	125	3.0	–	Rhyolite
RR3451	117	EE	(33.0)	(29.0)	20.0	16.5	4.0	–	105	1.7	3.5	Chalcedony
RR3510	42	EE	(35.0)	(32.5)	17.4	(14.5)	5.6	185	170	2.9	–	Chalcedony
RR3543	44	RSSN	(27.0)	(25.8)	(20.4)	(18.0)	3.4	215	140	1.0	1.3	Chalcedony
RR3544	44	EE	(41.0)	(38.0)	21.0	11.8	4.4	125	105	2.9	–	Rhyolite
RR3545	44	Cot	14.2	14.2	13.0	13.0	3.0	–	–	0.5	–	Rhyolite

TABLE 1 – (*Continued*)

Spec. No.	Quad	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR3546	44	HCB-BN	(31.0)	(28.7)	(18.0)	(18.0)	5.4	–	–	2.5	3.5	Chalcedony
RR3579	46	Cot	(25.0)	(23.3)	(11.8)	(11.8)	2.8	–	–	0.6	–	Chalcedony
RR3582	47	RSCN	(30.0)	(28.8)	(19.0)	(13.0)	3.5	–	115	1.0	1.5	Chalcedony
RR3614	222	HCB-BN	(64.0)	(59.3)	23.0	23.0	7.2	–	–	7.6	8.0	Rhyolite
RR3621	226	ECS	(34.0)	(34.0)	(20.5)	10.5	5.4	195	80	2.7	–	Rhyolite
RR3640	228	ECN	(36.0)	(36.0)	(25.0)	13.8	4.0	125	105	2.2	3.2	Chalcedony
RR3651	211	EsES	(31.0)	(31.0)	(23.0)	(7.3)	4.0	125	(>100)	1.4	2.2	Rhyolite
RR3655	221	RSCN	(32.0)	(31.8)	(23.0)	(17.3)	4.3	145	115	2.0	2.5	Chalcedony
RR3660	221	ECN	(39.0)	(37.0)	(26.4)	(15.9)	5.5	165	150	3.1	4.0	Chert
RR3668	212	Cot	(30.0)	(27.5)	12.9	12.8	3.5	–	–	0.6	1.0	Chalcedony
RR3677	229	EE	(38.0)	(35.4)	(24.0)	(14.0)	5.5	160	155	1.7	3.5	Chalcedony
RR3681	229	DSN	(17.0)	(15.0)	(11.5)	11.5	2.1	–	–	0.4	0.9	Chalcedony
RR3704	16	EsES	(27.0)	(27.0)	(22.0)	9.5	4.2	115	75	1.3	2.5	Rhyolite
RR3708	16	HCB-B	27.0	26.0	11.0	8.4	4.8	–	–	1.1	–	Obsidian
RR3721	17	ECN	(31.0)	(31.0)	(23.0)	16.4	6.1	170	115	3.1	4.0	Chal. (sil. brec.)
RR3727	17	ECN	(29.0)	(29.0)	–	14.8	4.7	–	115	1.5	4.0	Chalcedony
RR3746	18	P	(30.0)	(27.9)	16.5	16.5	7.0	(>170)	110	2.8	3.4	Obsidian
RR3783	19	ECN	(38.0)	(38.0)	37.2	26.9	4.9	145	120	2.3	3.2	Quartzite (sil.)
RR3841	198	EE	(37.0)	(34.1)	20.6	(16.0)	3.3	145	135	1.3	3.2	Chert
RR3842	198	ECN	(26.0)	(26.0)	(19.0)	(9.0)	4.0	–	135	1.0	4.0	Chalcedony
RR3852	199	P	(38.0)	(36.8)	–	(15.0)	5.4	185	115	3.6	–	Chal. (sil. brec.)
RR3885	253	P	(35.0)	(30.0)	(23.0)	13.5	5.6	195	115	1.7	–	Chalcedony
RR3889	253	RSCN	(24.0)	(23.2)	(20.0)	13.7	5.3	165	135	1.2	2.8	Chalcedony
RR3925	N.P.	DSN	(20.0)	(16.8)	(11.0)	(10.0)	2.6	220	175	0.4	–	Chalcedony
RR3926	N.P.	P	(40.0)	(37.0)	23.5	13.5	5.8	(160)	80	4.2	4.8	Rhyolite (sil.)
RR3927	N.P.	Cot	(27.0)	(27.0)	11.7	11.7	3.8	–	–	1.1	–	Chert
RR4306	399	RSCN	(36.0)	(34.1)	18.0	(13.1)	4.9	190	150	2.4	2.6	Rhyolite
RR4323	404	ECN	(34.0)	(33.7)	(26.5)	16.2	3.8	130	110	2.1	3.0	Chalcedony
RR4340	406	ECS	(31.0)	(31.0)	24.1	9.5	5.1	135	65	1.5	>3.0	Chalcedony
RR4355	409	RSCS	(22.0)	(22.0)	(17.0)	7.8	3.5	145	95	0.8	1.1	Chalcedony
RR6076	235	HCB-B	22.8	21.2	12.5	8.5	4.7	–	–	0.8	0.8	Obsidian
RR6083	270	ECN	(35.0)	(35.0)	27.3	17.4	7.1	–	105	3.6	–	Chalcedony
RR6116	276	ECN	(28.0)	(28.0)	(26.0)	16.0	3.8	135	110	1.7	3.1	Chalcedony
RR6125	277	ECN	(27.0)	(27.0)	23.5	13.5	4.1	145	115	1.5	>3.0	Chalcedony
RR6162	285	EE	(29.0)	(25.5)	(20.0)	17.8	4.4	–	130	1.2	3.6	Chalcedony (opal.)
RR6193	295	HCB-A	(32.0)	(26.3)	–	–	5.3	–	–	1.4	3.2	Chalcedony

TABLE 1 – (*Continued*)

Spec. No.	Quad	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR6225	301	ECN	(29.0)	(29.0)	(27.0)	(17.0)	3.7	155	115	1.3	>3.0	Chert
RR6231	303	ECN	(35.0)	(35.0)	(23.0)	(11.0)	5.5	160	140	1.4	4.0	Chalcedony
RR6243	307	P	(35.0)	(34.0)	20.7	12.4	5.5	185	100	2.4	2.9	Chalcedony
RR6249	311	HCB-B	(19.0)	(16.5)	12.0	10.5	3.5	–	–	0.4	–	Chalcedony (brec.)
RR6251	314	ECS	–	–	26.5	5.4	7.1	190	50	3.6	5.0	Chalcedony
RR6263	327	P	(39.0)	(34.3)	(23.0)	12.4	4.0	195	95	1.1	2.5	Chalcedony
RR6275	334	RSCN	(27.0)	(25.1)	(22.0)	(12.0)	3.8	145	105	1.3	1.6	Chalcedony
RR6314	347	NSN	30.0	30.0	16.5	(15.0)	5.2	(180)	160	2.2	2.4	Rhyolite
RR6315	348	P	(38.0)	(36.9)	(29.0)	19.0	9.6	(>175)	115	4.3	6.0	Rhyolite
RR6321	349	HCB-B	(30.0)	(27.3)	(13.0)	11.3	5.1	–	–	0.5	–	Chalcedony
RR6328	352	Cot	19.6	18.3	(16.0)	(16.0)	4.5	–	–	0.5	–	Obsidian
RR6331	352	HCB-A	(27.0)	(24.1)	16.5	15.3	3.7	–	–	0.6	3.0	Chalcedony
RR6337	353	DSN	(18.0)	(18.0)	(9.0)	5.3	2.7	190	(>130)	0.1	0.15	Chalcedony
RR6348	354	ECS	(37.0)	(37.0)	(27.0)	(14.0)	5.3	175	75	2.6	4.0	Rhyolite
RR6353	354	EE	(37.0)	(34.0)	(25.0)	(11.0)	4.6	155	115	2.1	3.5	Chalcedony
RR6359	356	P	(43.0)	(40.5)	(22.5)	13.2	5.4	(>140)	(80)	3.2	4.2	Rhyolite
RR6380	362	EE	39.3	36.2	(28.0)	(19.0)	5.5	140	135	3.7	4.0	Rhyolite (?)
RR6412	364	EsES	(32.0)	(32.0)	(16.0)	(16.0)	3.0	125	(100)	1.0	–	Obsidian
RR6437	367	Cot	(16.0)	(13.5)	10.5	10.5	1.8	–	–	0.1	–	Chalcedony
RR6450	368	HCB-B	22.9	22.5	10.5	9.0	5.2	–	–	1.1	1.1	Chalcedony
RR6455	369	EE	(27.0)	(25.0)	23.0	(14.0)	4.4	125	110	1.7	3.0	Chalcedony
RR6456	369	RSCN	20.9	18.7	(18.0)	12.6	3.3	155	120	1.1	–	Chert
RR6457	369	RSCN	22.5	20.6	21.0	19.0	4.0	160	110	1.6	1.6	Obsidian
RR6478	371	ECN	(40.0)	(40.0)	22.8	8.9	4.3	145	115	2.4	3.0	Chalcedony
RR6647	372	ECN	(31.0)	(31.0)	(24.0)	(17.0)	4.3	185	145	1.0	3.5	Chalcedony
RR6651	372	P	(34.0)	(31.2)	(23.0)	14.6	4.8	205	95	2.1	–	Chalcedony
RR6675	375	ECN	(29.0)	(29.0)	21.0	11.0	3.5	115	105	1.6	3.0	Chalcedony
RR6706	377	EsES	(29.0)	(29.0)	(22.0)	10.0	3.4	115	100	1.4	2.0	Chalcedony
RR6707	377	HCB-A	(32.0)	(28.5)	(14.0)	13.7	4.9	–	–	1.4	2.5	Chalcedony
RR6708	377	ECN	(33.0)	(33.0)	(26.0)	(23.0)	4.6	185	160	1.6	–	Chalcedony
RR6713	377	Cot	19.5	17.7	(12.0)	(12.0)	1.9	–	–	0.3	–	Chalcedony
RR6845	389	ES	(33.0)	(33.0)	(20.4)	(12.0)	5.9	170	–	2.7	3.0	Chalcedony
RR6907	396	HCB-A	45.3	42.3	17.9	(13.0)	7.0	–	–	5.2	5.5	Rhyolite (sil)
RR6918	*a*	DSN	24.5	24.0	15.0	14.0	4.5	175	160	1.4	1.4	Chalcedony
RR6923	416	ECN	(39.0)	(39.0)	23.7	7.0	5.2	135	130	3.7	3.9	Chalcedony
RR6927	416	EE	(38.0)	(34.0)	(32.0)	23.9	4.4	150	120	1.5	5.0	Rhyolite

TABLE 1 – (*Continued*)

Spec. No.	Quad	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR6928	416	ECS	(35.0)	(35.0)	23.5	8.5	4.9	185	60	2.2	3.5	Vein quartz
RR6937	417	ECS	(44.0)	(44.0)	(28.0)	9.0	7.1	155	75	6.2	7.0	Chert
RR6944	421	HCB-A	46.3	44.5	23.2	13.6	7.3	–	–	7.4	7.4	Chal. (sil pl re)
RR6945	421	HCB-A	(37.0)	(33.6)	13.8	13.8	6.1	–	–	2.4	3.2	Chalcedony
RR6950	423	Cot	(33.0)	(27.8)	(18.0)	(18.0)	5.0	–	–	1.2	2.0	Chert
RR6957	427	DSN	(17.0)	(17.0)	9.5	9.5	2.1	180	170	0.2	–	Chalcedony
RR7136	1033	ECS	(32.0)	(32.0)	(15.0)	11.5	4.5	145	65	1.3	>3.0	Chert
RR7142	980	P	(38.0)	(36.1)	(19.0)	(12.5)	6.4	225	115	2.6	3.0	Rhyolite
RR7156	1035	HCB-B	27.5	25.5	11.4	10.5	4.7	–	–	1.2	1.2	Chalcedony
RR7157	449	EsES	(30.0)	(26.5)	–	–	2.8	115	(90)	0.7	1.8	Chalcedony
RR7147	987	DSN	(21.0)	(18.1)	13.0	13.0	2.8	185	170	0.3	0.5	Chalcedony
RR7215	Map 8	RSCN	(30.0)	(29.0)	(19.0)	9.5	3.4	–	105	1.3	1.5	Chalcedony
RR7216	Map 9	ES	(31.0)	(31.0)	(27.0)	(12.0)	4.3	155	115	2.4	2.9	Chalcedony
RR7219	Map 8	RSCN	(25.0)	(25.0)	(17.7)	7.3	4.3	150	125	1.2	1.6	Chalcedony
RR7220	Map 10	EsES	(27.0)	(27.0)	16.0	6.5	3.7	140	95	1.0	–	Rhyolite
RR7221	Map 10	RSCN	21.4	20.5	13.7	9.3	3.5	185	125	0.5	0.5	Chalcedony
RR7222	Map 10	EE	(37.0)	(29.0)	23.6	23.6	4.0	–	135	1.3	4.0	Chert
RR7223	Map 10	EE	(37.0)	(34.1)	23.6	(20.5)	5.7	180	140	3.9	4.5	Rhyolite
RR7224	Map 10	P	(37.0)	(35.0)	24.0	20.0	8.5	185	105	4.4	5.0	Chalcedony
RR8610	187	P	(35.0)	(32.3)	(21.0)	11.0	5.5	(190)	(100)	2.2	4.4	Chalcedony
RR8619	188	DSN	21.4	18.2	18.5	18.5	3.6	210	160	1.0	1.0	Chalcedony
RR8622	189	ECN	(39.0)	(39.0)	23.4	(11.0)	5.5	175	125	4.9	–	Chalcedony
RR8626	189	EE (?)	–	–	–	–	4.9	–	–	1.4	–	Obsidian
RR8636	215	Cot	29.3	27.0	13.0	(12.5)	4.8	–	–	1.6	–	Chalcedony
RR8637	215	P	(43.0)	(39.3)	(20.0)	12.0	6.0	185	105	3.1	3.9	Rhyolite
RR8662	223	HCB-A	(37.0)	(35.5)	(19.0)	14.7	5.9	–	–	3.1	–	Rhyolite (sil)
RR8664	223	RSCN	(26.0)	(26.0)	(20.0)	9.7	3.7	120	110	0.6	1.3	Chalcedony
RR8665	223	HCB-B	(33.0)	28.8	17.5	17.0	4.9	–	–	1.7	2.5	Chalcedony
RR8683	225	EE	(39.0)	(36.0)	(26.0)	(17.0)	4.9	165	145	2.5	3.0	Rhyolite
RR8757	398	RSCN	31.4	30.5	(23.4)	19.2	5.2	155	125	2.6	2.6	Chalcedony
RR8936	*b*	ECN	(38.0)	(38.0)	(33.0)	20.6	4.0	200	115	1.2	4.0	Quartzite (sil)
RR8937	*b*	ECN	(31.0)	(31.0)	23.4	(15.0)	4.3	160	140	1.4	>3.0	Quartzite (sil)
RR8941	585	HCB-B	(37.0)	(34.0)	17.3	17.3	3.9	–	–	1.4	2.8	Chalcedony
RR8943	585	RSCN	(28.0)	(28.0)	(16.5)	(9.6)	3.3	130	105	1.1	–	Chalcedony
RR8945	905	ECN	(37.0)	(37.0)	(30.0)	(15.0)	4.0	125	105	1.7	3.0	Chert
RR8960	725	ECN	(42.0)	(42.0)	(27.0)	(6.0)	4.5	145	110	4.6	–	Quartzite (sil)

TABLE 1 – (*Continued*)

Spec. No.	Quad	Type	Length max.	Length axial	Width axial	Width basal	Thick- ness	DSA	PSA	Weight	Wt. est.	Material
RR8961	725	EE	(37.0)	(33.0)	22.3	16.0	5.0	170	115	2.4	3.5	Rhyolite
RR8962	725	EsES	(26.0)	(26.0)	(21.0)	9.5	3.5	110	100	0.5	–	Chalcedony
RR8963	640	Cot	(27.0)	(24.4)	(12.0)	(12.0)	4.5	–	–	0.6	–	Chalcedony
RR8979	888	ECN	(37.0)	(37.0)	(27.0)	18.0	4.5	150	125	2.1	3.2	Rhyolite
RR8981	*c*	Cot	29.0	27.3	13.5	13.5	5.0	–	–	1.3	1.3	Chalcedony
RR9886	85	EE	(40.0)	(36.0)	(24.0)	(16.0)	4.4	(170)	120	1.7	–	Rhyolite
RR9920	289	EsES	(28.0)	(28.0)	(20.0)	10.2	4.0	<130	65	1.7	–	Chalcedony
RR9922	53	DSN	(24.0)	(20.8)	–	13.6	3.2	–	170	0.3	0.6	Chalcedony
RR9923	253	HCB-B	(30.0)	(28.5)	14.5	13.0	6.6	–	–	1.5	2.0	Chalcedony
RR9929	29	RSCN	(22.0)	(22.0)	16.9	9.8	2.7	140	105	0.3	–	Chalcedony
RR9933	258	Cot	(31.0)	(27.9)	13.0	12.3	4.3	–	–	1.2	<3.0	Quartzite
RR9959	94	RSCN	(28.0)	(28.0)	(22.0)	18.0	3.7	160	130	0.5	2.5	Rhyolite

[a]Outside baseline at 250 m.
[b]10 percent border sample
[c]120 m. on baseline + 8 mi. N.

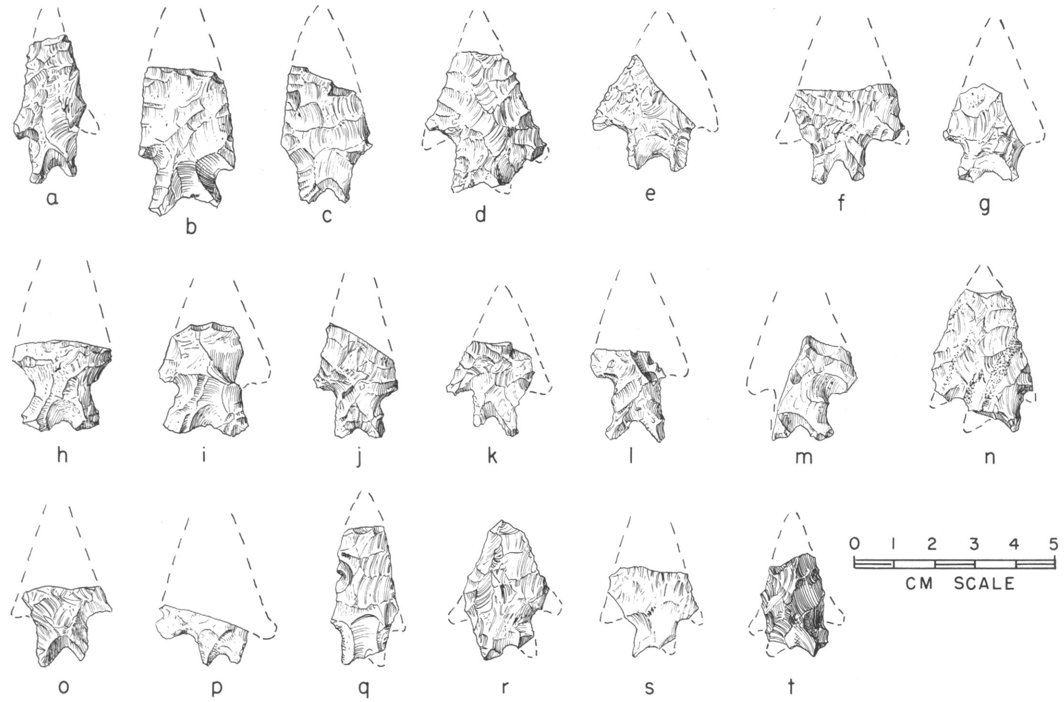

FIG. 12. Pinto Series projectile points from the Mateo's Ridge site.

a. RR8637	f. RR1091	k. RR2117	p. RR3188
b. RR3287	g. RR6651	l. RR3885	q. RR7142
c. RR6359	h. RR6315	m. RR3852	r. RR1110
d. RR2116	i. RR7224	n. RR3926	s. RR8610
e. RR3167	j. RR6243	o. RR6263	t. RR3746

piñon ecotone settlements considered in this monograph.[1]

Bifacial Stone Tools. In addition to projectile points, 693 other bifacially worked artifacts were recovered from Mateo's Ridge. A great variety of stone tools have been grouped into this class: finished knives, unfinished knife and projectile point blanks, and crude quarry roughouts (figs. 24 and 25). Relatively little detailed analysis has been attempted for Desert West implements such as these, and the catch-all term "biface" remains quite nebulous, grouping a rather heterogeneous collection of artifacts. A detailed morphological analysis (such as that implied by the projectile point key) will probably prove of little help when applied to bifacial implements such as these, given the great range of function and manufacturing stages represented. A more fruitful approach seems to be to analyze microwear and breakage patterning, but such analysis has not yet been attempted on the Mateo's Ridge bifaces. The current grouping serves only for gross descriptive purposes.

Drills. The category "drill" can be operationally defined as a bifacial implement exhibiting a blade curvature index of less than −0.10 (see fig. 10). This simple index expresses the degree of concavity on the blade of the artifact. Only 24 drills were recovered from Mateo's Ridge (fig. 26).

Unifacial Tools. Unifacial tools are lithic artifacts made on a flake, exhibiting intentional retouch modification from a single direction. Only 23 unifacial tools were recovered from Mateo's Ridge (figs. 27 and 28). This category

[1] These chronological implications must be considered only tentative; ongoing excavations by the authors at Gatecliff Shelter in nearby Monitor Valley promise in-depth, microstratigraphic considerations of the central Great Basin sequence.

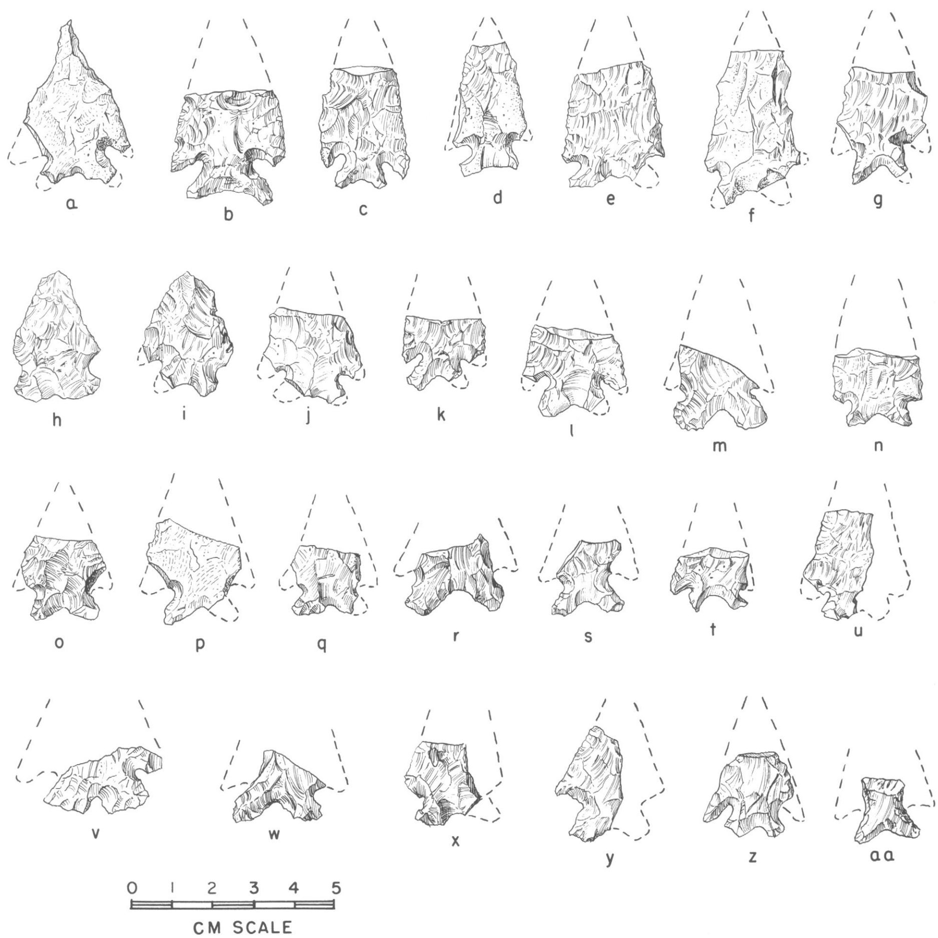

FIG. 13. Elko Eared projectile points from the Mateo's Ridge site.

a. RR6380	h. RR1332	o. RR3451	v. RR6927
b. RR1190	i. RR3252	p. RR9886	w. RR8626
c. RR3544	j. RR8683	q. RR1265	x. RR8645
d. RR3510	k. RR3841	r. RR7222	y. RR3181
e. RR7223	l. RR1486	s. RR6162	z. RR6455
f. RR1494	m. RR1870	t. RR3677	aa. RR1109
g. RR3344	n. RR8961	u. RR6353	

includes artifacts commonly termed end scrapers, spokeshaves, flake scrapers, and cobble scrapers.

Additional Artifacts. Eight fragmentary metates and two manos were present on the Mateo's Ridge site. We think that this paucity is due in large measure to a stone wall built adjacent to the historic cabin. Virtually all the large stones (including grinding stones) were removed from the site and incorporated in the wall, probably within the past 100 years.

Two small cores were found and only a single sherd of Shoshoni ware pottery was present. One small polished stone was recovered which we interpret to be an atlatl weight (fig. 29).

Debitage. Waste flakes were present throughout the site, and all chippage was collected from each quadrant. The predominant material utilized was banded chert. Waste flakes of chalcedony, obsidian, silicified tuff, and rhyolite were also recovered. Percussion and pressure flakes representing all phases of manufacture from primary flaking to retouch were recovered.

Chippage frequency ranged from absolutely zero in a couple of quadrants to more than 5000 flakes in a single 10 meter square.

Euramerican Artifacts. This study has been concerned strictly with the prehistoric occupation of Mateo's Ridge and the analysis leaves untouched the hundreds of Euramerican artifacts recovered in the survey. Within this category are items representing either white contact with historic Shoshoni Indians, or else the debris from white settlers themselves. Common artifacts of this period include glass trade beads, fragments of seamed and unseamed glass bottles, tin cans (some dating from the late nineteenth century), porcelain fragments, buttons, eating utensils, bullet casings, barbed wire, and household implements.

In some cases these artifacts have been rather extensively modified. For example, large tin cans had been converted to buckets, water containers, and/or cooking vessels by placing stiff wire handles around the rim; steel rivets which may have been worn as ear spools, and an 1853 half-dime which was perforated along the rim apparently for suspension as a pendant. A number of glass fragments were worked into scrapers and knives.

These historic artifacts are currently housed at the Department of Anthropology, University of California, Davis, and await further, more intensive analysis.

INTRASITE DISTRIBUTION OF ARTIFACTS AND CHIPPAGE

The main reason for imposing the 10-meter grid system was to control artifact provenience within the site. Do the artifacts tend to be randomly distributed across the entire site, or are there areas of internally patterned activities? From just working on the site, we could not discern any particular activity areas, so we attempted to find clustering by mapping the individual artifact categories. Because of the sheer

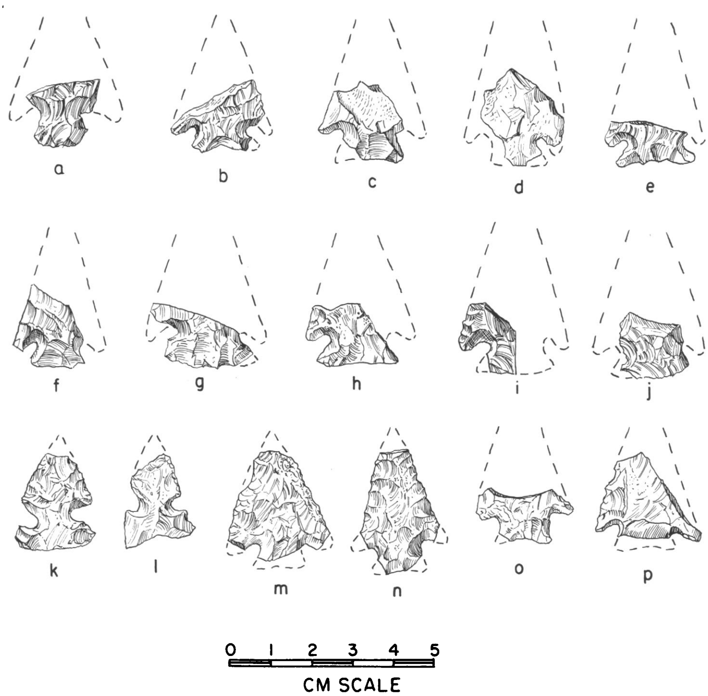

FIG. 14. Elko Corner-notched projectile points from the Mateo's Ridge site.

a. RR1682
b. RR1114
c. RR6225
d. RR6708
e. RR1415
f. RR6647
g. RR8936
h. RR6231
i. RR3842
j. RR3727
k. RR1592
l. RR3280
m. RR7216
n. RR6845
o. RR3040
p. RR1869

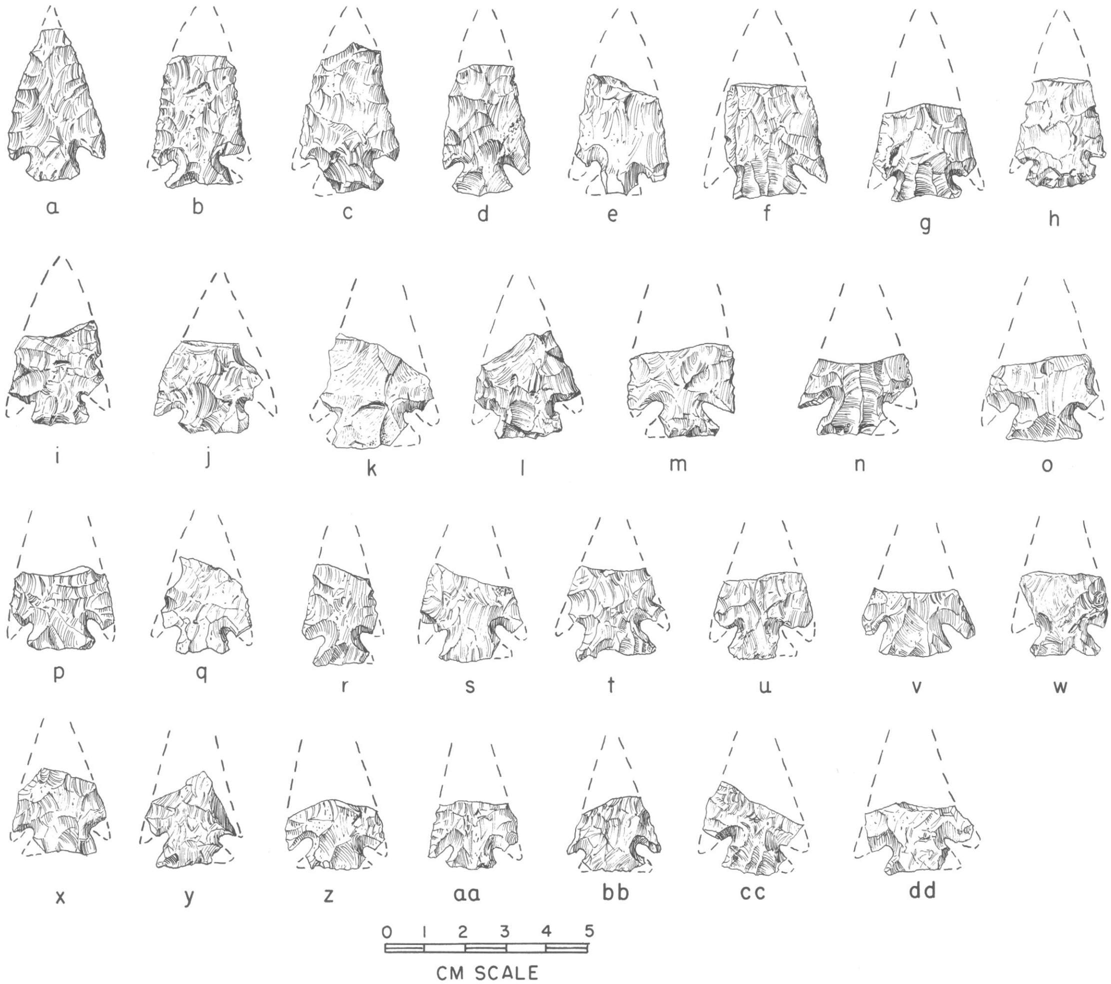

FIG. 15. Elko Corner-notched projectile points from the Mateo's Ridge site.
a. RR6923
b. RR1235
c. RR8622
d. RR1792
e. RR6478
f. RR8960
g. RR3660
h. RR3359
i. RR3640
j. RR1873
k. RR3340
l. RR1191
m. RR1123
n. RR8979
o. RR6083
p. RR4324
q. RR1835
r. RR2115
s. RR3332
t. RR3326
u. RR1493
v. RR3783
w. RR3721
x. RR6116
y. RR3193
z. RR8937
aa. RR6675
bb. RR6125
cc. RR6945
dd. RR1183

numbers of artifacts involved, a computer assisted mapping technique was employed, analogous to the preferential pattern analysis program described by Roberts, Strand, and Burmeister (1971) who applied scaling and preference mapping methods to the intuitive concept of "systematic culture patterning." A special computer program, a modified General Purpose Contour routine, was prepared to translate artifact frequency into a topographic contour analog map. The idea is simple: geographic coordinates are translated into topographic contours and the result is displayed on a CALCOMP plotting system.

Contour maps indicating cultural densities have been plotted for the major artifact categories present at Mateo's Ridge. In effect, we are using a computer to fish for a consistent patterning which we were unable to find intuitively. Such a pattern did finally emerge. Consider first figure 30, the terrain analog map for unmodified chippage. Of the roughly 50,000 individual flakes represented on this diagram, two peaks of density ("hot spots") seem clearly evident. The larger of these (Cluster A) centers about coordinates (20, 24) and a lesser concentration (Cluster B) appears at about (30, 15), approximately 100 meters to the southeast. According to this plot, Mateo's Ridge contains two major areas of prehistoric habitation.

Cluster A actually consists of 29 quadrants, and Cluster B is roughly half that size. Although these two "hot spots" comprise less than 11 percent of the total site area, they contain nearly three-quarters of the chippage recovered. In round figures, this clustering is as follows:

Area	Total Number of Unmodified Flakes	Number of Quadrants
Cluster A	30,000 (60%)	29 (7%)
Cluster B	7,000 (14%)	15 (4%)
Other quadrants	13,000 (26%)	376 (89%)
Total	50,000	420

We think these clusters are archaeological as well as graphic realities.

But what do they mean in human terms? Why should waste flakes concentrate so distinctly into two groupings? A number of hypotheses come to mind. If it is true, as archaeologists commonly assume, that chippage can function as a general, all-purpose indicator of prehistoric habitation, then Mateo's Ridge actually consists of two

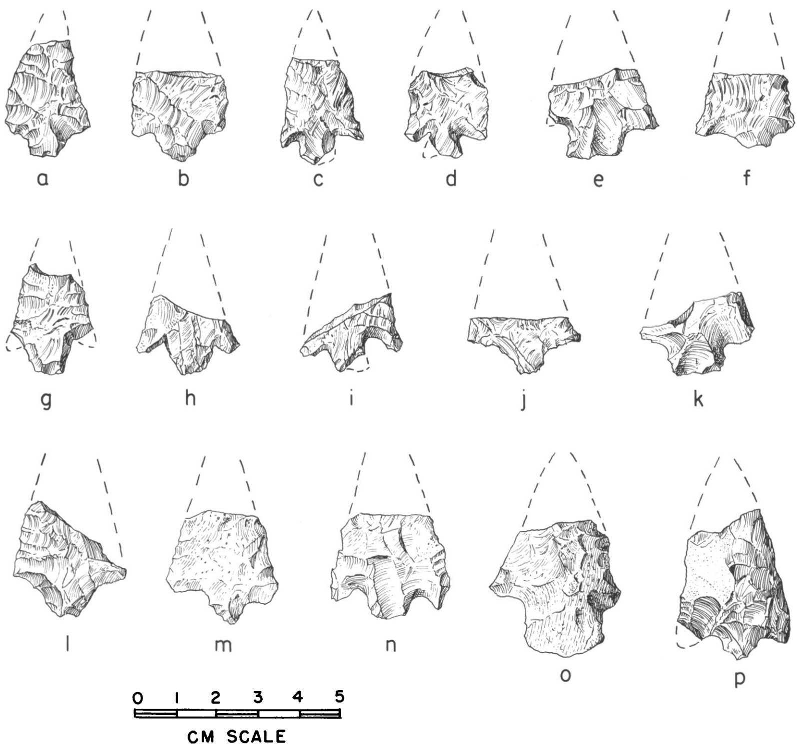

FIG. 16. Elko Contracting-stem projectile points from the Mateo's Ridge site.

a. RR1701
b. RR3296
c. RR3067
d. RR1282
e. RR6348
f. RR6928
g. RR3621
h. RR7136
i. RR4340
j. RR1773
k. RR1192
l. RR6251
m. RR1101
n. RR1214
o. RR1579
p. RR6927

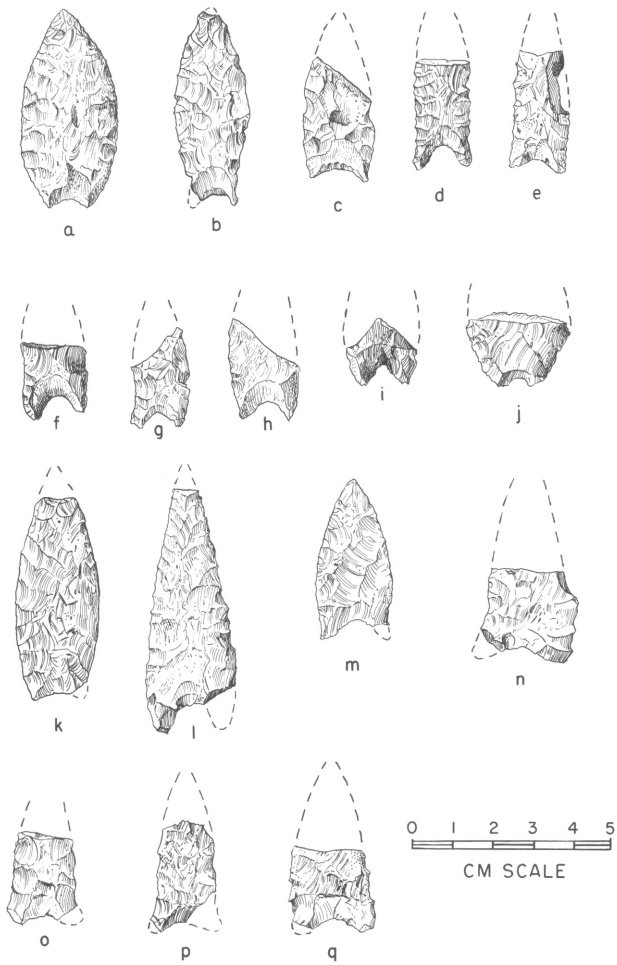

FIG. 17. Humboldt Concave Base-A projectile points from the Mateo's Ridge site.
a. RR6944
b. RR6907
c. RR8662
d. RR1508
e. RR6945
f. RR6193
g. RR6707
h. RR3088
i. RR6331
j. RR1845
k. RR2118
l. RR3614
m. RR1334
n. RR1732
o. RR1189
p. RR3546
q. RR3149

rather distinct campsites. Perhaps the Mateo's Ridge site is merely an archaeological construct rather than a significant cultural unit. By comparing the two density clusters on figure 30 with the physical topography (fig. 4), we can see that these two camps lie on the outer margins of the saddle, separated by a gently sloping pass. The lower part of the saddle seems to have been the least heavily occupied in prehistoric times (also see fig. 8). Although we cannot presently reconstruct the prehistoric vegetation cover of Mateo's Ridge, it is worth noting that the seemingly uninhabited central portion of the ridge is likewise devoid of piñon and juniper trees; the actual campsite locales host modern stands of both species. Perhaps these trees offered protection from wind and snow during the winter months, or perhaps the families were simply camping nearer their fall caches of piñon nuts. It might even be that the two camps were operated simultaneously, separated by a rather barren "no man's land."

Alternatively, it could be that the chippage clusters in fact represent functionally distinct activity areas, localities where differing (perhaps sex-specific) tasks were performed. It is even possible the chippage scatters represent nothing more than that: lithic clumps. That is, it is conceivable that extensive tool manufacture and repair—the activities which produce waste flakes in the first place—were conducted out away from major living areas. Many of these flakes are razor-sharp, a seeming problem to a barefoot or sandal-wearing folk. If this were so, then the "no man's land" on the lower saddle might actually have been the most intensively occupied area of all on the entire ridge.

Of course such speculation can never be completely explicated, but the remaining artifact categories can provide further insights into prehistoric community patterning on Mateo's Ridge.

Consider now the analog contour map for bifacial tools at Mateo's Ridge (fig. 31). The configuration is quite similar to that for chippage. Two major clusters once again emerge, with the western settlement containing the far greater density of tools. A third clumping, Cluster C, occurs on the southwestern extreme of Mateo's Ridge, near Cottonwood Creek. Similarly, projectile points (fig. 32) tend to cluster in two modes, although the western cluster is somewhat south of the major chippage concentration (Cluster A). The second concentration is halfway between Clusters B and C. Finally, figure 33 diagrams the distribution of utilized flakes. Major Clusters A and B once again emerge in the central portion of the site, and the streamside concentration, Cluster C seems particularly dense. There is an added concentration of utilized flakes that progress westward, extending almost off the site boundary.

Because of the problems inherent in surface archaeology, we hesitate to make firm interpretations of these data. Nevertheless, a pattern of intrasite variability does exist, and deserves brief interpretation. Cluster A seems to be the most dense occupation of the entire saddle. All the major artifact categories (except grinding stones, as discussed above) are represented in abundance, and the chippage is so dense as to sometimes completely obscure the underlying soil. Across the saddle, Cluster B also has an abundant chippage concentration and numerous artifacts, but projectile points are quite rare. We cannot satisfactorily explain this absence, but we must note the presence of a modern dirt road passing through this sector of the site. We think it probable that recent relic hunters have skimmed off the more complete projectile points within this restricted area, for their private collections.

The two major clusters can be computed as follows:

	Cluster A	Cluster B
Chippage	30,000	7000
Utilized flakes	49	95
Bifacial tools	112	29
Projectile points	54	16

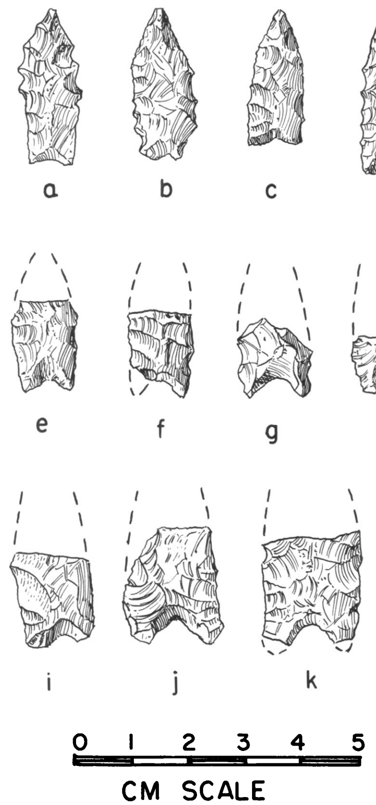

FIG. 18. Humboldt Concave Base-B projectile points from the Mateo's Ridge site.

a. RR3708 d. RR7156 g. RR6321 j. RR8655
b. RR1307 e. RR1320 h. RR6249 k. RR8941
c. RR6450 f. RR1884 i. RR9923 l. RR6076

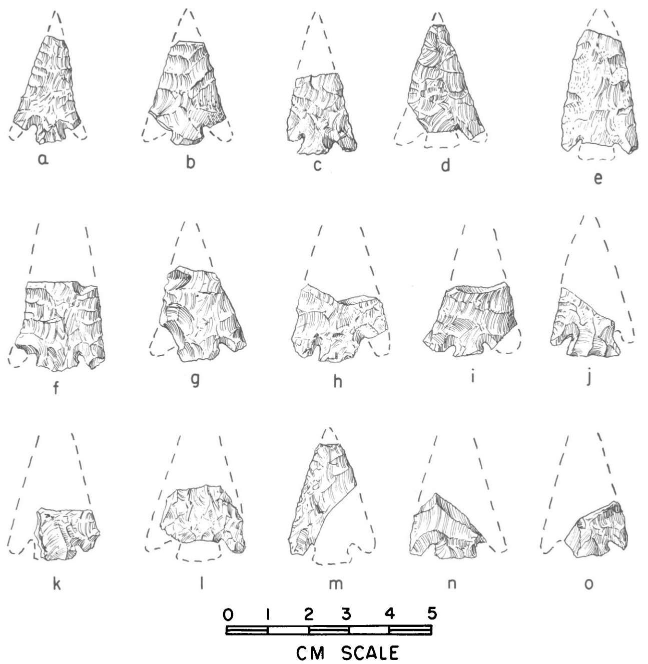

FIG. 19. Eastgate Expanding Stem projectile points from the Mateo's Ridge site.

a. RR7220	e. RR1146	i. RR1535	m. RR7157
b. RR3361	f. RR6706	j. RR1641	n. RR3704
c. RR1131	g. RR9920	k. RR8962	o. RR3232
d. RR6412	h. RR3168	l. RR3651	

A binomial test (see Thomas 1976, Chap. 6) indicates that there is a highly significant difference between the two clusters with respect to all four artifact categories. Projectile points, bifaces, and chippage are much denser in Cluster A, but Cluster B has a disproportionate number of utilized flakes.

Cluster C, the southern grouping situated on the meadow adjacent to Cottonwood Creek, poses something of a problem. Although extremely dense, the cluster is limited in areal extent and absolute tool frequencies are too small to be considered statistically. Figures 30 and 33 do indicate, however, that bifaces and utilized flakes are extremely common in Cluster C, projectile points occur in limited numbers, and chippage is virtually absent. We think that area C was probably involved in rather specialized butchering and hide processing, but definitely not habitation or tool manufacture. If this interpretation were correct, it would be worth considering the possibility that the adjacent stone fence dated from prehistoric times and that it was involved in herding or corraling of artiodactyls such as bighorn or antelope. (This notion, of course, contradicts local tradition.) We are suggesting, therefore, that Mateo's Ridge had two major areas of habitation, denoted as Clusters A and B. A third locality, Cluster C, seems to have been used most commonly as a restricted activity area, probably for butchering, skinning, and hide processing.

Even assuming that these tentative interpretations have some validity, one question posed above remains unanswered: why two discrete habitation areas on the same archaeological site? One solution could be that they were occupied at different times (that is, during different cultural phases). Although this proposition can be readily tested on buried deposits using radiocarbon or other suitable chronometric techniques, Mateo's Ridge is a strictly surface manifestation, lacking associations required for absolute (or even relative) dating. Surface find can generally be dated only on typological grounds, a technique that is imprecise at best. The situation is exacerbated in this cause by the small samples involved. Nevertheless, we have tabulated the relative frequency of time-sensitive artifacts between the two clusters:

	Cluster A	Cluster B
Yankee Blade phase	6	1
Underdown phase	5	1
Reveille phase	9	3
Devils Gate phase	4	0
Total	24	5

As noted previously, relic hunters have probably removed most of the typable points from Cluster B, so we are dealing with fragmentary, rather scanty data. But even granting this, these data in no way suggest a significant temporal discrepancy between the two clusters.[1] That is, we are wholly justified in concluding that both areas of Mateo's Ridge were more or less occupied throughout the 4000-year time span suggested by artifact typology.

[1] A Kolmogorov-Smirnov two-sample test (described in Thomas, 1976, pp. 322-326) produced a D of only 0.17. This value is grossly inadequate to reject the null hypothesis. Of course, because of the small samples, these results remain little more than suggestive.

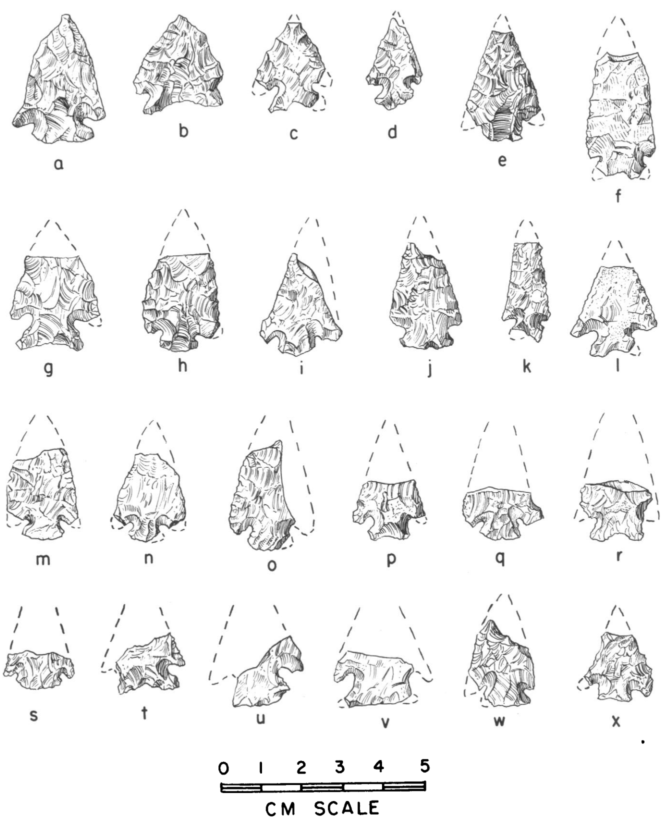

FIG. 20. Rose Spring Corner-notched projectile points from the Mateo's Ridge site.

a. RR8757
b. RR6457
c. RR6456
d. RR7221
e. RR7215
f. RR4306
g. RR3655
h. RR1255
i. RR1333
j. RR3325
k. RR1113
l. RR6275
m. RR8943
n. RR7219
o. RR3174
p. RR3197
q. RR8664
r. RR3582
s. RR9929
t. RR3889
u. RR9959
v. RR3077
w. RR1770
x. RR4355

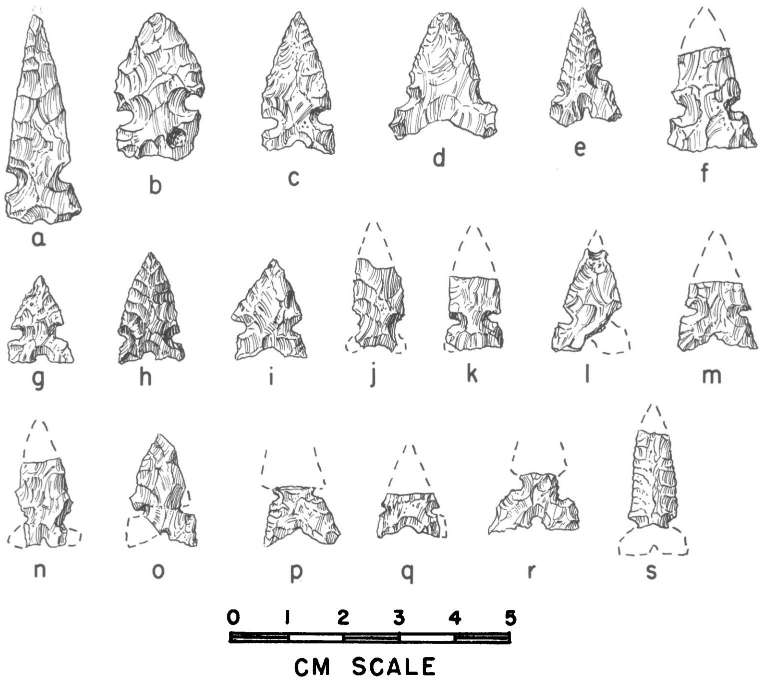

FIG. 21. Desert Side-notched projectile points from the Mateo's Ridge site.

a. RR1536
b. RR6918
c. RR1557
d. RR8619
e. RR1623
f. RR3275
g. RR3356
h. RR3357
i. RR1877
j. RR2113
k. RR6957
l. RR3925
m. RR7147
n. RR1554
o. RR1552
p. RR9922
q. RR3681
r. RR1108
s. RR6337

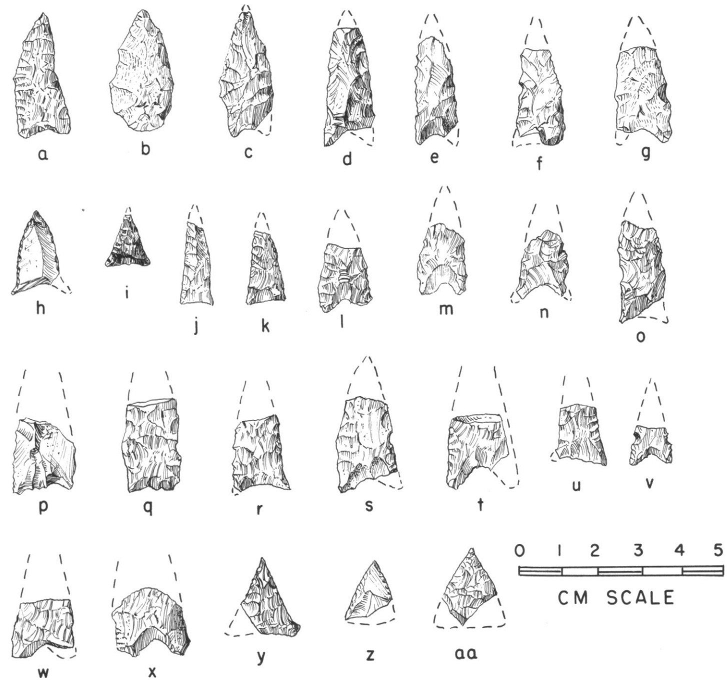

FIG. 22. Cottonwood Series projectile points from the Mateo's Ridge site.

a. RR8981
b. RR3358
c. RR8636
d. RR1218
e. RR1655
f. RR3927
g. RR9933
h. RR6713
i. RR1612
j. RR1604
k. RR1549
l. RR3668
m. RR3312
n. RR8962
o. RR3336
p. RR1606
q. RR3068
r. RR1353
s. RR3289
t. RR6950
u. RR3579
v. RR6437
w. RR1487
x. RR3061
y. RR6328
z. RR3545
aa. RR3163

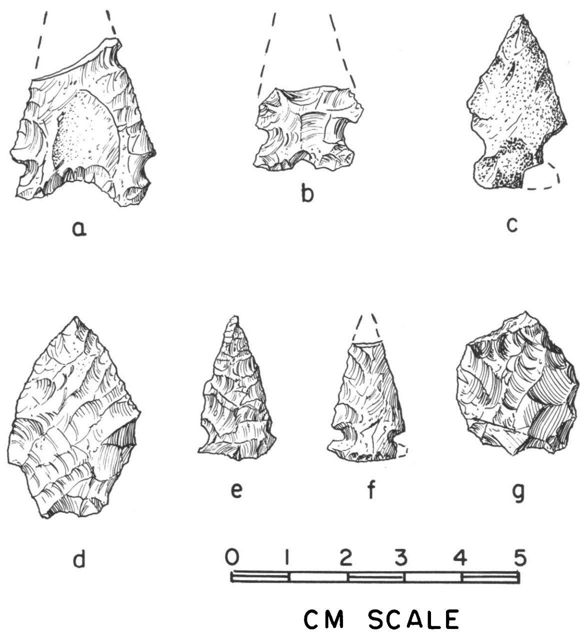

FIG. 23. Miscellaneous projectile points from the Mateo's Ridge site.

a. RR3041
b. RR3543
c. RR6314
d. RR3084
e. RR1194
f. RR1602
g. RR3451

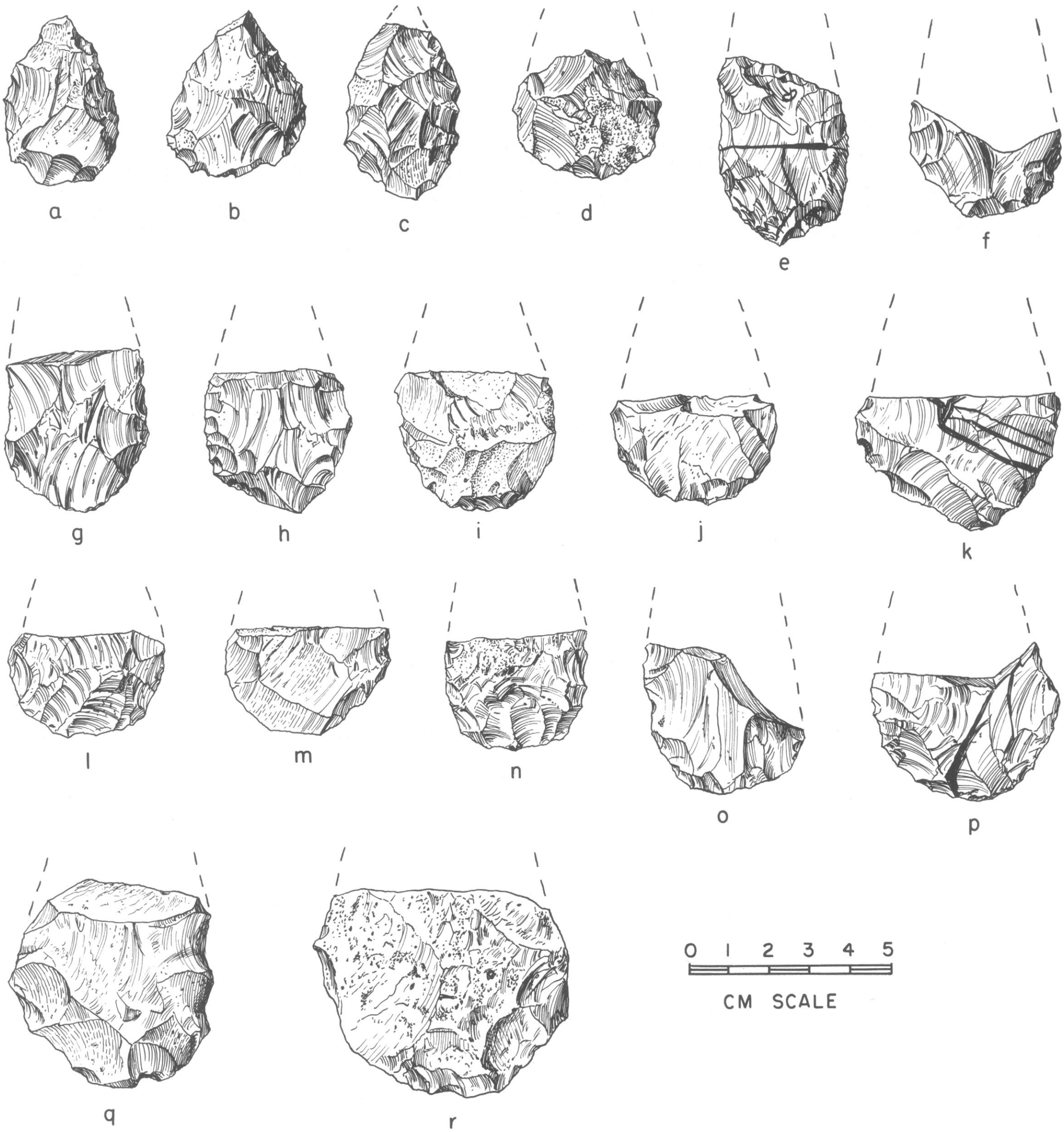

FIG. 24. Bifaces with rounded bases from the Mateo's Ridge site.

a. RR6265
b. RR3136
c. RR6745
d. RR1707
e. RR3523
f. RR1350
g. RR3053
h. RR8081
i. RR1841
j. RR6216
k. RR6080
l. RR6443
m. RR3015
n. RR7141
o. RR6032
p. RR1222
q. RR4369
r. RR4654

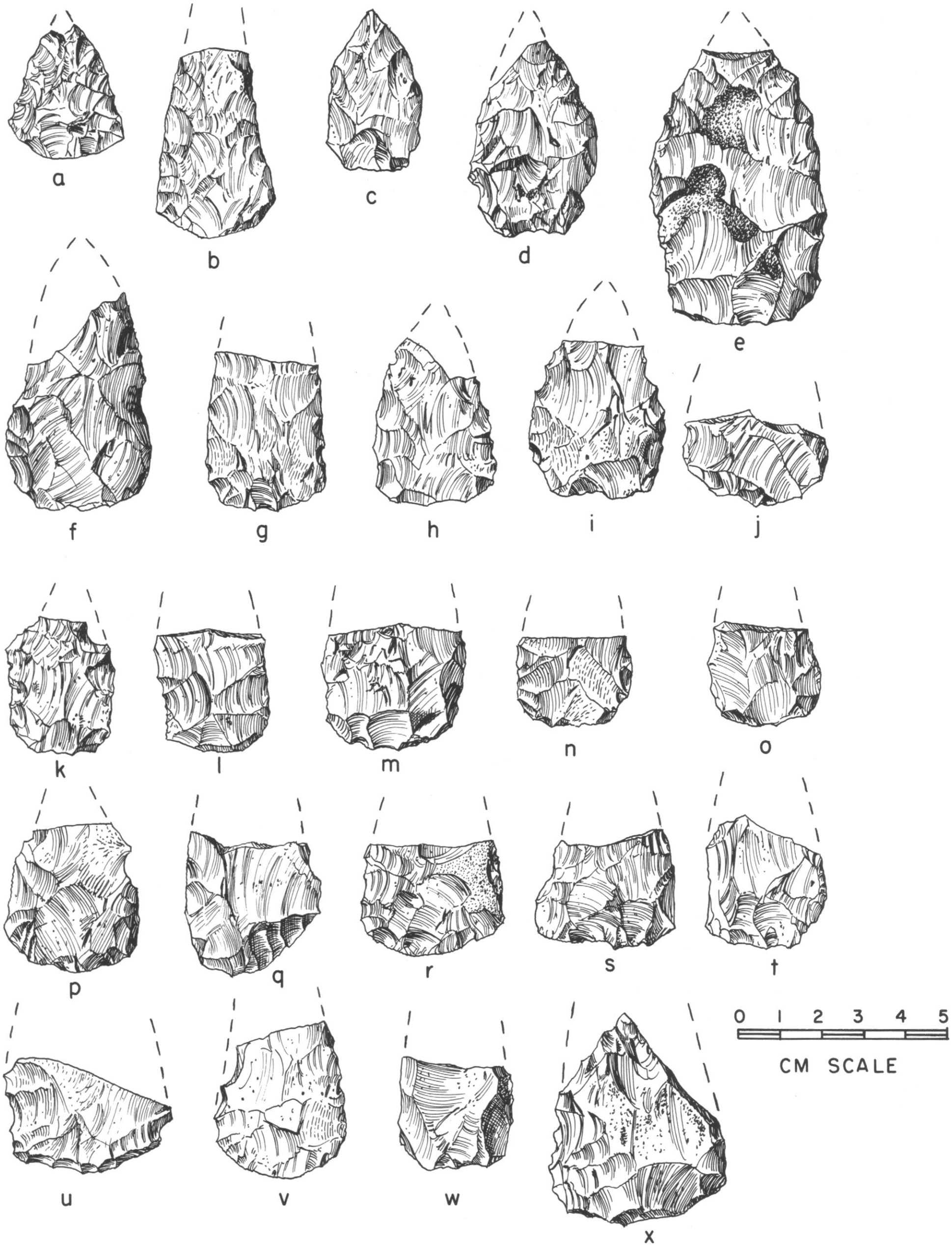

FIG. 25. Bifaces with non-rounded bases from the Mateo's Ridge site.

a. RR8673
b. RR6820
c. RR6427
d. RR1771
e. RR4655
f. RR1157
g. RR6633
h. RR6079
i. RR1084
j. RR3804
k. RR3279
l. RR6644
m. RR1158
n. RR7146
o. RR6215
p. RR1382
q. RR6667
r. RR6438
s. RR9834
t. RR6664
u. RR3104
v. RR8950
w. RR1218
x. RR3172

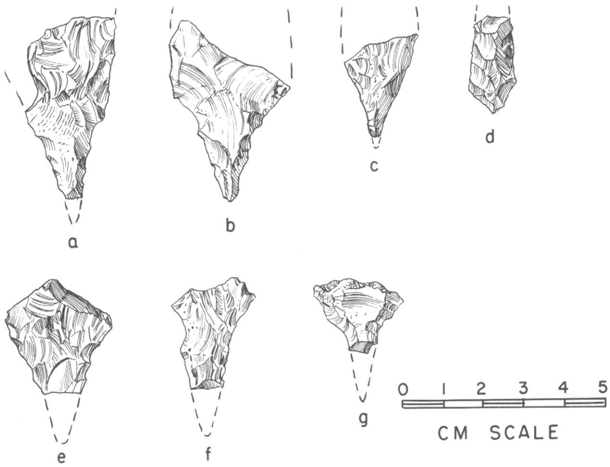

FIG. 26. Drills from the Mateo's Ridge site.

a. RR3179
b. RR3112
c. RR6891
d. RR3073
e. RR9972
f. RR1263
g. RR3195

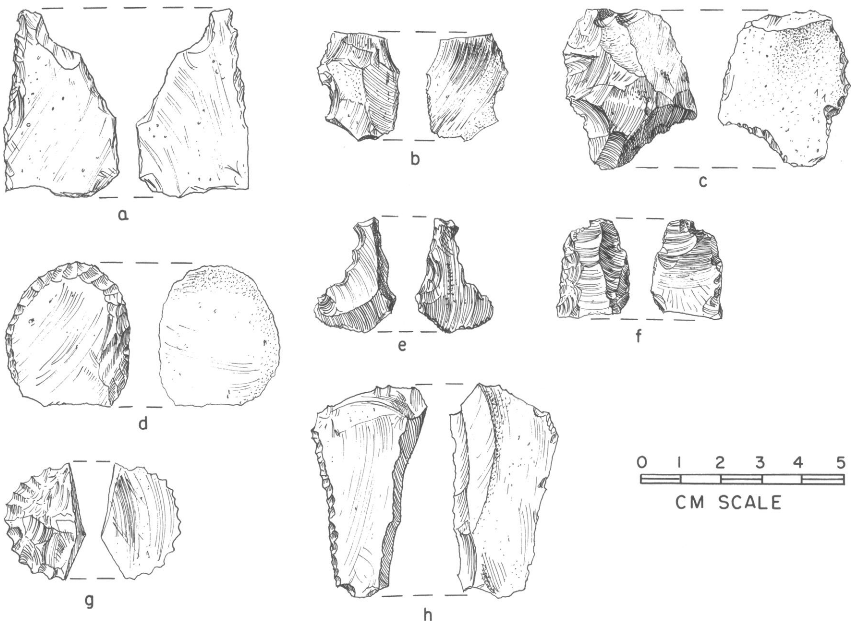

FIG. 27. Unifaces from the Mateo's Ridge site.

a. RR7137
b. RR9879
c. RR1478
d. RR3505
e. RR6422
f. RR1879
g. RR8641
h. RR9848

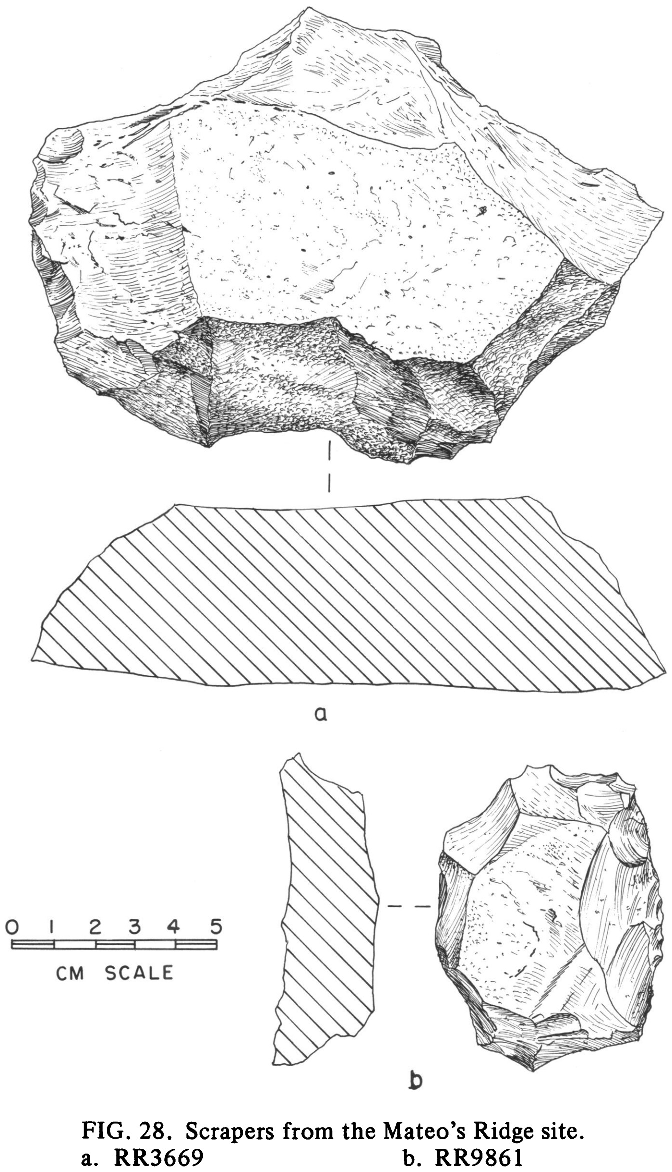

FIG. 28. Scrapers from the Mateo's Ridge site.
a. RR3669 b. RR9861

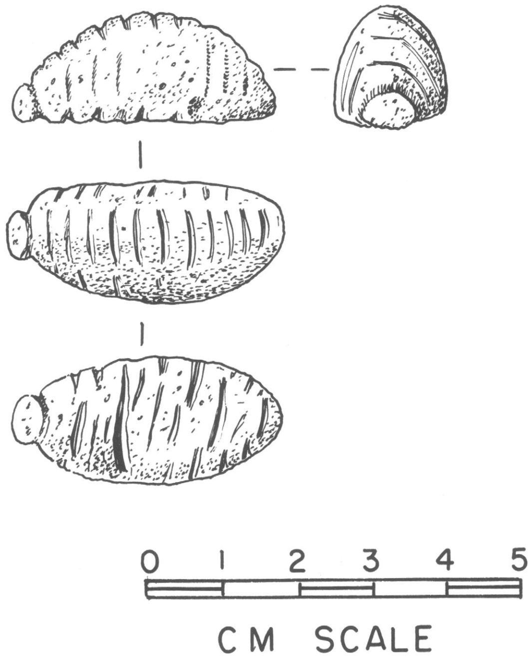

FIG. 29. Altatl weight from the Mateo's Ridge site. RR1249

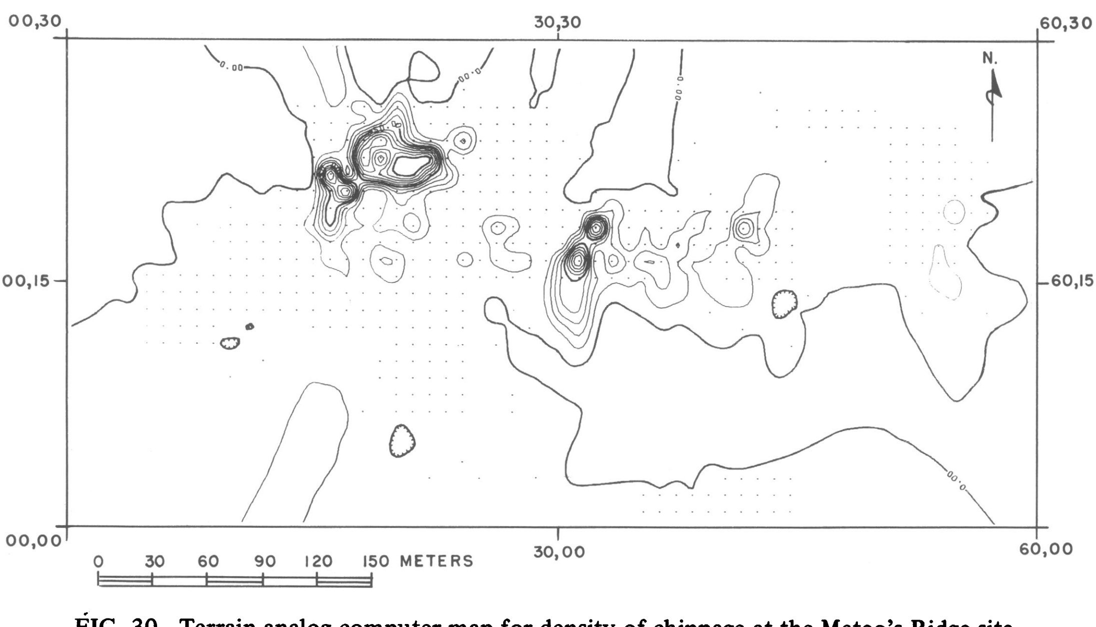

FIG. 30. Terrain analog computer map for density of chippage at the Mateo's Ridge site.

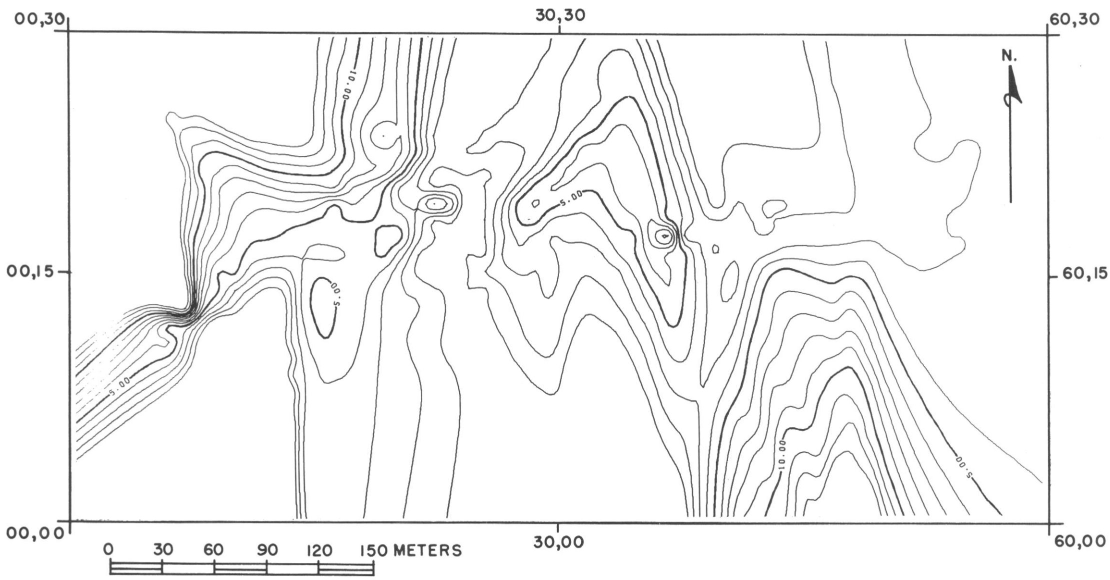

FIG. 31. Terrain analog computer map for density of bifacial tools at the Mateo's Ridge site.

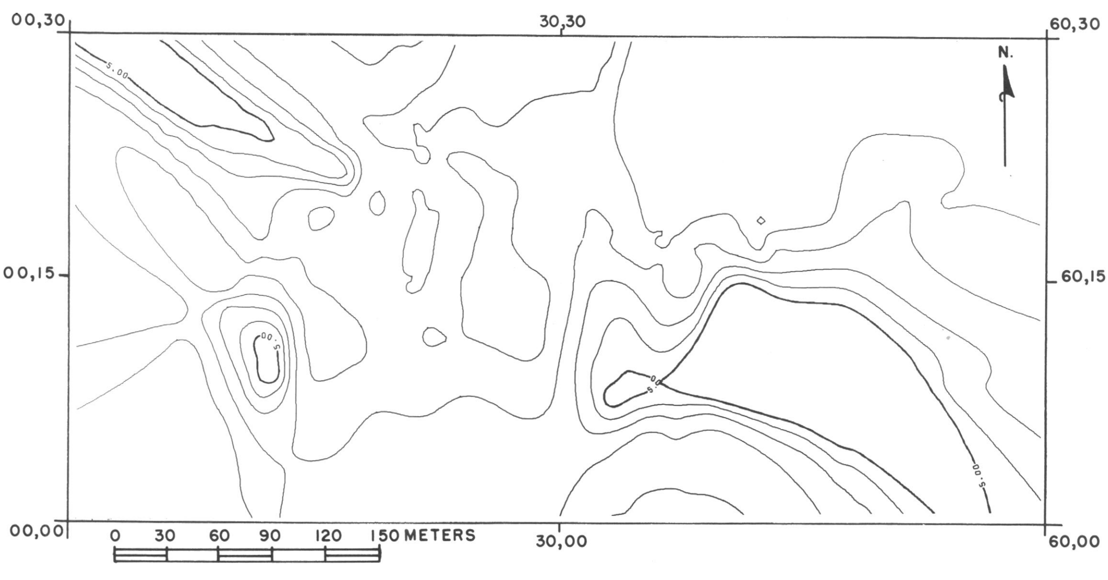

FIG. 32. Terrain analog computer map for density of projectile points at the Mateo's Ridge site.

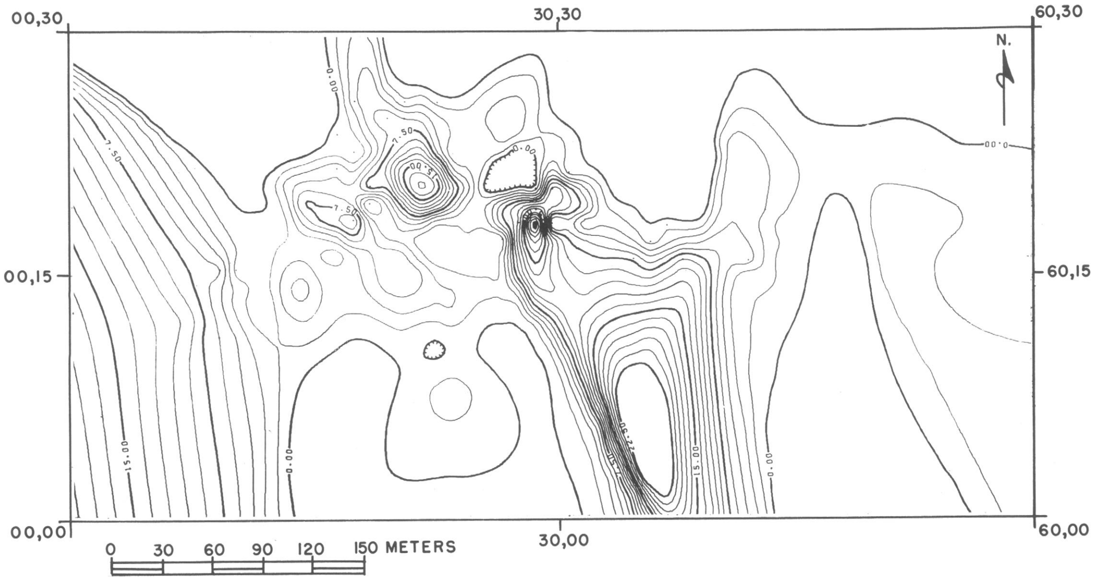

FIG. 33. Terrain analog computer map for density of utilized flakes at the Mateo's Ridge site.

FLAT IRON RIDGE SITE, 26-Ny-313 (D13)

ROBERT L. BETTINGER

Flat Iron Ridge is a small site situated on the flat crest of a ridge. It covers about 5000 square meters, the surface of which is scattered with moderate amounts of chippage, a few flaked and ground stone artifacts, and a considerable amount of historic debris (tin cans, nails, and glass). On the east edge of the site is a small stone circle, approximately 2 meters in diameter.

A second stone ring (fig. 34) found on the western margin of the site was comprised of about 50 boulders and several smaller cobbles; an opening, which may represent a doorway, is

FIG. 34. Floor of house ring A at Flat Iron Ridge. The shrub understory is largely sagebrush (*Artemisia tridentata*).

situated on its eastern side. The depression within the ring had a maximum depth of 15 cm. Two grinding stones were found in separate places, each 1.5 meters from the house ring. One metate was found face down, but the second had apparently been cached face up on top of a heavy, cast clothing iron, which probably served as a mano (fig. 35). This rock ring was better preserved than most encountered in the Reese River area, so we attempted to expose the original floor intact.

Prior to excavation, the structure was carefully cleared of brush, and a north-south datum line was established (fig. 36). Subsequently, a second north-south line was established 25 cm. east of the first, and the strip between the two was excavated with trowel and whisk broom. Then a single east-west datum line was estab-

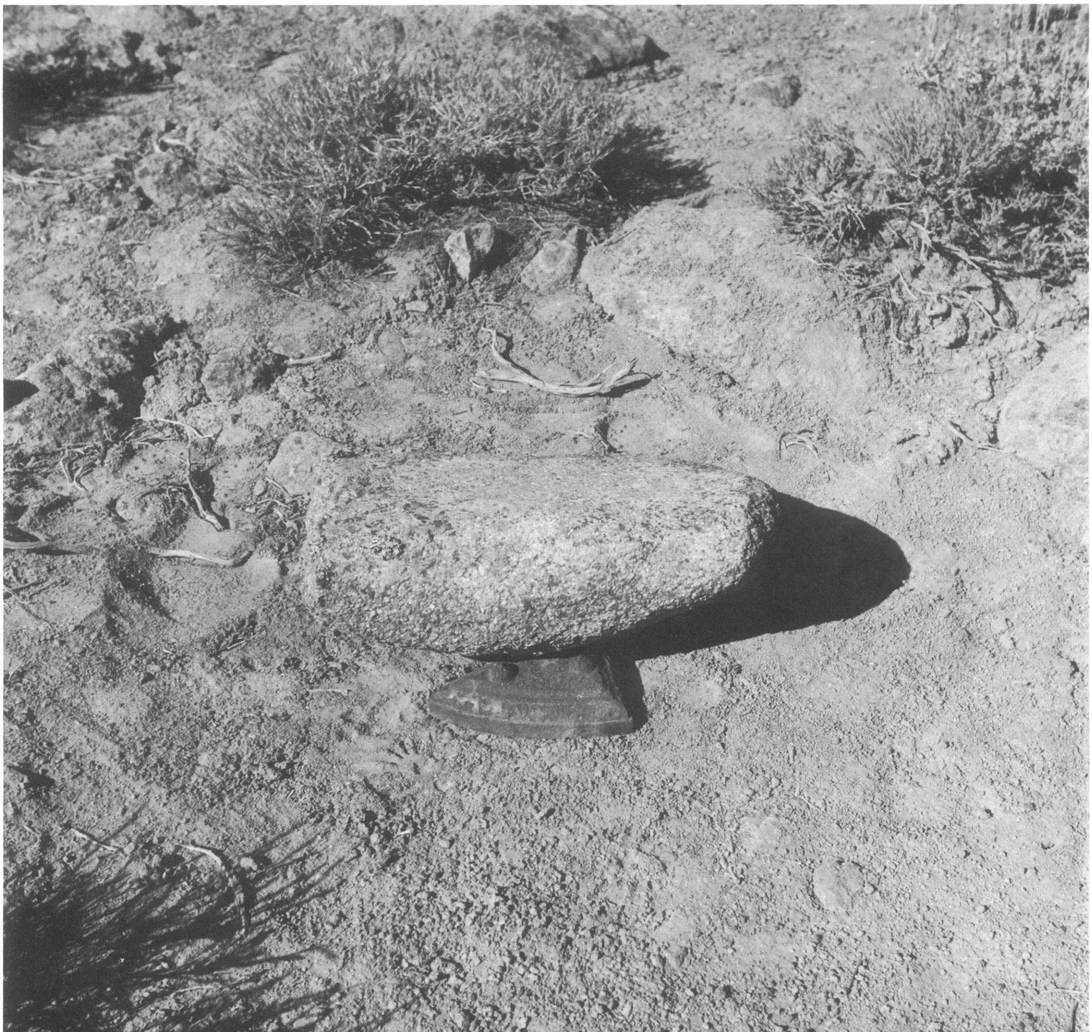

FIG. 35. One of the two granite grinding slabs associated with house ring A at Flat Iron Ridge. Note the cast clothes iron, used as a mano.

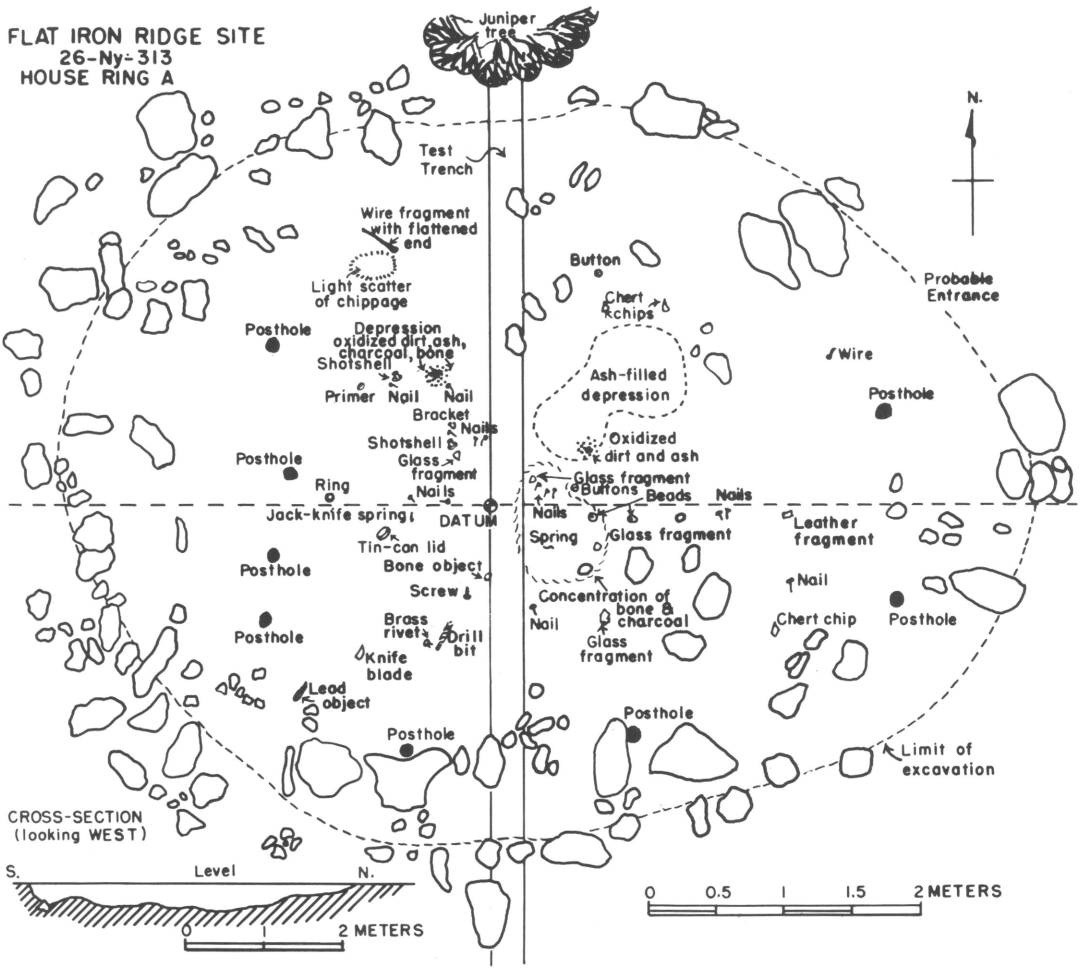

FIG. 36. Plan view of house ring A, Flat Iron Ridge.

lished, and each of the four resulting quadrants was excavated with trowel and brush. All excavated material was passed through a one-eighth-inch screen.

STRATIGRAPHY

The stratigraphy of the ring was not complex. Two units were noted. The uppermost level is a thin unbedded, unsorted, and loosely compacted unit composed largely of fine windblown materials ranging up to about 2 mm. in diameter. It contains small amounts of ash, charcoal, and organic surface humus. The upper unit is about 10 cm. thick in the center of the ring, pinching to less than 3 cm. near its perimeter. Excavations in the test trench indicated that the layer of windblown silts lay uncomfortably on a more compacted second unit, gray-white in color and consisting of about equal amounts of fine-grained materials and sand-sized (*ca.* 2 mm.) particles. This unit was approximately 8 cm. thick, and broken into polygons about 5 to 10 cm. wide. The surface texture may represent mud cracking, as this feature fills with snow melt during each spring thaw. We interpreted this surface

TABLE 2
Summary of the Distribution of Artifacts from the House at Flat Iron Ridge

	NE	SE	SW	NW	Total
Tools					
Knives					
Jacknife springs	0	0	1	1	2
Table knife blade	0	0	1	0	1
Unidentified blade fragment	0	0	1	0	1
Drill bit	0	0	1	0	1
Tool shank	0	0	1	0	1
Hardware					
Carpentry hardware					
Square-cut nails	2	8	1	4	15
Round-wire nails	2	1	0	2	5
Tacks (brads)	5	5	2	3	15
Studs	0	1	8	2	11
Screws	0	0	1	0	1
Brackets	0	0	0	1	1
Wire					
Loops and shaped segments	2	1	1	1	5
Unmodified segments	0	0	3	0	3
Harness hardware					
Cinch rings	0	0	0	1	1
Rivets	0	1	1	0	2
Clothing					
Buttons					
Glass	2	0	1	0	3
Pearl	1	0	0	1	2
Metal (compound)	0	1	0	1	2
Clasp	0	0	1	0	1
Shoe leather and hardware					
Leather fragment	0	1	0	0	1
Leather nails					
Large	4	0	3	7	14
Small	4	0	4	9	17
Leather screws	1	0	2	0	3
Decoration					
Beads					
Blue-green	5	2	0	23	30
White-colorless	9	0	0	5	14
Red-pink	0	0	0	9	9
Other	3	0	0	4	7
Containers					
Can lids	0	0	0	1	1
Glass bottle fragments	2	0	0	0	2
Firearms and ammunition					
Shell casings	0	0	0	2	2
Primers					
Disc-shaped	0	5	1	0	6
Column	0	0	1	0	1
Percussion cap	0	0	0	1	1

TABLE 2 – (*Continued*)

	NE	SE	SW	NW	Total
Shot	0	0	1	0	1
Lead fragments	2	0	2	1	5
Glass					
Mirror fragments	5	5	10	5	25
Miscellaneous metal					
Foil fragments	1	0	3	2	6
Other	0	0	1	0	1
Worked bone	1	0	1	0	2
Other	0	1	0	0	1
Groundstone	0	0	0	2	2
Debitage	2	2	5	21	30
Weight	1.5	2.5	9.0	21.0	25gm

to be a living floor associated with the rock ring.

SUBSURFACE FEATURES

Three types of subsurface features were encountered during the excavation: hearths, chipping scatters, and postholes.

Hearths. Two hearths were found within the house ring (fig. 36). The first of these was a bilobed depression about 1.5 meters long and 10 cm. deep and .75 meters across near the center of the ring in the northeast quadrant. The surface of the floor at this point is a reddish brown and the depression is filled with gray-white to pink ash. A concentration of bone fragments and charcoal exposed in the central portions of the northeast and southeast quadrants just south of the hearth is probably residue from this feature. A rough semicircle, consisting of seven rocks north of the hearth, and a cluster of six rocks south of the hearth residue may also be associated with the feature. The half-circle may be a hearth ring, whereas the cluster of stones might have been used as "heat transfers" in stone boiling or roasting processes.

The second hearth is a circular depression about 25 cm. in diameter and 10 cm. deep. The feature is filled with large quantities of ash mixed with fragments of bone and charcoal. In general, pieces of both charcoal and bone are larger than those noted in feature 1. The rim and interior of the depression were oxidized to an orange-red color.

The presence of charred faunal remains seems to indicate that both hearths were used in food preparation. The larger hearth was presumably the location where most of these activities were performed; the smaller one may have served a more specialized function. The large fragments of charcoal (perhaps coals) suggest that the smaller hearth could have been used for heat-treating chert, rendering bones, roasting meat, or as a flameless heater for the structure. A relatively dense scatter of chippage (feature 3) about 1 meter north of the hearth, some pieces of which are heat-treated, provides some support for the first alternative; large fragments of bone within the hearth are in accordance with the second and third possibilities.

Chipping Scatter. A scatter of chipping waste was localized in the north one-half of the northwest quadrant. It consisted of about 15 small pieces of chert.

Postholes. Eight features identified as possible postholes (fig. 36) are distributed among the four quadrants as follows:

NE	SE	SW	NW	Total
1	2	3	2	8

These are roughly circular in top section, about 10 cm. in diameter, and are visible as dark stains containing decayed organic material. These features were not cross-sectioned to determine their depth. They may possibly represent either stalk and root structures of sagebrush, but their circular distribution seems to indicate postholes. When plotted according to frequency, the distances between stains roughly fell into three categories:

	Distances Between Postholes (cm.)
Mode 1	40, 50, 80
Mode 2	120, 130, 160
Mode 3	600

Distances of the second and third modes probably represent segments where one and two postholes, respectively, were either missed during excavation or not presented. No postholes were noted in the northern part of the ring; this may reflect the use of another type of frame structure or simply a lack of preservation.

ARTIFACTS

Artifacts recovered from the house floor at Flat Iron Ridge are summarized in table 2, p. 316.

Tools. Tools are divided into three categories: knives, drillbits, and tool shanks.

Knives. Four broken fragments of metal knives were recovered. Two of these were identified as jackknife springs, and one as a blade of a table knife. A small blade section could not be positively typed as belonging to either a folding or a table knife. Complete jackknife springs have narrow distal tongues that articulate with the blade, and expanded proximal segments that curve downward to form the end of the knife opposite the blade-spring joint (fig. 37 a-b). Examples from Flat Iron Ridge are fragmentary. One specimen found in the southwest quadrant measured 8.3 cm. long, 0.2 cm. thick, with a maximum width of 0.6 cm. (fig. 37b). One specimen was missing the blade articulation, whereas the other lacked part of the expanded end. In each case, a small pin inserted in the spring near the point where it constricts to form the tongue acted as an anchor. Originally, these probably pierced the surface of the knife handle, and they indicate that both specimens were about 1.2 cm. wide.

The single table knife fragment is the rounded distal portion of a blade measuring 6.5 cm. long, 1.9 cm. wide, and 0.1 cm. thick (fig. 37c).

The unidentifiable blade fragment is 3.8 by 1.0 by 0.1 cm. Both were recovered in the southwest quadrant.

Drill Bit. A large metal drill bit was found in the southwest quadrant. It measured 20 by 2.5 cm. The proximal end consisted of a shaft about 1.0 cm. in diameter and 7.0 cm. long which expands slightly and becomes square in cross-section, then tapers to a square end.

Tool Shank. A piece of metal 6.3 cm. long and 0.7 cm. in diameter identified as a broken tool shank was recovered in the southwest quadrant (fig. 37d). The distal end was hammered flat on two sides and measured 0.4 cm. thick at that point, whereas the proximal end was circumscribed by a deep incision, possibly to facilitate breaking it at that point. The specimen probably represents that part of the tool connecting the blade to a steel collar fitted to receive a wooden handle; similar fittings are found on the modern garden hoe.

Hardware

Nails. Both square-cut nails and round wire nails were represented. Square nails (fig. 38a, b) have subrectangular heads, which are 0.3 cm. thick and range between 0.5 and 0.6 cm. wide, and 0.6 and 0.8 cm. long. Shafts of these specimens measure from 0.2 to 0.3 cm. by 0.3 to 0.5 cm. by 3.1 to 7.8 cm. A total of 15 square nails and shank fragments were found.

The five round wire nails have heads measuring 0.1 by 0.4 to 0.6 cm., shanks 0.2 cm. in diameter, and range between 3.0 and 4.5 cm. in length. The distal ends of these pieces are four-sided pinched to a sharp point.

Tacks. Fifteen round-headed tacks or brads were found (fig. 38c, d). Specimens exhibit heads 0.6 cm. in diameter, and shanks 0.2 by 0.3 cm. to 0.3 by 0.4 cm. in section, and 1.2 to 1.9 cm. long.

Studs. Studs have shanks which are square in cross section, but lack heads. The 11 shanks measure 0.3 by 0.4 cm., and the lengths vary

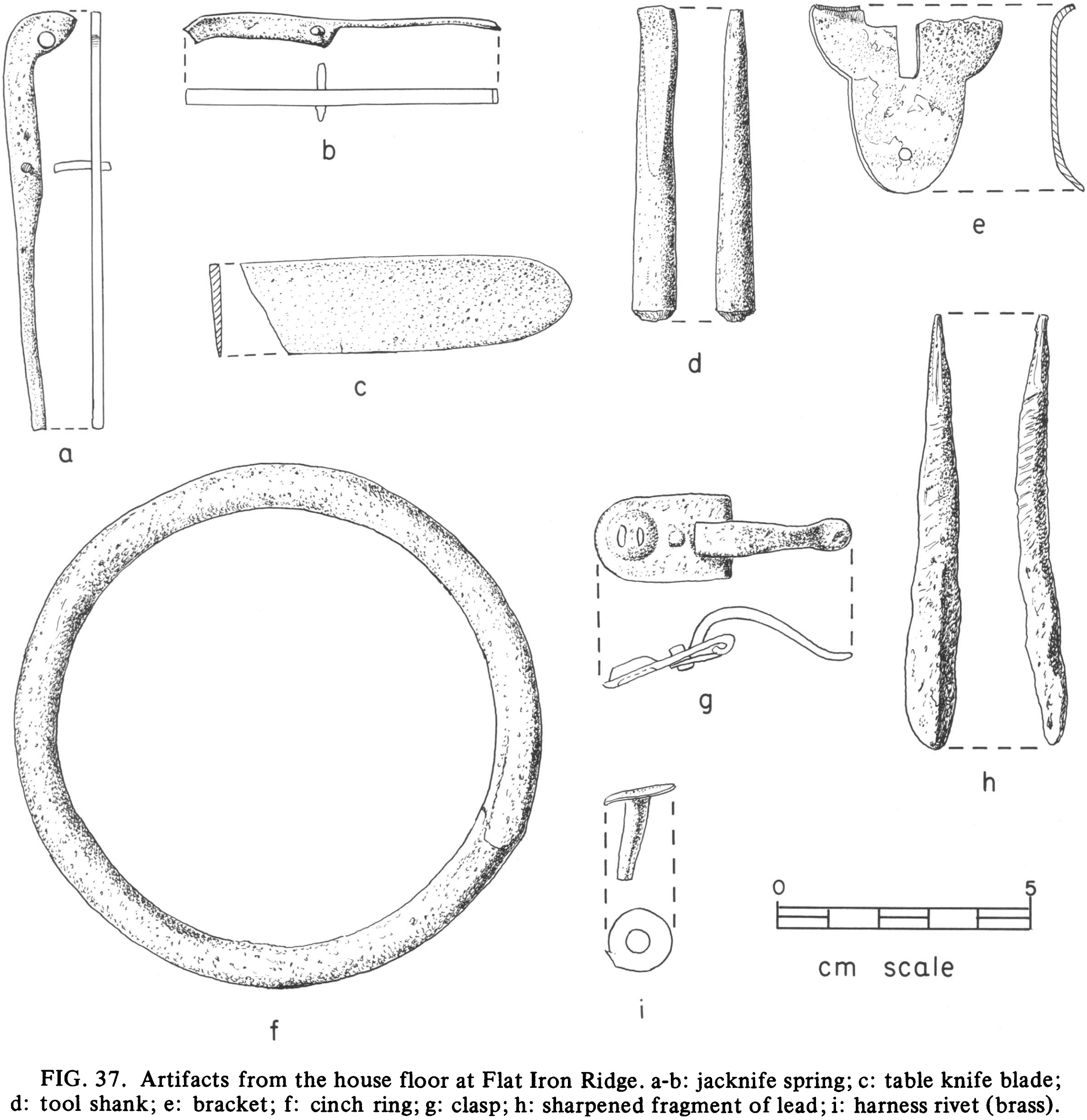

FIG. 37. Artifacts from the house floor at Flat Iron Ridge. a-b: jacknife spring; c: table knife blade; d: tool shank; e: bracket; f: cinch ring; g: clasp; h: sharpened fragment of lead; i: harness rivet (brass).

from 2.4 to 1.7 cm. The actual distribution of their length is given below: 2.4 cm. (1); 2.2 cm. (2); 2.1 cm. (4); 2.0 cm. (1); 1.8 cm. (2); 1.7 cm. (1).

Screw. One flat-headed wood screw was found in the southwest quadrant. Its head is 0.4 cm. in diameter and the shank is 0.3 cm. in diameter and 1.3 cm. long. The ridges (lands) of the bit are 0.2 cm. in diameter.

Bracket. A single bracket (fig. 37e) was recovered in the northwest quadrant. The specimen, which is fragmentary, was stamped from flat iron stock 0.1 cm. thick and is 3.7 cm. wide and 3.4 cm. long. The piece is rounded on one end and exhibits expanding convex shoulders on the other. There is a circular perforation 0.3 cm. in diameter on the rounded end, and a cruciform slot on the other. The fragment was bent on

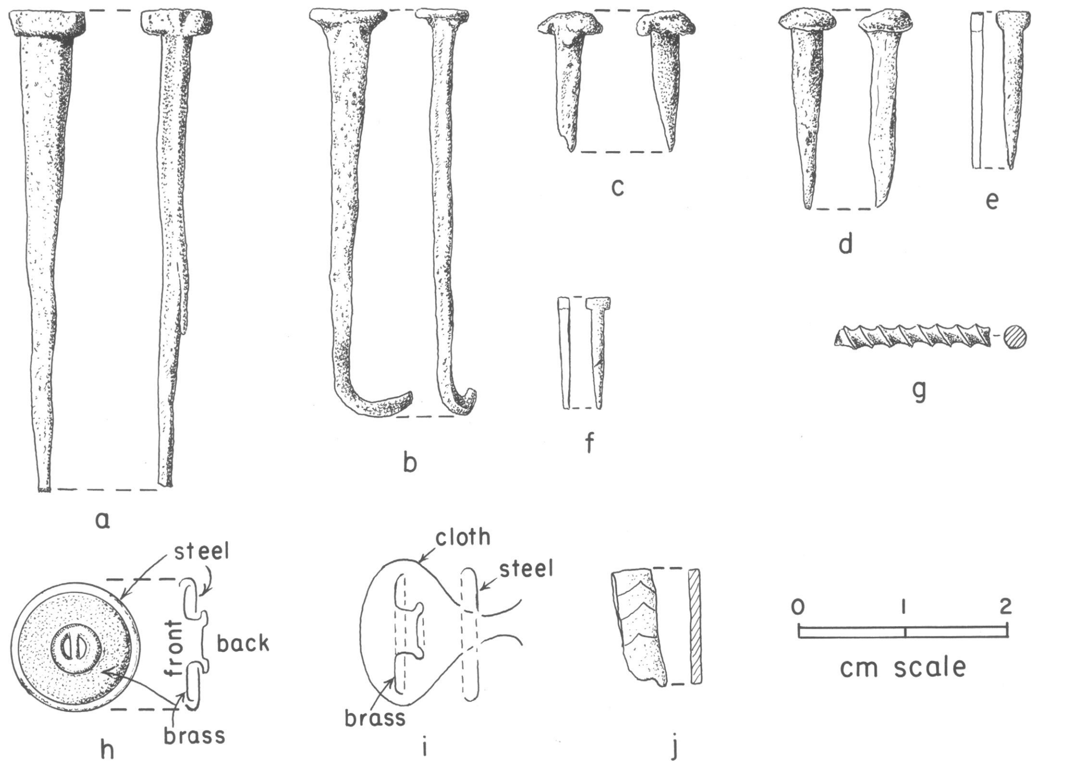

FIG. 38. Additional artifacts from house floor at the Flat Iron Ridge site. a-b: square-cut nails; c-d: round-headed, square-shanked tacks; e-f: large and small leather nails; g: leather screw; h: compound brass and steel button; i: exploded view of compound button showing relative placement of brass, clothes and steel components; j: incised bone artifact.

either end and was broken along the transverse segment of the slot.

Wire. Within the group of wire artifacts loops and shaped segments are distinguished from unmodified pieces. Five of the former were found. A section of wire 0.3 cm. in diameter, weighing 18.5 grams, and twisted back on itself to form a P-shaped outline was recovered in the northwest quadrant. The end nearest the curved section was hammered flat for a distance of 0.8 cm. along the shaft; the opposite end, which appears to have been broken by fatigue, exhibits use polish within 0.5 cm. of the termination. Two pieces, both 0.2 cm. in diameter, one from the northeast quadrant and one from the southwest quadrant, are twisted into spiral loops with an inside diameter of 0.5 cm. The former weighs 1.9 grams and is looped once; the latter weighs 3.4 grams and is looped three times. A piece of brass wire 0.3 cm. in diameter, weighing 21 grams and bent acutely twice to form a Z was found in the southeast quadrant. In addition, a section of fine wire 0.1 cm. in diameter with its ends joined to form an oval measuring 1.3 by 1.1 cm. was found in the northeast quadrant. Three other pieces of wire, all unmodified, were recovered in the southwest quadrant.

The function of most of these pieces is not clear: the specimen exhibiting use-wear may have functioned as an awl or perforator; the looped examples were almost certainly used as bindings or wrappings. Ambro (personal commun.) has noted that similar items are used to lash and secure willow-pole house frames in Grass Valley, just north of the Reese River Valley. The Z-twisted brass wire could have been used either as a fastener of some sort or alternatively, this piece could have served admirably as an earring or nose ring.

Harness Hardware. Harness hardware from the ring at Flat Iron Ridge includes a cinch ring (fig. 37f), recovered in the northwest quadrant. It is made from iron stock 0.8 cm. in diameter with an inside diameter measuring 8.8 cm. and an outside diameter measuring 10.4 cm.

Two rivets were also found. One brass specimen with a head measuring 1.2 cm. across, and a circular shank 2 cm. long, and tapering from 0.5 cm. next to the head to 0.4 cm. at the distal end was recovered in the southwest quadrant (fig. 37i). A second example made of iron was hollow-shanked and had a head measuring 0.7 cm. in diameter, and a shank 0.5 cm. in diameter, and 0.7 cm. long was found in the southeast quadrant.

Clothing

Buttons. Three types of buttons were found: glass, pearl, and metal. Three glass buttons were recovered. One white glass specimen measuring 1.2 cm. in diameter and 0.3 cm. thick with four perforations was found in the southwest quadrant. Two examples from the northeast quadrant were noted. One of these was made of a black iridescent glass and measured 1.0 cm. in diameter and 0.2 cm. thick and exhibited two perforations. The other was a large black fragment 2.0 cm. in diameter and 0.4 cm. thick which probably had four holes.

Two pearl buttons were found. One four-holed piece, plano-convex in section, and measuring 1.3 cm. in diameter and 0.2 cm. thick, was recovered in the northeast quadrant. The other was a two-holed specimen measuring 1.1 cm. in diameter and 0.1 cm. thick found in the northwest quadrant.

The two metal buttons (fig. 38h) were of a compound, slotted, and cloth-covered variety. In both cases a brass centerpiece with a raised and slotted center was inserted into a perforated steel disc with a short rim. During manufacture, the side of the brass component opposite the raised portion was covered with cloth and the excess passed through the perforation of the steel component (cf. fig. 38i). The raised section was then inserted in the perforation, and the cloth facing was stamped, causing the raised segment to expand and become permanently seated in the steel perforation. A complete button of the type described above was found in the southeast quadrant, and the brass portion of another specimen was recovered in the northwest quadrant. The raised portion of the latter exhibited fine impressions of a cotton-like machine-woven cloth; bits of a similar material protruded from the back of the complete piece.

Buckle. A single metal buckle or clasp of the type still found on yellow rubberized canvas raincoats was recovered in the southwest quadrant (fig. 37g). Its base measures 1.6 by 2.8 cm. It is square on one end and rounded on the other. A curved tongue pivots on a hinge formed at the straight end of the base. The clasp was attached to the garment using two transverse slots at the round end of the base. Originally, a deep U-shaped slot was cut in the straight end of the base, and the two resulting projections were rolled down, forming a pair of tubes centered on the same axis. The tongue component was attached to a pin passing through both tubes. The ring of slotted piece of metal usually placed on garments opposite these clasps was not recovered.

Shoe Leather and Hardware. A single piece of dried and badly cracked leather, probably from a shoe, was found in the southeast quadrant. One edge is serrated or was sewn and torn, giving a serrated appearance.

A total of 31 leather nails was found. They had been stamped from flat iron stock 0.1 cm. thick, have square heads, and willow leaf-shaped shanks. Two sizes were noted, those ranging from 1.6 to 1.7 cm. in length (fig. 38e), and those from 1.1 to 1.2 cm. long (fig. 38f).

Three pieces were identified as leather screws (fig. 38g). These are headless and pointless segments of threaded wire 0.2 cm. in diameter, with eight threads per cm. and ranging in length from 1.8 to 1.3 cm.

Beads. A total of 92 small glass beads, commonly called "seed beads," was recovered within the house ring and in a small anthill situated 1 meter north and west of the structure. The beads average about 0.2 cm. in diameter and 0.1 cm. thick. Table 3 presents the distributions and colors.

TABLE 3
Distribution of Glass Beads at Flat Iron Ridge

	NE	SE	SW	NW	Anthill	Total
Red transparent	0	0	0	3	4	7
Red transparent with white center	0	0	0	5	2	7
Pink	0	0	0	1	3	4
Clear	0	0	0	2	0	2
White	9	0	0	0	4	16
Yellow	1	0	0	2	2	5
Green (transparent)	0	0	0	1	0	1
Indigo blue (transparent)	0	1	0	8	0	9
Medium blue (opaque)	0	0	0	1	1	2
Baby blue (opaque)	5	1	0	13	13	32
Black	1	0	0	2	3	6
Purple	1	0	0	0	0	1
	17	2	0	41	32	92

Containers

A single can lid was found in the southwest quadrant. It measured 5.8 cm. in diameter, 1.3 cm. deep and was bent once along a single axis.

Two bottle glass fragments were recovered in the northeast quadrant. One of these is a purple rim specimen weighing 5.0 grams which exhibits three raised horizontal ribs. The other example represents one corner of an aqua-tinted bottle with walls 0.2 cm. thick. The joints and corners of this specimen have been beveled forming an octagon with four major and four minor sides when viewed in top section. The basal portions of the broad side and shallow side views are similarly shaped.

Firearms and Ammunition

Two brass shotgun shell bases, bearing the inscription "Conical Base, St. Louis Mo," were found in the northwest quadrant. These measure 2.2 cm. across the rim and 2.1 cm. across their walls and are 1.7 cm. high. The primer "pillar" within these pieces is 0.5 cm. in diameter.

Seven brass primers falling into two distinct types were noted. Six disc-shaped primers 0.5 cm. in diameter and 0.2 cm. tall were found, five in the southeast quadrant and one in the southwest quadrant. Each was expended, exhibiting circular firing pin impressions about 0.2 cm. across. These specimens match almost exactly the primers still in place in the two shotgun shell casings found in the northwest quadrant. In addition, a single column-shaped brass primer 0.4 cm. tall was found in the southwest quadrant. It was not expended.

A brass percussion cap with a serrated lip and a corrugated wall was recovered in the northwest quadrant. It measured 0.5 cm. across and 0.5 cm. tall.

A single piece of round lead shot 0.3 cm. in diameter and weighing 0.4 gram was recovered in the southwest quadrant. It is rolled slightly flat around one circumference.

A total of five pieces of lead weighing 34.8 grams was recovered. One of these specimens, recovered in the southwest quadrant (fig. 37h), was 8.6 cm. long, 1.0 cm. wide, and 0.6 cm. thick, and weighed 23 grams. It is icicle-shaped and sharpened to a point at one end, but bears no obvious signs of use-wear.

OTHER ARTIFACTS

Glass. Twenty-five pieces of aqua-tinted glass about 0.15 cm. thick and weighing a total of 7.2 grams were recovered. The specimens are of uniform thickness, and remnants of an unidentified type of "backing" material on some examples indicate that these are probably fragments of a single mirror.

Miscellaneous Metal. Several identified fragments of metal were recovered. Three small fragments of iron, subrectangular in outline and about 0.1 cm. thick were found in the northeast quadrant. Each exhibited a small perforation about 0.2 cm. across. Six pieces of metal foil (possibly lead) were recovered weighing a total of 0.8 gram, and a fragment of unidentified metal measuring 1.0 by 0.9 by 0.2 cm. was found in the southwest quadrant.

Debitage. A total of 30 pieces of chert chippage weighed 25 grams. Two pieces of glass debitage were recovered, one in the northeast, and the other in the southwest quadrants.

Ochre. A fragment of bright red ochre, weighing less than 0.1 gram, was found in the southeast quadrant.

Groundstone. In addition to the two large metates noted in the site description, two abraded gneiss fragments were found in the northwest quadrant. These may represent fragments of a portable grinding slab, as gneiss was frequently used for grinding stones.

Worked Bone. Two pieces of worked bone were noted. One fragment, found in the southwest quadrant, measured 1.2 by 0.2 by 0.4 cm., and is ground flat and polished on both sides (fig. 38j). Its intact edge is rounded in cross section and slightly convex in outline. The piece bears an incised three-line chevron on one face, and probably represents part of a decorated bone disc or gaming piece. Another specimen found in the northeast quadrant is of the same size and shape, but is not incised.

Faunal Remains. A total of 671 fragments of bone, representing individuals of cottontail (*Sylvilagus sp.*), jackrabbit (*Lepus sp.*), sheep (*Ovis sp.*), and two unknown birds was recovered. Of these, 617 or approximately 92 percent were charred (table 4). Since the house floor did not appear to have been burned, it is reasonable to assume that most of the specimens represent food remains. Pieces, which could not be positively identified according to species, were grouped into one of four classes based on the probable size of the individual. These are defined as follows: Class I. Squirrel-sized or smaller. Class II. Not larger than a jackrabbit. Class III. Not larger than a coyote or smaller than a badger. Class IV. Larger than a coyote; including mountain sheep, deer and antelope.

The distribution of faunal remains identified according to species, as well as those grouped by size, are summarized in table 5.

DISCUSSION

Dating. Artifacts of non-Indian manufacture

TABLE 4
Distribution of Faunal Remains from the House at Flat Iron Ridge

	NE	SE	SW	NW	Total
Class I					
Frequency	4	1	0	3	8
% Charred	75	100	0	100	88
Class II					
Frequency	162	11	9	59	241
% Charred	99	72	89	97	96
Class III					
Frequency	103	44	18	0	165
% Charred	100	100	78	0	97
Class IV					
Frequency	159	66	11	21	257
% Charred	100	65	64	19	97
Unclassified					
Frequency	46	0	0	13	59
% Charred	87	0	0	92	88
Total					
Frequency	496	128	47	110	630
% Charred	94	91	66	86	88

TABLE 5
Identifiable Faunal Remains from the House at Flat Iron Ridge

	NE	SE	SW	NW	Total	Individuals (minimum)
Small Bird (quail-sized)						
Frequency	0	0	0	1	1	1
% Charred	0	0	0	100	100	–
Large Bird (duck-sized)						
Frequency	1	0	0	0	1	1
% Charred	100	0	0	0	100	–
Sylvagilus sp.						
Frequency	2	0	0	1	3	1
% Charred	100	0	0	100	100	–
Lepus sp.						
Frequency	1	0	1	3	5	1
% Charred	100	0	66	60	0	–
Ovis sp.						
Frequency	18	6	4	10	38	1
% Charred	0	0	75	10	10	–

indicate that the house ring was occupied after historic contact. The first intensive European settlement of the area is marked by the founding of Austin in 1862; thus, the earliest use of the house at Flat Iron Ridge probably falls after this event. The date at which the structure was abandoned is less clear, however. The presence of both round and square nails provides some clues. Although round nails were produced as early as 1850, they did not become popular until the latter part of the nineteenth century. As square nails outnumber round nails at Flat Iron Ridge, we tentatively place the terminal occupation of the structure between A.D. 1880 and A.D. 1890. This estimate is supported by the presence of chipping waste within the house, since this activity disappeared rapidly following European contact, and is altogether absent in villages established after 1880 in Grass Valley (Ambro, 1972, p. 89).

Construction. The size, outline, and cross section of the house at Flat Iron Ridge are comparable with those noted for *Type I Shoshoni* houses, or "large structures with deep depression" of the historic period in nearby Grass Valley (Ambro, 1972). However, unlike the latter, the Flat Iron Ridge house exhibits a foundation constructed largely of rock, and its fill is devoid of any charred construction materials. Both the absence of charred materials in the center of these features, which would indicate the presence of a roof, and the presence of hearths lead Ambro to conclude that the examples noted in Grass Valley are unroofed brush windbreaks. Although this may be true in the case of the house at Flat Iron Ridge, alternative interpretations are possible. First, the presence of the hearth per se does not exclude the possibility that the structure was roofed. Smaller but equally flammable houses containing hearths are known in several parts of western North America (Longacre and Ayres, 1968; Steward, 1933). Further, if our hypothesis that the site was occupied in the winter months is correct, then it follows that only a roofed enclosure could provide sufficient protection from the cold. Unfortunately, with the exception of eight postholes, structural remains such as wooden beams and rafters, which might resolve some of these questions, were not preserved.

Distributions. Activity areas within the structure are based on observed distributions of artifacts (fig. 36). This procedure is complicated by the limited size of the sample and the fact that few artifact types, if any, are clearly localized in a given quadrant. Additional confusion results from the inferred discontinuity between Indian and Anglo functional application of certain historic artifacts, for example tin cans or jackknife springs. Together, these considerations render most conclusions tentative at best.

The initial analytical procedure involved rank-ordering the four quadrants according to the distribution of each artifact type, some 35 in all. These rankings were summarized in a graph for each quadrant (fig. 39). The curves depict the frequency with which a quadrant occurs in a given rank position relative to the other quadrants. It was assumed that special-use areas should exhibit bimodal curves, since artifacts related to the special function should be present in large numbers (high-rank mode), whereas other artifact types would tend to be entirely absent (low-rank mode). Alternatively, generalized work areas should exhibit single modes of medium to low-rank order, since artifacts present will reflect a large number of activities, few of them restricted to the work area alone. The results showed that graphs from the northeast and southeast quadrants were largely unimodal, the southwest quadrant curve was strongly bimodal, and that from the northwest quadrant was weakly bimodal. When the curves were compared, the Kolmogorov-Smirnov two sample test (Thomas, 1976, pp. 322-325) indicated that the northeast and southeast quadrants were indistinguishable from each other but that both differed significantly from the southwest quadrant. The northwest quadrant most resembled the southwest quadrant, but was within the statistically acceptable variation of both the southeast and northeast curves. These relationships are illustrated in the form of a Venn diagram in figure 40.

We interpret the northeast and southeast quadrants as generalized activity areas, the southwest quadrant as a specialized activity area, and the northwest quadrant as sharing characteristics of both. In general, the hearth and the faunal remains indicate that food preparation was a common activity in the east one-half of the ring. Further, the proximity to light admitted by the doorway would make this an ideal indoor work area during inclement weather. The large number of nails and tacks found in this part of the ring may derive from boards salvaged from white settlements and used as firewood. We attribute the large number of tools found exclusively in the *southwest* quadrant, as well as a variety of cartridge components and miscellaneous items including mirror fragments and unidentified bits of metal, to one or more cache bundles stored there. Moreover, because it lacks features and is situated well away from the door—making it one of the warmest parts of the house—suggests that the southwest quadrant may also have been used as a sleeping area.

The *northwest* quadrant apparently combines aspects of both generalized and specialized activity areas, and its function is less clear. As the locations of the quadrants were established without prior knowledge of the distribution of cultural remains, it was possible that the northwest quadrant had inadvertently included both types of activity areas. This implies that any items recovered in the northwest quadrant should be readily attributable to activities identified in either the east one-half or the southwest quadrant, the 17 beads found in the northeast quadrant and the 41 found in the northwest quadrant should belong to the same population:

	NE	NW	Total
Blue-green	5	23	28
White-colorless	9	5	14
Red-pink	0	9	9
Other	3	4	7
	17	41	58

Unfortunately, cell sizes in this table are too small for reliable statistical testing (Thomas 1976, p. 298). It appears, however, that the beads are drawn from two distinct populations, and on this evidence I reject the hypothesis that the northwest quadrant represents a mixture of the other excavation units. If it is assumed that the beads represent items lost from two separate pieces of clothing, and that activities in the northeast quadrant must have centered around female use of the hearth for food preparation, then the northwest quadrant may well represent a male activity area. This proposition is supported by a chippage scatter, and the comparatively large number of artifacts related to firearms found in the northwest quadrant. If the use of the area was restricted to males, as opposed to a general use by both sexes, this sex-linked

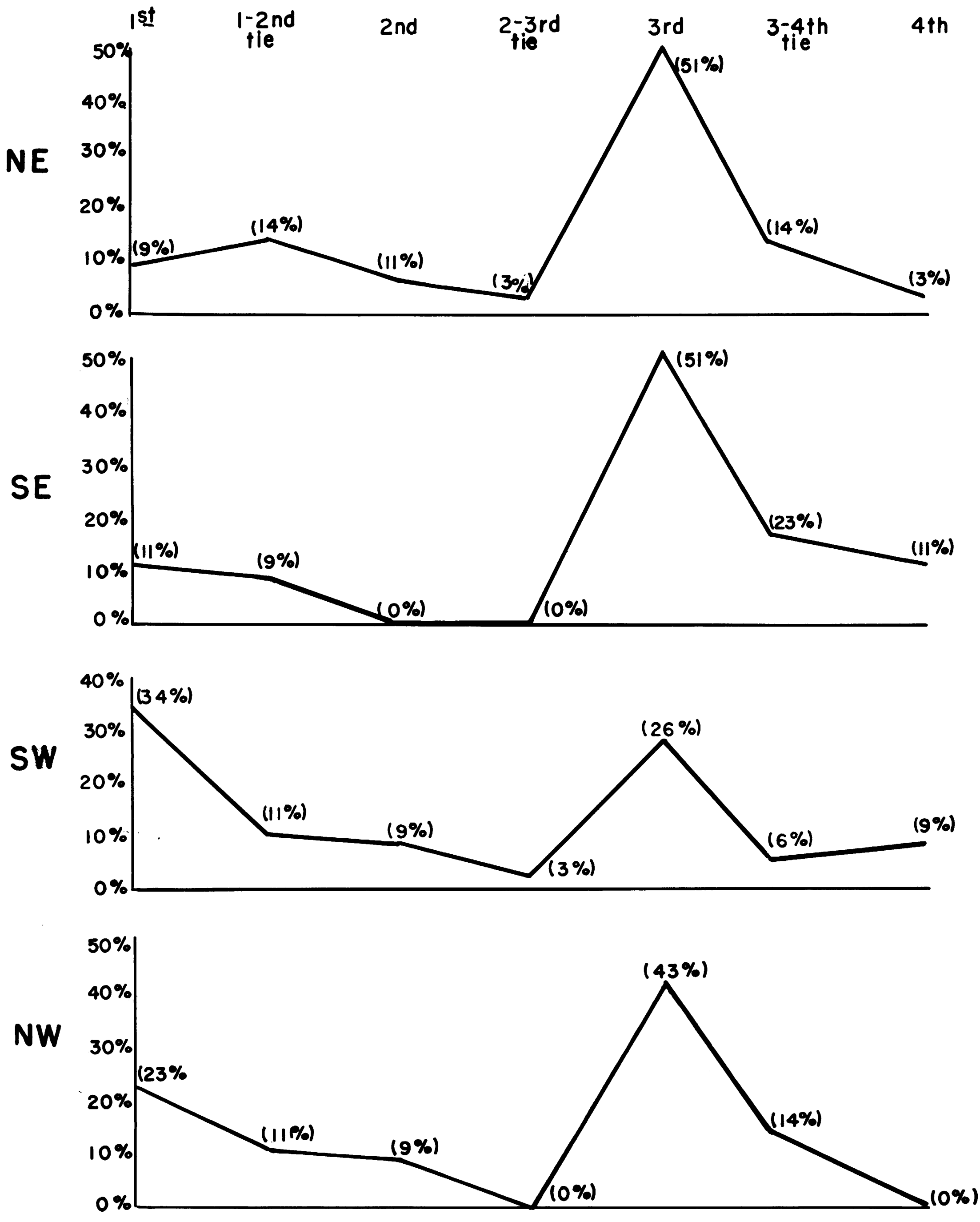

FIG. 39. Rank orderings of artifact types, by quadrant.

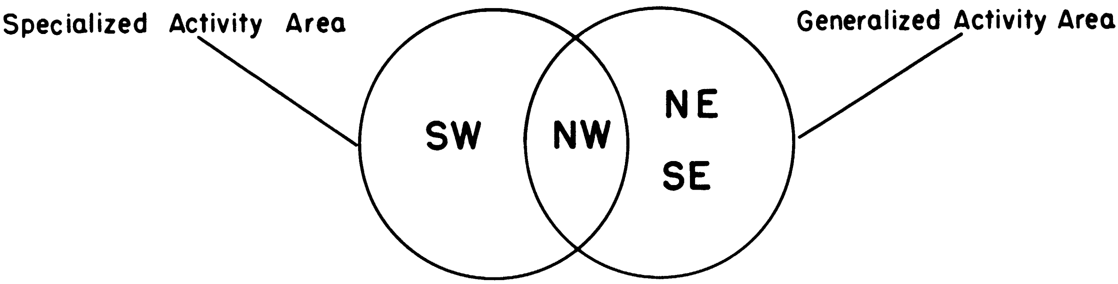

FIG. 40. Venn diagram indicating relationship of quadrants within house floor at Flat Iron Ridge.

activity specialization might account for the bimodality of its cumulative rank-order curve.

Population. It is difficult to determine the exact number of persons occupying the house at Flat Iron Ridge. The presence of a hearth and food remains probably indicate use by a stable social unit, no smaller than a nuclear family. Steward (1938, p. 240) estimated that the typical Great Basin household consisted of from six to 10 individuals. Using the smaller number gives a figure of about 3 square meters of floor space per person, which is roughly one-half the estimate of Cook and Heizer (1968) for California households.

Economy. Few of the items recovered from the Flat Iron Ridge house are helpful in reconstructing the subsistence and/or wage earning activities of the occupants. Ambro (1972) noted that during the post-contact period in Grass Valley many Shoshone associated themselves with ranches and worked there as washerwomen, housekeepers, ranch hands, and post-cutters. It is possible that the house at Flat Iron Ridge represents a seasonal camp established by such a post-cutter and his family. On the other hand, Gould (1969) noted that while large numbers of aborigines are aggregated around recently established white missions in Australia, a small number of families continue to isolate themselves from such settlements and pursue essentially native lifeways. I note in this regard, unlike excavated houses in Grass Valley, the example at Flat Iron Ridge exhibits evidence of a distinctly aboriginal activity, stone flaking, whereas it lacks the large and varied array of post-contact artifacts. The latter can be partially attributed to the distances between Flat Iron Ridge and other historic white settlements–the nearest, Mateo's Ridge, lies more than a mile to the east through broken terrain, whereas two others, a large town on Washington Creek and a smaller settlement on Upper San Juan Creek, are still farther away–but, in sum, the data presently at hand are most consistent when the house ring is interpreted as the winter camp of a small group of people, probably a nuclear family and one or two additional relatives, that chose to ignore the attractions of white settlements, and to exploit in a traditional manner those parts of the natural environment that had escaped the destructive effects of ranching and mining activities.

ADDITIONAL PIÑON ECOTONE SETTLEMENTS OF THE REESE RIVER VALLEY

DAVID HURST THOMAS, ALAN LEVENTHAL, AND LEONARD WILLIAMS

A total of 63 additional sites was located in the piñon ecotone survey (see figs. 2 and 3). For the most part, these sites consist of thin artifact and chippage scatters, frequently punctuated with stone circles and other features. The primary metric attributes of the 65 sites have been summarized in table 6. The short descriptions, although slightly repetitive, underscore the consistent, overall patterning that characterizes prehistoric piñon ecotone settlements in the Reese River Valley.

MICROTOPOGRAPHIC CHARACTERISTICS

26-NY-309 (D4) Newcomer's Bluff Site

The Newcomer's Bluff site is situated high astride the narrow-backed ridge separating San Juan Creek from Cottonwood Creek. Although three other prehistoric sites (Ny-326, Ny-327, Ny-328) lie immediately downhill, Newcomer's Bluff is the largest on the ridge. Ny-309 is situated directly uphill from San Juan Creek, but the steep climb takes about 20 minutes, and would be even more time-consuming and difficult for a person carrying any sort of burden. The site sits on a flat area some 75 meters wide (fig. 42). Chippage is scattered over most of the 150 meter length of the site, but the four well-defined stone circles are conspicuously confined to the western half of the flat area. It is also interesting to note that the rings are almost equidistant from one another, each lying 34-40 meters from its nearest neighbor. Furthermore, the stone rings are almost exactly the same size, each having an outside diameter between 4 and 6 meters (fig. 43). House rings A, C, and D each have a small rock cluster in the center which perhaps served to contain a fire hearth.

A concentration of pottery was found in direct association with a small cluster of stones near house ring B. This stone cluster might once have served as an outdoor hearth as house ring B lacks an inside hearth. *In situ* distribution of the sherds suggested that a single large pot had broken, perhaps upon the hearth stones.

Newcomer's Bluff is almost unique among the ecotone camps on the western slope of the Toiyabes because it is a single component site. The five typable projectile points (three Desert side-notched, two Cottonwood triangular) are all diagnostic of the Yankee Blade (post-A.D. 1300) phase. No historic debris was present at Newcomer's Bluff, although neighboring sites are typically littered with purple glass and decaying metal. This information, taken together with the fact that aboriginal pottery apparently postdates A.D. 1300 in the Great Basin, seems to place the Newcomer's Bluff site later than A.D. 1300, and probably earlier than 1860.

Another unusual aspect of Newcomer's Bluff is the relative abundance of black obsidian chippage lying on the surface of the ground. Nearly 50 percent of the chippage is obsidian, as were four of the five projectile points. Abundance of obsidian would rarely provoke comment elsewhere in the Great Basin, but obsidian is indeed uncommon in the Reese River area. Of the nearly 4000 lithic artifacts recovered in a systematic survey of the Reese River Valley (Thomas, 1973), fewer than 5 percent are made of obsidian.

26-Ny-310 (D10)

Situated at the mouth of Cottonwood Creek, Ny-310 consists of a lithic scatter extending approximately 400 meters along the first low, flat ridge to the south of the creek. The southern edge of the site ends abruptly as the flat ridge drops off into a ravine. The northwestern margin of the site borders a marsh created by meanders of Cottonwood Creek. The surface scatter is primarily chippage and seems to be clustered into rather distinct habitation areas. No features were located.

26-Ny-311 (D11)

Ny-311 is a large site nestled into a dry upland

FIG. 41. House ring A at Flat Iron Ridge following excavation. A cord marks the limit of the exposed floor. The figure is standing in the northeast quadrant, with the central hearth directly at her feet. A granitic metate is seen immediately to the right of the left elbow of the figure. Darkened areas along the margins of the house are probably post holes.

basin only a few hundred meters to the south of Ny-310. The vegetation at Ny-311 appears sparser than that on the surrounding slopes, perhaps because the site lies in the lee of a hill protecting it from northerly precipitation. Cultural debris is scattered over 10,000 square meters and extends nearly to the ravine separating this site from Ny-310; with the obvious exception of the Mateo's Ridge site, Ny-311 seems to be the most extensive site in the Cottonwood-San Juan Creek drainage. No features were located.

26-Ny-312 (D12)

This small site is one of a string of habitation

TABLE 6

Characteristics for 65 Piñon Ecotone Settlements (In Meters) of the Upper Reese River Valley, Nevada

Site No.	Field No.	Elevation above Sea Level	Percentage of Slope	Elevation above Valley Floor	Distance to Piñon-Juniper Ecotone	Nearest Potable Water: Distance	Nearest Potable Water: Source
Ny-307	D2	2164	7	97	1300	180	Cottonwood Creek
Ny-308	D8	2383	10	292	900	900	San Juan Creek
Ny-309	D4	2189	4	122	1400	250	San Juan Creek
Ny-310	D10	2092	5	30	100	100	Cottonwood Creek
Ny-311	D11	2116	5	49	800	100	Cottonwood Creek
Ny-312	D12	2128	5	152	500	800	Cottonwood Creek
Ny-313	D13	2152	5	176	900	800	Cottonwood Creek
Ny-314	D14	2140	10	106	300	1500	Cottonwood Creek
Ny-315	D15	2164	5	109	1000	500	San Juan Creek
Ny-316	D16	2164	10	158	600	400	San Juan Creek
Ny-317	D17	2140	10	134	600	350	San Juan Creek
Ny-318	D18	2140	1	73	600	700	San Juan Creek
Ny-319	D19	2134	2	67	900	800	San Juan Creek
Ny-320	D20	2140	15	73	700	900	San Juan Creek
Ny-321	D21	2134	20	64	900	600	San Juan Creek
Ny-322	D22	2128	10	286	900	500	San Juan Creek
Ny-323	D23	2116	5	73	300	1250	San Juan Creek
Ny-324	D24	2067	15	30	300	1500	Cottonwood Creek
Ny-325	D29	2164	3	97	1300	500	San Juan Creek
Ny-326	D30	2092	0	46	900	175	San Juan Creek
Ny-327	D31	2116	10	49	500	100	San Juan or Cottonwood Creek
Ny-328	D32	2140	10	73	400	200	San Juan Creek
Ny-329	D33	2146	8	79	700	100	Cottonwood Creek
Ny-330	D34	2213	13	146	60	65	Cottonwood Creek
Ny-331	D35	2237	5	195	400	750	San Juan or Cottonwood Creek
Ny-332	D37	2310	5	322	600	500	San Juan Creek
Ny-333	D38	2201	5	134	700	700	Cottonwood Creek
Ny-334	D39	2164	15	49	100	200	Washington Creek
Ny-335	D40	2174	6	106	800	400	Washington Creek
Ny-336	D41	2134	7	67	750	350	Washington Creek
Ny-337	D42	2092	5	24	0	200	Washington Creek

TABLE 6 – (*Continued*)

Site No.	Field No.	Elevation above Sea Level	Percentage of Slope	Elevation above Valley Floor	Distance to Piñon-Juniper Ecotone	Nearest Potable Water Distance	Nearest Potable Water Source
Ny-338	D44	2192	9	125	500	300	Washington Creek
Ny-339	D45	2189	7	122	600	400	Washington Creek
Ny-340	D53	2143	12	76	75	250	Cottonwood Creek
Ny-341	D54	2134	5	67	700	400	Cottonwood Creek
Ny-342	D55	2128	14	61	400	300	Cottonwood Creek
Ny-343	D56	2092	5	49	152	91	Cottonwood Creek
Ny-344	D57	2092	9	43	150	100	Cottonwood Creek
Ny-345	D82	2250	10	182	1200	300	San Juan Creek
Ny-346	D83	2219	8	128	1200	300	San Juan Creek
La-602	D25	2037	10	100	50	75	Washington Creek
La-603	D26	2101	10	49	200	250	Washington Creek
La-604	D27	2092	10	49	700	400	Washington Creek
La-605	D28	2128	3	61	250	400	Washington Creek
La-606	D43	2113	5	46	500	300	Washington Creek
La-607	D46	2140	8	24	70	150	Washington Creek
La-608	D49	2177	10	109	230	400	Washington Creek
La-609	D50	2158	10	97	350	800	Washington Creek
La-610	D51	2140	10	49	150	350	Washington Creek
La-611	D52	2140	14	91	100	300	Washington Creek
La-612	D63	2098	5.5	30	700	1200	Washington Creek
La-613	D64	2049	8	43	225	900	Washington Creek
La-614	D65	2067	10	61	900	1100	Washington Creek
La-615	D66	2116	10	97	900	1100	Washington Creek
La-616	D71	2092	5	24	400	100	Crane Creek
La-617	D72	2049	5	0	0	100	Crane Creek
La-618	D74	2116	4	46	300	120	Knox Creek
La-619	D75	2146	11	55	145	275	Knox Creek
La-620	D76	2189	15	205	100	150	Brewer Creek
La-621	D77	2237	11	122	400	500	Brewer Creek
La-622	D78	2213	20	91	600	450	Brewer Creek
La-623	D79	2189	15	122	400	400	Brewer Creek
La-624	D80	2215	10	99	200	20	Porter Creek
La-625	D81	2201	7	91	400	80	Porter Creek
La-626	D84	2128	2	61	400	400	Washington Creek

areas that dot the area south of Ny-311. Thirty meters from the end of the ridge (which drops off abruptly to the valley floor) is a single stone circle (approximately 3 meters in diameter); chippage and artifacts seemed to be constructed around the stone ring. About 30 meters uphill from this is a second stone circle (roughly 5 meters in diameter) covered by the collapsed remains of a wooden shack. The wooden structure dates from the historic period, but it is unclear whether the associated stone circle is contemporary with it.

26-Ny-314 (D14)

This small site lies immediately southeast of Ny-311 in a saddle of the ridge. Only light chippage was present, and few artifacts were located. A small depression on the northern margin of the saddle is ringed by several stones. We think this depression may represent a cache pit similar to those reported for the Western Shoshoni by Steward (1941). We would be hardpressed to demonstrate conclusively that this small feature was used aboriginally, however we simply remark that the location seems ideal for storing the piñon seeds available in the area in late fall.

26-Ny-315 (D15)

Ny-315 is a large, rambling site that lies approximately 300 meters to the southeast of Ny-314. Also situated on a saddle, Ny-315 could easily have been defined as two sites, since the artifact scatter divides into two relatively distinct clusters. Two overlapping stone circles lie adjacent to a modern fenceline that skirts the southwestern margin of the site. The southern sector of the site has markedly less cultural debris than the northern half, a curious situation if stone circles are "house rings," as is commonly assumed.

26-Ny-316 (D16)

Less than 50 meters to the north of Ny-315 lies another site. The ridge narrows at this point to roughly 35 meters in breadth, so the area of flat land suitable for dwelling is rather tightly

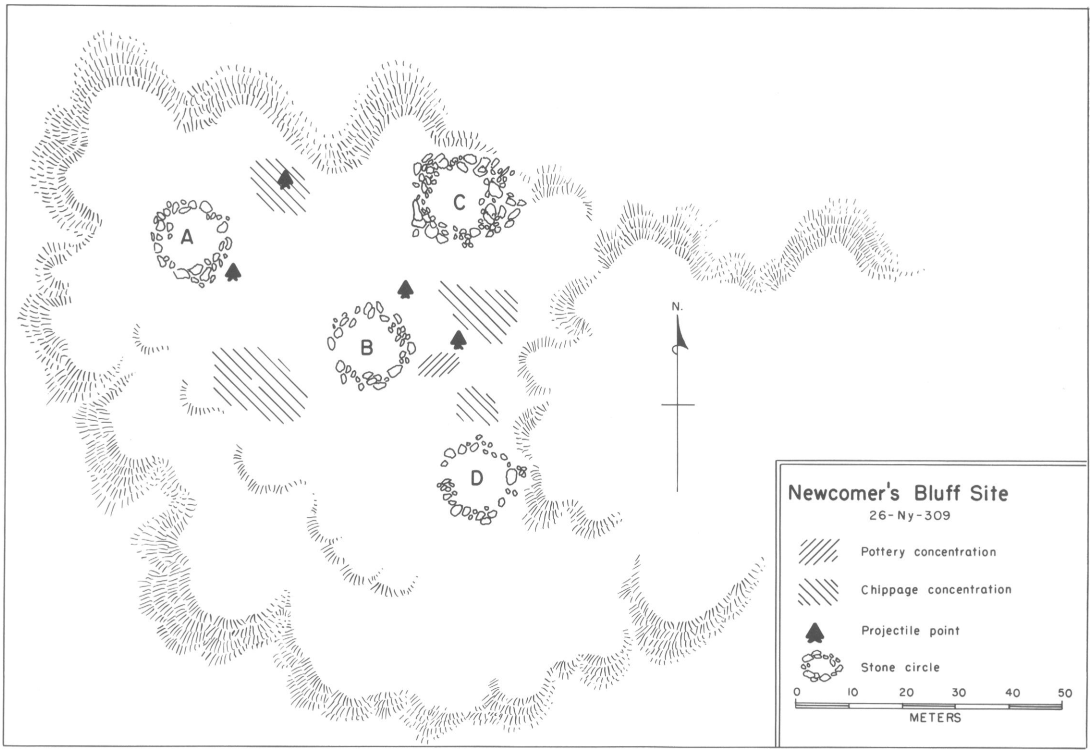

FIG. 42. Plan view of the Newcomer's Bluff site. Stone rings not to scale.

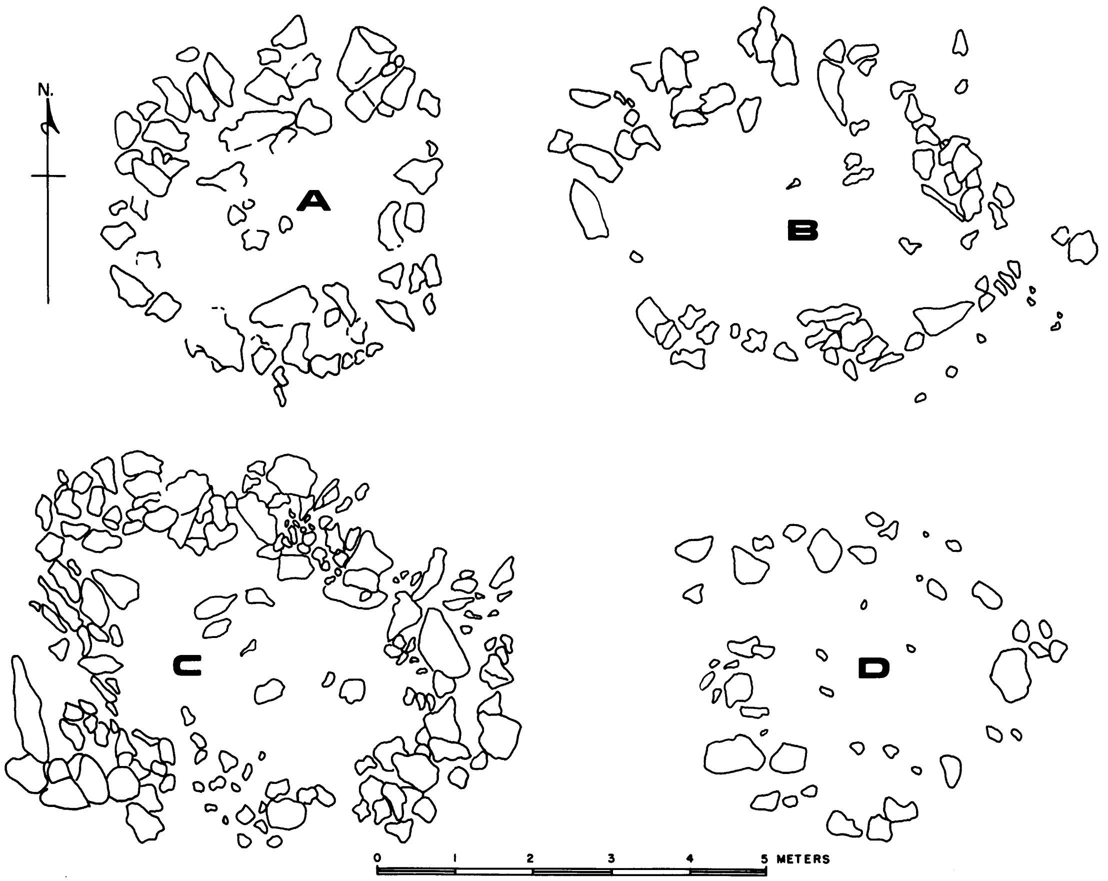

FIG. 43. Stone rings at the Newcomer's Bluff site.

circumscribed. Although the site covers only 2000 square meters, four stone circles were located. One pair (2 meters and 3 meters in diameter) are about 30 meters apart and lie at the westernmost margin of the site, almost overlapping Ny-315. The second pair of rings (3 meters and 5 meters in diameter), are situated at the eastern extreme of the site approximately 25 meters apart. The two pairs of rings thus lie at opposite ends of the site, perhaps some 50 to 60 meters from one another. Dozens of pottery sherds were collected within 10 meters of the eastern stone circles. The remaining artifacts from Ny-316 seem to suggest a single-phase occupation during Yankee Blade times (i.e., post-A.D. 1300).

26-Ny-317 (D17)

Ny-317 is a small site situated about 100 meters uphill from Ny-316. On the southern margin of the site—near the steep slope of the ridge—is a well-defined stone circle bordered by a second, less distinct rock ring. Near the circles is a pile of basketball-size stones arranged in a line. The function of this line is unknown, although Thomas and McKee (1974) have argued that somewhat similar features located about 30 miles to the north may have functioned as hunting fences. A moderate amount of debitage was scattered about, but chipped stone artifacts were totally absent.

We termed Ny-315, Ny-316 and Ny-317 separate sites because they were separated from one another by topographic barriers. This interpretation is open to contention, however, because the areas of cultural debris seem roughly contiguous. Whenever two areas of cultural debris were separated by a natural barrier, such as a ravine or a sharp rise, we felt justified in treating the areas as separate sites.

26-Ny-318 (D18)

Ny-318 lies to the south of and equidistant from Ny-314 and Ny-315. Two well-defined stone circles (4.2 meters and 4.0 meters in diameter) are present, as well as a sizable accumulation of broken stones which appear to have been fire-cracked. The fire-cracked rocks are about 15 meters from one of the rock rings. Two drills were found not far from the cracked rocks.

26-Ny-319 (D19)

Ny-319 consists of a single stone circle (3 meters in diameter) surrounded by scattered lithic debris. Ny-319 is situated on a steep ridge, 400 meters long, which widens at various intervals to form flat areas. The total effect is as a flight of steps, each flattened area a bit lower in elevation than the last. An archaeological site occurs on back of the flat area, Ny-319 is situated on the highest of the steps.

26-Ny-320 (D20)

Site Ny-320 is situated approximately 200 meters to the southwest of Ny-319, on a lower "step" down the ridge. Four stone rings are present (one 4 meters, two 3.5 meters and one 3 meters in diameter); each ring is separated from its nearest neighbor by 30 to 35 meters. The configuration is virtually identical to that noted for the Newcomer's Bluff site (Ny-309).

26-Ny-321 (D21)

Approximately 60 meters downhill from Ny-320 is a stone circle (3.5 meters in diameter) surrounded by a small scatter of lithic debris. The small flat area seems barely suitable for a single nuclear family.

26-Ny-322 (D22)

Approximately 50 meters down the ridge from Ny-321 is another flat area that hosts two adjoining stone circles and a 1000 square meter area of sparsely scattered chippage. The largest of the two circles has a diameter of about 5 meters; the smaller ring is actually semicircular (about 3 meters in diameter), and directly abuts the larger circle. If a brush or bark hut were constructed over the circles, the effect would be a two-room affair, with access to the smaller area through the main room.

26-Ny-323 (D23)

The lowest site on the ridge lies nearly 100 meters southwest of Ny-322; the ridge ends in a small, flat "step" approximately 300 meters square. There is a stone circle (2 meters in diameter) about 20 meters from the end of the ridge, and a light lithic scatter.

It seems quite possible that this feature served as a hunting blind rather than a house ring. The circle is somewhat smaller than the stone rings encountered elsewhere, and more stone appears to have been used in construction. The total effect is, therefore, a taller, yet less spacious stone structure. The topography is perfectly suited for a hunting blind, since the ridge fans out onto the valley floor at this spot. When driven uphill from the valley floor, game (such as deer or mountain sheep) would tend to converge on the stone ring. Unfortunately, at this point we have no reliable means of distinguishing between hunting blinds and house rings.

26-Ny-324 (D24)

On descending the "stepped" ridge at site Ny-323 and following a dry wash to the north, one eventually reaches a low saddle connecting a knoll to the ridge. At this spot Ny-324 is situated, consisting of a light scatter of chippage associated with two adjoining stone circles nearly identical to those at Ny-322. Ny-324 lies slightly outside the modern range of piñon and juniper trees, less than 10 meters from a dry creekbed.

26-Ny-325 (D29)

Ny-325 lies approximately 500 meters south of Ny-315, Ny-316, and Ny-317. The site is on a small knoll surrounded on all sides by steep slopes. A small quantity of chippage is directly associated with two well-defined stone circles. A second concentration of chippage lies a few meters to the west of the stone rings. The flakes in the second cluster are larger than usual and appear to be the same coarse rhyolite that occurs in large outcrops on the west side of the Reese River Valley.

26-Ny-326 (D30)

Ny-326 is situated on a low ridge separating Cottonwood and San Juan Creeks. The site is a difficult climb from either stream; the nearest creek is about 175 meters from the site. The flat area is less than 100 meters square and cultural material is sparse. There is a single stone circle (3 meters in diameter) at Ny-326. Historic debris is scattered over the ridge in this area.

26-Ny-327 (D31)

This site is only about 100 meters uphill from Ny-326, and consists of a flattened area comprising about 1000 square meters. On one side there is an abrupt drop to the Cottonwood Creek. A few lithic artifacts were found along with scattered chippage. A slight depression toward the center of the site suggests a deep house pit, or perhaps a large cache pit.

26-Ny-328 (D32)

Approximately 100 meters uphill from Ny-327 is another small site, Ny-328, situated on a flat portion of the ridge. Chippage is scattered over about 50 square meters and only a single projectile point was recovered. No features were present. We think that the large Newcomer's Bluff site, only 150 meters uphill from Ny-328, was probably the major site on this ridge in late prehistoric times. The artifacts from Newcomer's Bluff are strictly from the Yankee Blade phase (post-A.D. 1300), whereas those from the three lower sites are all earlier in time. The three small ridge sites seem to have been occupied during earlier times, the Newcomer's Bluff site after about A.D. 1300, and the lower sites once again in historic times.

26-La-602 (D25)

La-602 is situated near the mouth of Washington Creek, where a low ridge extends onto the valley floor far beyond the slope of the Toiyabe Mountains. The chippage extends for approximately 75 meters along the flat ridgetop, which at times expands to 30 meters in width. The western edge of the ridgeline gradually slopes onto the valley floor, and the eastern margin tilts up abruptly to the flat area containing site B-32-1, recorded during the 1969-1970 Reese River random survey. Two adjacent stone circles are just a few meters from the steep eastern slope. Grinding stones were found as well as numerous broken lithics.

26-La-603 (D26)

On the ridge to the south of La-602 is La-603. Although the flat area is more than 7800 square meters, the chippage scatter was light and spotty. The ridge is bounded on three sides by steep slopes that drop off to Washington Creek and a small dry wash. La-603 is situated at the end of the ridge and affords an excellent view of both the valley floor and the small meadow at the mouth of Washington Creek. No features were located.

26-La-604 (D27)

This site lies on a small ridge approximately 100 meters to the south of La-603, and consists of very light chippage scattered over nearly 1300 square meters. The number of whole lithic artifacts found was much greater than might be expected given the sparse chipping waste. No features were present.

26-Ny-331 (D35)

A poorly defined stone circle occurred just upslope from a light concentration of chippage scattered over about 100 square meters. The site is more than 700 meters from the nearest permanent water source.

26-Ny-332 (D37)

A small stone circle sits atop a small peak overlooking both the San Juan and Cottonwood creeks. In 1968, two projectile points were found just downslope from the stone ring. The paucity of chippage, the small diameter of the ring, and the remoteness of this rather small peak once again suggests that Ny-332 may have been a hunting blind rather than a habitation site.

26-Ny-334 (D39)

This site lies approximately 200 meters to the south of the large meadow and marshland formed by Washington Creek. Chippage occurs in scattered patches, and no discernible features were present, although several stone tools were recovered. In 1956, when the USGS topographic map was published, this spot was outside the piñon-juniper treeline. But when we surveyed the site in 1971, the treeline extended at least 100 meters beyond the northern border by Ny-334.

26-Ny-335 (D40)

Although this site covers fewer than 1200 square meters, a large quantity of cultural debris (both artifacts and debitage) was discovered. The site is quite similar in form to the Mateo's Ridge site (Ny-307) in that the cultural debris sits astride a large saddle between two sloping peaks. No features of historic debris were present.

26-Ny-337 (D42)

Like both Ny-307 and Ny-335, this site sits on a saddle. Dozens of broken lithics and ample chippage are spread over an area at least 200 by 100 meters. No features were located.

26-La-606 (D43)

La-606 lies on a long narrow ridge some 50 meters north of Ny-337. A thick stand of piñon and juniper trees covers the apex of the ridge. On the east/west boundaries of La-606 a fairly steep drop-off occurs. Abundant lithic debris constitutes the only evidence of occupation.

26-Ny-338 (D44)

Site Ny-338 is situated directly behind the last remaining building of the historic town of Washington. The site runs along a well-defined ridge, which is flanked by dry washes on the north and south. Although no stone circles or other apparent structures were noted, a moderate amount of chippage was scattered over most of the site.

26-Ny-339 (D45)

Approximately 100 meters from the northern boundary of Ny-338 is another flat ridge containing a variety of lithic tool fragments. The western boundary slopes rather rapidly toward Washington Creek and the surrounding marsh area. Its close proximity to the marsh and creek suggests a tool manufacturing and hunting station.

26-La-608 (D49)

La-608 lies at the fork of two major dry drainages, approximately 600 meters due east of Washington Creek. Here the meadow/marsh reaches its widest point. The site is on a sloping ridge and covers only about 1500 square meters. Small amounts of whole and fragmented lithic tools make up the total debris of this site. No features were noted.

26-La-609 (D50)

Of the seven sites in this immediate area, La-609 is the smallest. Like La-608, the site is on a sloping ridge with a small scatter of chipping debris and some tool fragments.

26-La-610 (D51)

Approximately 100 meters downslope from La-609 a heavy scatter of chippage waste was concentrated on the eastern margin of the ridge.

26-La-611 (D52)

La-611 almost overlaps onto La-610 and a small dry drainage course is the only feature that separates the two. This site is on a fairly steep ridge with continuous chippage scatter along the east/west axis.

26-Ny-340 (D53)

Ny-340 is one of five sites (Ny-341, Ny-342, Ny-343, Ny-344) on a long, relatively flat ridge that extends some 800 meters east from the confluence of the San Juan and Cottonwood creeks. It is almost to the highest point above Mateo's Ridge, which lies 250 meters on the south slope of the ridge. Small amounts of chippage cover the site and a barbed-wire fence bisects the site from north to south. No features were found.

26-Ny-341 (D54)

This small site has relatively easy access to Cottonwood Creek on its southern boundary and a dry drainage which connects to Washington Creek. A variety of points were found at this site, but chippage scatter was minimal.

26-Ny-342 (D55)

Site Ny-342 consists of little more than a small amount of localized chippage debris. It is just 50 meters downslope from Ny-341 and access to Cottonwood Creek is relatively easy. No features were located.

26-Ny-343 (D56)

Site Ny-343 lies directly across Cottonwood Creek from the Newcomer's Bluff site (Ny-309). A heavy lithic scatter was recorded for the site with several biface fragments included.

26-Ny-344 (D57)

This is the last of the five sites along this long ridge. Situated at the tip of the ridge, Ny-344 overlooks both the San Juan and Cottonwood Creeks. Very little cultural debris was collected from this site and no features were found.

26-La-612 (D63)

At the mouth of Leon Canyon, approximately 700 meters from the piñon-juniper/sagebrush ecotone, La-612 is situated on a large flat ridge that narrows from 100 meters at its eastern boundary to only 20 meters at its western boundary. Lithic material, mainly chippage, is very lightly distributed over the 600 meter length.

26-La-613 (D64)

La-613 lies about 500 meters west of La-612 on the same ridge. The southern boundary slopes sharply into the ephemeral drainage of Leon Canyon. The remaining boundary lines diffuse into the heavy stand of piñon and juniper trees. No features were noted.

26-La-614 (D65)

This site lies more than 500 meters to the north of La-612 and Leon Canyon. It is in the piñon-juniper zone but more than 1100 meters away from Washington Creek, the nearest water source. The site is quite small.

26-La-615 (D66)

Some 30 meters up from La-614, and separated by a noticeable rise, is a small site on the narrow crest of the ridge. The only indication of habitation is a rather sparse amount of stone chippage.

26-La-616 (D71)

La-616 is situated on the south ridge of Crane Creek in a thick piñon-juniper forest. The site is one of the largest found in the area. It is characterized by a dense scatter of chippage and large array of chipped stone artifacts. The site extends roughly 250 meters by 600 meters. No features were noted.

26-La-617 (D72)

Just below La-616, on the same ridge, is another fairly large site. The break in cultural debris between the sites was easily discernible. The site commences in the foothills, approximately 200 or 300 meters wide, and pinches rapidly as it fingers down the ridge onto the alluvial fan. Chipped stone projectile points were the primary cultural evidence noted.

26-La-618 (D74)

Knox Creek is about 1000 meters north of Crane Canyon and La-618 is situated on the southern upland site of the creek which forms a narrow flat ridge. This site covers only about 2500 square meters.

26-La-619 (D75)

About 110 meters east of La-618, toward the mouth of Knox Canyon, lies La-619. It is on the tip of a steep sloping ridge just up from the intersection of Knox Creek to the north and a dry drainage canal on the south.

26-La-620 (D76)

Brewer Canyon is flanked on the south by a well-defined ridge. Piñon and juniper trees are abundant but confined mainly to the ridge, finally fingering onto the valley floor. A sizable collection of chipped stone artifacts was found on La-620.

26-La-621 (D77)

La-621 is situated across a dry creek, approximately 40 meters above La-620. The site is situated in a similar topographic locale as Ny-344 and La-619. Two dry drainage systems converge just down the western end of the ridge. The site contained an assortment of lithic tools, but no features were found.

26-La-622 (D78)

A small scatter of chippage waste was present at this site, which is directly across the Brewer Canyon from La-620.

26-La-623 (D79)

This site sits on a steep sloping ridge point somewhat higher than the two drainage systems that converge at the western base of the ridge. At the outer extremes of the site, the drop-off tends to occur rather rapidly. A variety of lithic artifacts was found, but no features were present.

26-La-624 (D80)

La-624 is one of two sites in Porter Canyon. The site is quite small but contained a large amount of chippage waste. No features were found.

26-La-625 (D81)

A second site is situated on the same ridge some 500 to 600 meters from the mouth of Porter Canyon. Heavy amounts of chippage were concentrated at the eastern and western extremes of the ridge.

26-Ny-345 (D82)

Ny-345 is a very small site on a ridge high above San Juan Creek on the south side. Access from the creek to the site is most difficult. At the southern extreme of the site is a series of rocks which may represent a house ring. Little chippage was found.

26-Ny-346 (D83)

On the eastern slope of Ny-345, about 100 feet below, Ny-346 is represented by a series of three stone rings spread across the 50 meter length of the site. A small rock outcrop occurs on the western margin some 10 meters from the first stone ring. The second stone ring occurs about 8 meters east of the first, and 20 meters east of that lies the third ring. Each ring was 4 to 6 meters in diameter and contained chippage debris, stone projectile points, and bifacial tools.

26-La-626 (D84)

La-626 is an extensive site comprised of thinly scattered chippage the full length, with a quantity of stone projectile points littered about. The site runs east/west along a fairly deep dry wash about 500 meters south of La-603. Its 500 meter length is dissected by a wire fence erected by local ranchers. No features were found.

ARTIFACTS FROM THE PIÑON ECOTONE SITES

All artifacts found on these piñon ecotone sites are grouped together for illustrative purposes. Variability between and within individual sites are considered subsequently.

Projectile Points. A total of 211 typable projectile points was recovered from the 63 piñon ecotone sites. These points have been classified by the criteria considered earlier for Mateo's Ridge.

Pinto Series		22
Elko Series		82
Elko Corner-notched	42	
Elko Eared	19	
Elko Contracting Stem	16	
Elko Side-notched	3	
Untyped Elko	2	
Humboldt Series		27
Humboldt Basal-notched	5	
Humboldt Concave Base-A	9	
Humboldt Concave Base-B	13	
Eastgate/Rose Spring Series		53
Eastgate Expanding Stem	15	
Eastgate Split Stem	2	
Untyped Eastgate	1	
Rose Spring Corner-notched	30	
Rose Spring Contracting Stem	4	
Rose Spring Side-notched	1	
Cottonwood Series		9
Desert Side-notched		16
Northern Side-notched		2
Total Projectile Points		211

Each of these artifacts is illustrated in figures 44 through 51, and the metric variates are given on table 7.

Considered strictly as time markers, the projectile points once again suggest a 5000-year temporal span for the piñon ecotone settlements.

Cultural Phase	Time Range	Number of Projectile Points
Devils Gate	3000 B.C.– 1500 B.C.	22
Reveille	1500 B.C.– A.D. 500	82
Underdown	A.D. 500– A.D. 1300	53
Yankee Blade	A.D. 1300– historic	25

These chronological implications must once again be interpreted only in the most general manner, but it is of interest to note how closely the temporal distributions of these 63 sites parallel those at the Mateo's Ridge.

Additional Artifacts. No attempt was made to systematically collect any artifacts other than projectile points in the piñon ecotone survey. Bifaces, drills, and other artifacts were collected only in a haphazard manner. The attempt was to recover as large a range of artifacts as possible from piñon ecotone sites. Grab samples such as these are useful only for gross descriptive purposes and cannot assist in reconstructing relative tool frequencies.

A great variety of bifacial implements was present at most sites. Broken knife fragments occurred with some regularity, and several of these are illustrated on figures 52 and 53. A number of artifacts thought to be incomplete knife blanks or preforms were also recovered (fig. 54) as were several large, crude quarry roughouts (fig. 55). Had time permitted, we could have collected literally thousands of biface fragments from these sites.

Although not nearly so common as bifaces, unifacial tools appeared from time to time (fig. 56), and several well-made drills were discovered. Sometimes drills occurred in concentrations of two or three to a site (fig. 57).

Pottery is never abundant in the central Great Basin, but sherds sometimes occur in late archaeological sites. Two of the piñon ecotone settlements produced limited quantities of potsherds.

TABLE 7

Attributes for Projectile Points found at Reese River Piñon Ecotone Camps

(Mateo's Ridge site excluded, see Table 1).

Variates in parentheses are estimates for broken artifacts.

Spec. No.	Site	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR2061	Ny318	ES-N	(29.0)	(23.7)	(14.5)	(14.5)	4.1	205	160	.8	2.0	Rhyolite
RR2062	Ny336	DS-N	(20.8)	(17.6)	(12.6)	(12.6)	2.6	240	200	.4	.5	Chert
RR2063	Ny336	PS	(35.9)	(32.4)	(35.0)	(26.0)	5.4	190	110	4.6	4.9	Rhyolite
RR2065	Ny336	EE	(43.7)	(41.2)	22.9	18.7	4.3	160	140	2.5	3.5	Rhyolite
RR2067	Ny336	EC-N	(41.8)	(41.8)	22.0	19.1	4.4	140	120	2.7	3.7	Silicified rhyolite
RR2070	Ny336	EC-N	(27.2)	27.2	(22.8)	15.8	4.1	180	170	1.5	3.0	Silicified rhyolite
RR2071	Ny336	EC-N	(46.6)	(44.3)	(28.4)	(16.2)	4.9	165	110	3.3	6.0	Banded rhyolite
RR2073	Ny336	DSN	(21.7)	(18.2)	(11.9)	(11.9)	3.1	200	165	.5	.6	Chalcedony
RR2074	Ny336	PS	(42.0)	(38.7)	(24.8)	19.6	7.0	205	110	2.9	4.0	Banded rhyolite
RR2075	Ny336	PCS	(48.5)	(48.5)	23.5	6.8	5.3	140	70	4.1	5.2	Chert
RR2077	Ny336	PC-N	(51.2)	(51.2)	24.8	17.7	4.9	165	140	3.8	5.0	Basalt (?)
RR2080	Ny311	HB-N	(57.4)	(48.7)	21.4	21.4	5.8	NC	NC	3.7	5.4	Chert
RR2092	Ny328	PS	(52.8)	(49.2)	21.9	(13.5)	5.4	200	110	3.5	6.2	Opal
RR2095	Ny329	DSN	(24.6)	(24.6)	10.5	9.4	3.5	180	150	.8	1.1	Chalcedony
RR2097	La626	ES	–	–	20.1	–	3.6	120	≃100	2.0	>3.0	Obsidian
RR2098	La626	PS	(41.4)	(40.7)	16.4	16.4	7.1	240	130	2.7	4.7	Obsidian
RR2099	La626	EC-N	(45.7)	(43.4)	(26.0)	(16.0)	5.4	150	130	4.3	4.9	Rhyolite
RR2100	La626	RSC-N	(32.0)	(32.0)	19.5	9.4	3.7	150	130	1.5	2.3	Silicified rhyolite
RR2101	La626	EES	(31.3)	(31.3)	(20.0)	(20.0)	3.6	100	90	.9	1.7	Chert
RR2102	La626	EC-N	(37.0)	(37.0)	25.8	15.2	5.7	150	150	4.2	4.5	Chalcedony
RR2103	La626	EE	(32.8)	(30.4)	(25.7)	16.7	4.8	170	120	2.6	3.0	Chert
RR2104	Ny315	PS	(46.7)	(42.7)	(27.6)	(14.7)	4.4	160	80	2.5	5.7	Chert
RR2106	Ny315	PS	(47.8)	(42.7)	(24.6)	16.1	6.0	190	100	4.7	5.7	Opal
RR2109	Ny315	EES	(35.0)	(35.0)	(19.9)	8.9	2.5	110	80	1.5	2.6	Chalcedony
RR2110	Ny315	HCB-B	(36.1)	(34.5)	15.4	12.3	4.9	NC	NC	2.0	2.6	Rhyolite
RR2120	Ny311	RSC-N	(30.1)	30.1	12.6	7.4	3.0	150	130	.8	.8	Chalcedony
RR2133	Ny311	EE	(36.8)	30.0	(21.1)	19.4	5.5	190	160	1.4	3.0	Chalcedony
RR2134	Ny311	EC-N	(46.7)	(46.0)	(23.0)	13.4	5.0	170	120	2.7	3.4	Silicified rhyolite
RR2135	Ny311	EC-N	(40.1)	(40.1)	17.8	12.9	4.9	170	150	1.6	3.6	Chert
RR2146	Ny311	ES-N	(34.5)	(34.5)	17.4	16.4	4.6	180	210	2.2	3.0	Basalt
RR2148	Ny311	RSC-N	(39.2)	(37.6)	16.4	(11.6)	5.1	165	120	2.0	2.9	Chert
RR2150	Ny311	EE	(33.8)	(32.0)	(17.1)	17.1	4.5	NC	160	.7	3.0	Chalcedony
RR2156	Ny311	RSC-N	–	–	12.0	–	3.2	190	90	.7	1.0	Rhyolite
RR2162	Ny311	EE	(35.1)	(32.4)	(26.7)	(15.7)	4.4	170	130	2.7	2.9	Opal

TABLE 7 – (*Continued*)

Spec. No.	Site	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR2167	Ny311	HCB-B	(27.2)	(26.4)	13.0	11.5	2.3	NC	NC	.7	1.1	Chalcedony
RR2176	Ny344	EC-N	(53.7)	(53.7)	(24.3)	18.1	4.4	170	150	3.4	5.8	Rhyolite
RR2177	Ny344	EC-N	(43.6)	(43.6)	(27.4)	17.0	4.0	140	120	2.3	4.8	Silicified rhyolite
RR2180	Ny340	EE	(53.1)	(49.6)	(22.3)	(16.1)	5.9	(160)	(120)	3.8	4.6	Chert
RR2182	Ny340	EC-N	(44.5)	(44.5)	(21.8)	15.5	4.3	160	135	3.4	4.9	Chert
RR2183	Ny340	EE	(42.6)	(39.5)	24.5	20.4	4.0	155	115	2.2	3.7	Silicified rhyolite
RR2184	Ny340	HCB-B	(34.6)	(32.0)	(12.6)	(12.6)	5.1	NC	NC	1.7	2.2	Silicified rhyolite
RR2186	Ny340	HCB-A	(47.3)	(41.0)	(21.4)	(18.7)	3.3	NC	NC	1.3	3.0	Silicified rhyolite
RR2187	Ny340	RSC-N	(34.8)	(34.3)	(19.8)	7.9	3.7	150	110	1.5	2.5	Opal
RR2188	Ny340	RSC-N	26.6	26.6	(21.0)	10.5	3.6	180	105	1.9	2.0	Chalcedony
RR2189	Ny340	HCB-A	(45.5)	(43.8)	19.8	9.9	6.6	NC	NC	5.5	5.7	Chalcedony
RR2190	Ny340	CT	(39.6)	(38.0)	14.5	13.7	3.2	NC	NC	.5	1.5	Silicified rhyolite
RR2193	La606	EC-N	(40.0)	(40.0)	(34.2)	(20.9)	5.2	180	160	1.5	3.7	Obsidian
RR2195	La606	ECS	(44.0)	(44.0)	(21.7)	7.5	6.1	170	80	4.0	5.2	Chert
RR2196	La606	EES	33.6	33.6	26.3	9.5	4.3	140	100	2.2	2.2	Silicified rhyolite
RR2197	La606	ECS	(60.7)	(60.0)	(29.4)	8.0	4.0	190	70	2.6	4.2	Chert
RR2198	La606	HCB-A	(62.3)	(49.5)	(28.4)	(23.0)	5.7	NC	NC	1.9	6.2	Quartzite
RR2199	La606	PS	(45.8)	(39.6)	26.3	(22.1)	4.9	190	110	3.4	4.4	Rhyolite
RR2201	La606	RSC-N	(33.7)	(33.7)	(17.6)	(13.5)	4.7	150	105	2.1	2.3	Opal
RR2202	La606	RSC-N	(26.3)	(26.3)	18.8	7.9	3.0	150	130	1.1	1.2	Opal
RR2203	La606	ECS	(36.3)	(36.3)	(22.5)	8.8	5.3	150	30	2.4	>3.0	Opal
RR2204	La606	EC-N	(44.4)	(44.4)	(26.8)	11.0	3.9	150	110	2.3	3.3	Silicified rhyolite
RR2210	La606	PS	(42.2)	(36.0)	21.1	18.2	4.9	200	130	4.2	4.8	Chalcedony
RR2212	La606	EE	(40.0)	(37.8)	(24.1)	17.7	4.3	160	135	1.9	3.5	Rhyolite
RR2215	La606	PS	(53.7)	(50.9)	29.0	13.3	8.2	180	120	7.7	8.2	Banded rhyolite
RR2220	La606	EC-N	(36.7)	(35.5)	(20.6)	13.5	4.8	165	150	1.7	>3.0	Chalcedony
RR2221	La606	PS	(41.4)	(39.8)	25.0	(18.5)	5.0	230	140	2.5	3.5	Chalcedony
RR2228	La606	ECS	(39.6)	(39.6)	(18.2)	7.0	6.7	175	85	2.8	3.2	Chalcedony
RR2229	La606	HCB-A	(36.3)	(31.4)	15.2	13.0	4.7	NC	NC	1.0	1.8	Opal
RR2230	Ny341	RSC-N	19.9	19.9	10.7	7.6	3.2	190	110	.7	.7	Rhyolite
RR2231	Ny341	RSC-N	(26.9)	(26.9)	13.1	6.9	3.6	160	120	1.7	1.8	Rhyolite
RR2232	Ny341	EES	(44.3)	(44.3)	17.3	7.4	3.7	130	100	2.5	3.3	Banded rhyolite
RR2234	Ny341	HCB-N	(42.5)	(37.0)	30.5	30.5	3.9	NC	NC	1.5	5.0	Chalcedony
RR2235	Ny341	RSC-N	(32.7)	(32.7)	22.1	10.2	2.9	140	110	1.1	3.0	Chalcedony
RR2237	Ny341	EC-N	(33.6)	(33.6)	(24.0)	9.6	4.4	175	150	1.4	2.6	Chalcedony
RR2239	Ny341	ECS	(31.7)	(31.1)	(25.0)	11.0	6.8	160	85	3.0	3.1	Rhyolite

TABLE 7 – (*Continued*)

Spec. No.	Site	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR2340	Ny341	PS	(38.7)	(36.7)	(20.0)	13.4	5.0	190	110	2.5	2.7	Rhyolite
RR2242	Ny341	PS	(38.6)	(33.4)	(20.5)	11.8	4.2	200	110	.8	2.0	Chert
RR2243	Ny341	ECS	(36.3)	(36.3)	24.1	13.0	5.2	180	90	5.2	5.4	Silicified rhyolite
RR2244	Ny338	DSN	28.7	28.2	16.4	16.4	3.5	200	190	1.0	1.0	Chalcedony
RR2245	Ny338	PS	(47.3)	(40.3)	(26.2)	21.2	5.5	180	100	3.7	4.0	Rhyolite
RR2246	Ny338	PS	(37.5)	(32.8)	(21.6)	11.5	5.5	185	100	3.8	4.0	Chalcedony
RR2248	Ny338	ECS	–	–	–	–	–	–	–	–	–	Chalcedony
RR2250	Ny338	EC-N	(41.5)	(40.0)	(26.0)	11.9	4.0	130	105	2.3	>3.0	Rhyolite
RR2251	Ny339	RSCS	34.1	34.1	16.4	7.8	4.4	160	90	2.1	2.1	Silicified rhyolite
RR2252	Ny339	EE	(33.4)	(30.5)	(23.4)	(12.6)	6.0	150	110	3.0	3.5	Banded rhyolite
RR2255	Ny339	RSC-N	(31.9)	(31.9)	19.0	7.9	3.8	190	130	.6	2.2	Chalcedony
RR2258	Ny339	PS	(47.8)	(46.5)	19.3	9.2	7.2	220	80	5.8	6.0	Silicified rhyolite
RR2261	La607	RSC-N	(27.9)	(27.9)	(16.7)	8.0	3.9	175	120	1.2	1.6	Chalcedony
RR2262	La607	HCB-B	(41.1)	(39.6)	16.1	14.3	5.2	NC	NC	2.3	2.5	Chalcedony
RR2263	La607	PS	(45.5)	(40.2)	22.8	(20.3)	4.7	205	130	2.3	3.0	Opal
RR2265	La608	RSCS	(27.3)	(26.9)	18.0	(7.9)	3.2	150	100	.9	1.1	Chert
RR2266	La608	ESS	(28.3)	(27.0)	19.6	7.8	4.1	140	110	1.6	1.9	Silicified rhyolite
RR2268	D-58	PS	31.3	28.6	17.6	13.2	6.3	220	100	3.2	3.2	Chalcedony
RR2271	La612	RSC-N	(32.6)	(32.6)	18.3	10.3	3.5	150	130	1.5	1.7	Opal
RR2272	La612	EES	(30.7)	(30.7)	(17.3)	8.0	2.8	130	100	.9	2.0	Chalcedony
RR2273	La612	DSN	(18.0)	(18.0)	10.9	10.0	2.4	195	130	.5	.6	Chalcedony
RR2275	La612	EC-N	(47.8)	(46.4)	22.5	11.9	5.0	160	120	3.2	3.2	Rhyolite
RR2277	La612	RSC-N	(27.0)	(27.0)	20.8	15.5	3.1	190	130	.8	1.1	Obsidian
RR2279	La612	EES	(37.6)	(37.6)	19.6	–	3.0	110	20	2.0	2.8	Chalcedony
RR2280	La612	HB-N	(62.9)	(51.3)	24.7	23.5	5.6	NC	NC	5.3	8.0	Obsidian
RR2283	Ny311	PS	(42.8)	(40.1)	(22.3)	(15.9)	4.9	220	130	1.8	4.5	Chert
RR2286	Ny311	ECS	(42.1)	(42.1)	23.7	11.9	4.9	160	70	1.7	3.5	Chert
RR2288	Ny311	RSC-N	(26.4)	(23.7)	(20.4)	(13.0)	4.5	180	110	1.4	1.9	Opal
RR2289	Ny311	PS	(57.3)	(49.5)	17.6	17.4	8.3	240	110	5.6	6.0	Chert
RR2291	Ny311	EC-N	(31.6)	(30.3)	21.5	18.8	4.4	170	150	2.0	>3.0	Silicified rhyolite
RR2292	Ny311	EES	(36.4)	(36.4)	(18.2)	(18.2)	3.7	130	90	1.7	1.9	Chalcedony
RR2299	Ny311	RSC-N	20.7	20.7	12.7	8.1	3.3	190	130	.8	.8	Chert
RR2303	Ny311	EC-N	(35.2)	(35.2)	(21.4)	10.9	3.6	(120)	110	1.1	3.0	Chalcedony
RR2304	Ny311	EC-N	(40.5)	(40.0)	(25.4)	(15.8)	5.4	140	130	2.1	3.2	Chalcedony
RR2306	Ny311	DSN	22.4	19.3	15.3	15.3	3.3	210	180	.6	.6	Chalcedony
RR2310	La615	EC-N	(44.4)	(43.9)	23.6	17.6	6.4	180	130	5.7	5.9	Silicified rhyolite

TABLE 7 – (*Continued*)

Spec. No.	Site	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR2315	La613	EC-N	(46.4)	(46.4)	27.2	19.1	4.4	165	160	2.6	3.2	Chalcedony
RR2319	Ny313	RSC-N	32.1	32.1	(16.9)	9.5	3.5	145	130	1.2	1.3	Rhyolite
RR2320	La602	EE	(49.6)	(45.0)	24.6	21.4	4.9	180	130	2.7	3.3	Chert
RR2321	La602	RSC-N	(32.5)	(32.5)	(20.7)	10.4	3.0	170	145	.9	2.2	Chalcedony
RR2322	La602	CT	(29.0)	(24.1)	13.0	13.0	4.4	NC	NC	.9	1.4	Chalcedony
RR2323	La602	HCB-A	(49.6)	(48.2)	18.1	15.5	7.4	NC	NC	4.9	5.5	Rhyolite
RR2324	La602	EC-N	(45.3)	(42.8)	(21.3)	(15.0)	4.6	170	120	2.5	3.0	Chalcedony
RR2325	La602	ECS	(52.5)	(52.5)	29.9	29.9	6.4	170	60	5.1	7.0	Chalcedony
RR2326	La602	HCB-A	(40.5)	(37.7)	(17.6)	(17.6)	8.1	NC	NC	4.6	5.3	Chert
RR2328	La602	EC-N	(44.4)	(43.3)	(19.3)	(9.6)	5.0	170	110	2.9	3.3	Rhyolite
RR2329	La602	EE	(45.7)	(43.2)	(28.9)	14.9	4.5	155	120	2.2	3.1	Chert
RR2332	La602	PS	(45.2)	(41.3)	(23.6)	18.3	7.6	220	120	5.6	5.8	Rhyolite
RR2335	Ny316	CT	13.6	12.5	9.1	8.3	1.7	NC	NC	.2	.2	Chert
RR2336	Ny316	DSN	15.5	13.0	(10.7)	(10.7)	1.9	230	130	.2	.3	Chalcedony
RR2339	Ny316	CT	(19.4)	(16.2)	(13.8)	(13.8)	2.6	NC	NC	.3	.4	Silicified rhyolite
RR2340	Ny316	DSN	20.5	20.4	11.0	(10.0)	2.3	205	160	.4	.4	Opal
RR2342	Ny316	DSN	(19.9)	(16.8)	(13.1)	(13.1)	2.4	230	140	.5	.6	Obsidian
RR2443	Ny316	RSC-N	(35.0)	(35.0)	13.8	8.7	5.8	165	140	1.8	2.2	Chalcedony
RR2344-45	Ny325	EC-N	(34.6)	(34.6)	(23.6)	(23.6)	4.5	165	120	2.5	>3.0	Rhyolite
RR2346	Ny325	EC-N	(41.5)	(40.9)	(21.1)	(17.8)	5.8	(190)	155	3.9	4.2	Rhyolite
RR2348	Ny325	HCB-B	(38.2)	(35.2)	12.3	(10.0)	5.0	NC	NC	1.8	2.1	Chalcedony
RR2349	Ny325	DSN	(27.5)	(27.4)	(12.4)	(12.4)	3.9	200	(130)	.7	.8	Opal (lichen on edge)
RR2350	Ny316	DSN	(23.7)	(21.7)	9.7	9.7	2.3	190	190	.4	.5	Chert
RR2351	La614	EC-N	(40.0)	(40.0)	(25.5)	(25.5)	4.8	160	125	2.9	3.2	Rhyolite
RR2352	La614	EC-N	(25.5)	(43.6)	22.4	19.0	4.9	155	120	3.6	3.7	Chalcedony
RR2353	Ny311	HCB-B	(36.8)	(34.1)	11.6	10.2	3.7	NC	NC	1.3	1.5	Silicified rhyolite
RR2354	La610	EC-N	(42.7)	(41.5)	25.0	15.2	5.2	140	120	2.9	4.5	Chalcedony
RR2356	La610	EES	(32.7)	(32.7)	(19.6)	7.9	4.0	140	95	1.7	1.9	Silified rhyolite
RR2357	La610	RSC-N	(36.6)	(34.9)	(23.4)	13.0	4.4	135	110	.7	2.5	Opal
RR2359	La610	CT	36.4	36.4	21.6	9.2	3.9	NC	NC	2.4	2.5	Rhyolite
RR2360	La610	RSC-N	(36.1)	(33.6)	19.8	(11.3)	3.6	165	140	1.4	2.5	Chert
RR2361	La610	RSCS	29.9	(29.2)	17.0	10.2	3.7	200	80	1.7	1.7	Jasper
RR2362	La610	ESS	(45.0)	(41.1)	(21.0)	(21.0)	4.0	120	90	1.8	2.5	Chalcedony
RR2367	Ny327	RSC-N	(34.1)	(34.1)	(16.4)	8.4	4.1	125	110	.9	2.2	Chalcedony
RR2368	La604	EE	(41.4)	(38.9)	19.4	14.4	5.2	180	125	3.0	3.7	Banded rhyolite
RR2369	La604	EC-N	(44.1)	(43.2)	(23.2)	(18.7)	(14.7)	180	140	2.6	5.2	Chalcedony

TABLE 7 – (*Continued*)

Spec. No.	Site	Type	Length max.	Length axial	Width max.	Width basal	Thick- ness	DSA	PSA	Weight	Wt. est.	Material
RR2370	La604	HCB-B	(36.5)	(35.5)	14.9	13.0	6.5	NC	NC	2.3	2.7	Chalcedony
RR2371	La604	ECS	(47.6)	(47.6)	(25.7)	(25.7)	5.3	(140)	90	3.1	4.0	Opal
RR2372	La604	RSC-N	(37.6)	(37.6)	(19.9)	(19.9)	4.2	120	110	1.7	2.0	Opal
RR2378	Ny311	RSC-N	(25.1)	(25.1)	15.1	14.0	2.8	185	105	.6	1.0	Chert
RR2379	Ny311	ESN	(27.7)	(27.7)	14.4	14.4	3.3	180	180	1.0	1.5	Chert
RR2380	Ny337	HCB-A	(45.6)	(42.3)	22.4	18.8	4.3	NC	NC	1.2	3.4	Chert
RR2382	Ny337	EES	(36.9)	(36.9)	(18.3)	8.6	3.8	120	95	1.7	2.5	Silicified rhyolite
RR2383	Ny337	EE	(35.7)	(32.5)	(19.9)	(17.8)	2.8	250	170	.4	>3.0	Chalcedony
RR2384	Ny337	HB-N	(44.4)	(38.5)	24.5	23.1	6.1	NC	NC	2.5	4.2	Chert
RR2385	Ny337	ESS	25.5	24.0	(24.2)	(14.9)	(4.9)	140	95	2.5	2.9	Opal
RR2388	Ny337	HCB-B	(33.9)	(30.7)	14.5	12.7	4.8	NC	NC	.6	1.2	Silicified rhyolite
RR2389	Ny337	HCB-A	(48.3)	(43.4)	21.8	17.0	5.5	NC	NC	2.3	4.9	Rhyolite
RR2390	Ny337	ECS	(66.2)	(66.2)	35.5	12.4	5.8	180	80	5.7	6.5	Rhyolite
RR2391	Ny337	ES-N	(38.6)	(36.8)	(19.1)	17.8	5.0	190	140	1.8	2.3	Rhyolite
RR2393	Ny337	RSS-N	(22.1)	(22.1)	13.7	11.9	3.4	240	125	1.2	1.2	Opal
RR2394	Ny337	HCB-A	(36.0)	(34.1)	18.3	15.0	4.7	NC	NC	1.0	>3.0	Obsidian
RR2397	Ny337	HCB-B	(29.7)	(26.5)	13.8	11.9	4.4	NC	NC	.8	1.4	Obsidian
RR2398	Ny337	PS	(53.2)	(51.4)	19.8	(11.8)	5.3	200	100	4.1	4.3	Silicified rhyolite
RR2399	La617	EES	(44.3)	(44.3)	(17.2)	10.0	3.9	150	100	1.8	2.2	Chalcedony
RR2400	La617	EC-N	(41.7)	(41.7)	16.9	8.7	4.7	140	105	2.5	>3.0	Chalcedony
RR2402	La616	EC-N	(45.5)	(45.5)	27.7	17.9	6.2	160	150	4.4	5.7	Chalcedony
RR2403	La615	ECS	(46.5)	(45.7)	19.6	8.1	5.0	210	80	3.1	3.9	Chert
RR2404	La616	EC-N	(49.6)	(49.6)	27.9	(18.8)	4.9	170	140	3.9	4.2	Rhyolite
RR2405	La616	EES	48.4	48.4	15.4	15.4	3.6	115	60	2.5	2.5	Rhyolite
RR2406	La616	EC-N	(35.8)	(35.8)	(24.8)	11.0	4.9	160	140	2.7	3.0	Chert
RR2407	La616	EE	(33.8)	(30.7)	(20.8)	(17.5)	4.1	180	130	1.4	2.2	Opal
RR2408	La616	CT	(17.9)	(17.9)	(17.7)	(17.7)	3.3	NC	NC	.8	.9	Obsidian
RR2409	La616	ECS	33.5	38.5	(24.6)	17.0	5.2	210	100	3.8	4.2	Opal
RR2410	La616	EE	(29.6)	(27.3)	(23.2)	12.9	5.7	160	125	2.6	>3.0	Obsidian
RR2412	La605	HCB-A	(45.4)	(41.9)	28.7	20.5	7.0	NC	NC	4.4	6.0	Silicified rhyolite
RR2413	La605	RSCS	(32.7)	(31.9)	(18.4)	8.0	4.9	190	80	1.3	2.0	Chalcedony
RR2414	Ny335	ECS	(34.5)	(34.5)	21.2	21.2	3.2	<140	40	1.8	2.0	Chalcedony
RR2415	Ny335	EC-N	(35.5)	(35.5)	(27.8)	16.6	4.9	130	120	2.8	4.0	Chalcedony
RR2416	Ny335	RSC-N	(29.0)	(27.5)	19.1	15.5	4.7	170	150	1.8	1.9	Chalcedony
RR2417	Ny335	ECS	(32.3)	(32.3)	(27.9)	12.5	5.2	160	100	2.0	3.5	Chalcedony
RR2418	Ny335	ECS	(44.8)	(44.8)	17.2	8.4	5.7	200	70	3.3	3.8	Opal

TABLE 7 – (*Continued*)

Spec. No.	Site	Type	Length max.	Length axial	Width max.	Width basal	Thick-ness	DSA	PSA	Weight	Wt. est.	Material
RR2419	Ny335	EC-N	(31.7)	(31.7)	(20.6)	12.2	5.2	160	115	1.3	>3.0	Chert
RR2420	Ny335	EC-N	(40.0)	(40.0)	20.8	11.9	4.2	140	125	1.7	3.0	Chert
RR2422	Ny335	CT	(35.6)	(35.6)	24.9	24.9	4.0	NC	NC	1.9	2.3	Rhyolite
RR2423	Ny335	EDS	(42.3)	(42.3)	(21.7)	9.8	3.6	120	100	2.1	2.6	Chalcedony
RR2428	Ny335	NSN	(47.5)	(47.5)	(41.8)	(21.8)	5.8	170	150	5.4	6.0	Basalt
RR2429	La603	EE	(40.4)	(36.4)	(23.9)	(20.2)	4.9	160	120	2.4	3.6	Chert
RR2430	La603	EE	(37.4)	(35.0)	(26.4)	17.7	3.2	170	140	1.9	3.0	Opal
RR2332	Ny311	RSC-N	(35.1)	35.1	(17.6)	(9.0)	4.6	145	120	2.2	2.2	Banded rhyolite
RR2434	Ny316	ES	–	–	(24.0)	–	4.9	150	<130	2.9	3.5	Rhyolite
RR2436	Ny334	RSC-N	(32.6)	(28.2)	(22.3)	15.1	3.9	180	130	2.0	2.2	Rhyolite
RR2437	Ny334	HCB-A	25.4	23.0	11.7	10.4	4.9	NC	NC	1.4	1.4	Obsidian
RR2796	La625	PS	46.3	41.9	24.4	19.0	6.9	210	110	7.5	7.5	Chalcedony
RR2799	La621	EES	(30.4)	(30.4)	23.9	11.0	4.0	170	100	1.7	2.0	Chalcedony
RR2804	La621	EES	38.7	38.7	(18.8)	(18.8)	4.2	120	100	2.6	2.6	Silicified rhyolite
RR2808	La623	EC-N	(41.9)	(41.9)	(27.3)	17.9	4.2	180	130	3.1	3.9	Chalcedony
RR2846	La620	EE	(43.6)	(39.5)	(28.7)	22.6	5.5	160	140	4.5	4.9	Banded rhyolite
RR2848	La620	EE	(44.7)	(41.1)	(25.9)	(19.4)	5.0	190	140	2.9	4.9	Banded rhyolite
RR2849	La620	HB-N	(50.6)	(45.6)	(26.0)	(26.0)	5.7	NC	NC	3.8	5.0	Silicified rhyolite
RR2851	La620	EC-N	(38.2)	(36.5)	(23.0)	12.8	4.6	180	120	2.6	3.2	Rhyolite
RR2853	La620	HCB-B	(34.6)	(30.7)	11.9	11.0	5.1	NC	NC	1.9	2.3	Chalcedony
RR2858	La620	RSC-N	(32.1)	(29.1)	17.5	(14.0)	5.3	180	130	2.2	2.4	Chalcedony
RR2860	La620	RSC-N	(28.7)	(28.7)	15.2	6.1	3.2	170	110	.7	1.4	Chalcedony
RR2861	La620	HCB-B	(40.2)	(37.6)	15.4	12.2	4.0	NC	NC	1.9	2.5	Rhyolite
RR2862	La620	NSN	(44.9)	(44.9)	21.8	(13.4)	6.9	170	160	3.9	4.1	Basalt
RR2864	La620	EC-N	(40.7)	(40.7)	23.5	(14.7)	5.4	175	115	3.1	4.0	Chalcedony
RR2865	La620	DSN	(24.6)	(24.6)	13.0	12.2	2.7	180	180	.5	.6	Silicified rhyolite
RR2866	La620	EC-N	(31.2)	(39.1)	(25.0)	(17.4)	4.6	170	135	2.5	3.6	Chert
RR3891	Ny309	ESC	–	–	–	–	–	–	–	–	–	Chert
RR6055	Ny309	DSN	16.6	13.9	(12.0)	(12.0)	2.9	240	150	.3	.4	Basalt
RR6056	Ny309	CT	–	–	–	–	2.6	–	–	.6	–	Obsidian
RR6068	Ny309	DSN	(28.0)	(28.0)	(14.6)	(14.6)	4.2	190	150	1.0	1.3	Obsidian
RR6069	Ny309	CT	(18.8)	(18.8)	13.4	13.4	2.4	NC	NC	.2	.3	Obsidian

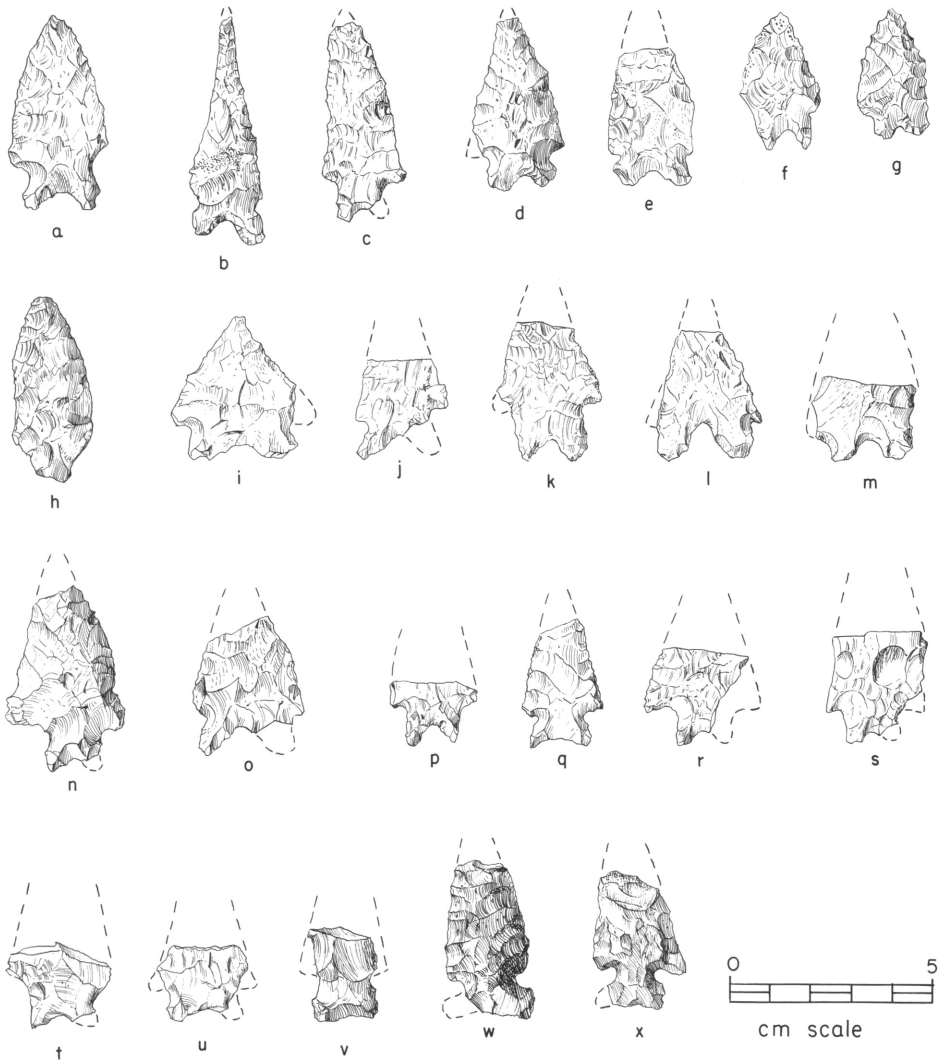

FIG. 44. Pinto Series projectile points.

a. RR2796
b. RR2289
c. RR2398
d. RR2332
e. RR2210
f. RR2246
g. RR2268
h. RR2258
i. RR2063
j. RR2263
k. RR2106
l. RR2245
m. RR2074
n. RR2215
o. RR2199
p. RR2242
q. RR2240
r. RR2104
s. RR2092
t. RR2221
u. RR2283
v. RR2098

Northern Side-notched projectile points.

w. RR2428
x. RR2862

	Sherd Count			
Site	Body Sherd	Rim Sherd	Basal Sherd	Total
Ny-309	111	1	0	112
Ny-316	80	4	1	85

Diagnostic sherds have been illustrated on figure 58 and the exact context of the sherd concentrations was considered previously in the site descriptions.

The pottery varies in color from a light to a dark gray-brown. Surface texture is quite coarse and wiping marks are not uncommon. Temper seems to be a coarse crushed rock, perhaps a welded tuff or quartz grit. The few rim sherds vary from straight to flaring, and the single basal fragment indicates a flat bottom. No intentional decoration appeared on any sherd. This pottery seems to be typical "Shoshoni ware" which is distributed throughout the eastern and central Great Basin. A similar vessel was found some 30 miles to the north by Magee (1964). Shoshonean pottery almost certainly dates post-A.D. 1300.

One rather unusual item is a small fired clay fragment that seems to represent part of a figurine—a leg or perhaps an ear (fig. 58g). Horse-like figures have been reported from the western Great Basin by Layton (1970) and Magee (1966).

Two *Haliotis* ornaments were found (fig. 59). These were undoubtedly traded from the California coast, either as raw materials or finished products.

CONCLUSIONS

In the past, some investigators have questioned the importance, and occasionally the very existence, of prehistoric piñon exploitation in the Great Basin (e.g., Cowan, 1967; Napton,

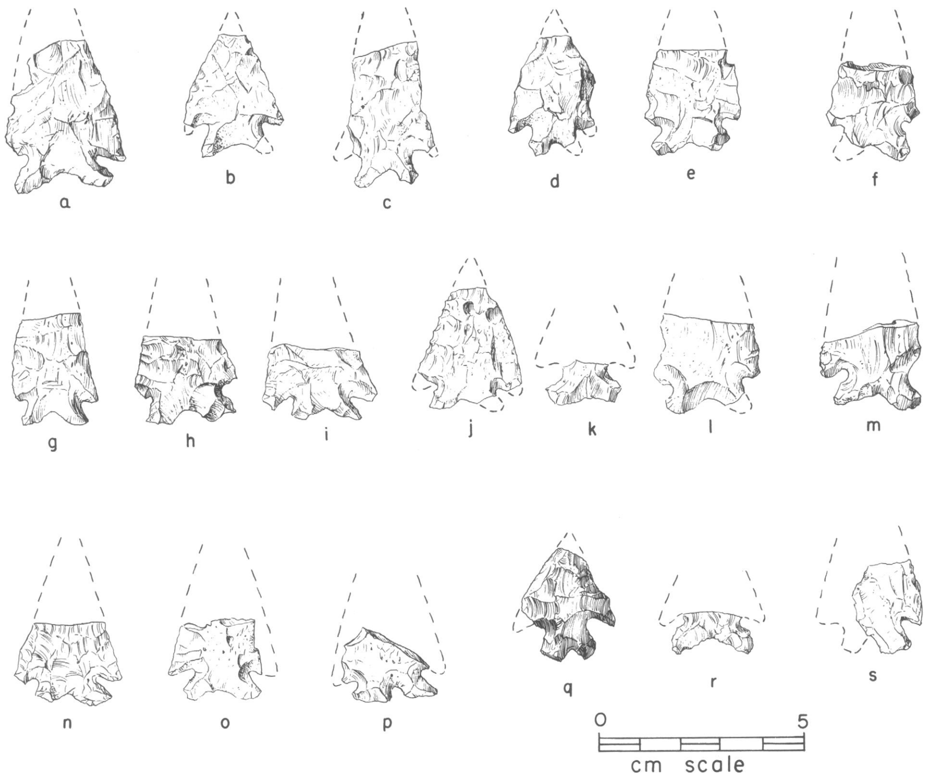

FIG. 45. Elko Eared projectile points.

a. RR2846
b. RR2103
c. RR2180
d. RR2252
e. RR2065
f. RR2429
g. RR2368
h. RR2183
i. RR2329
j. RR2162
k. RR2150
l. RR2848
m. RR2320
n. RR2430
o. RR2212
p. RR2133
q. RR2410
r. RR2383
s. RR2407

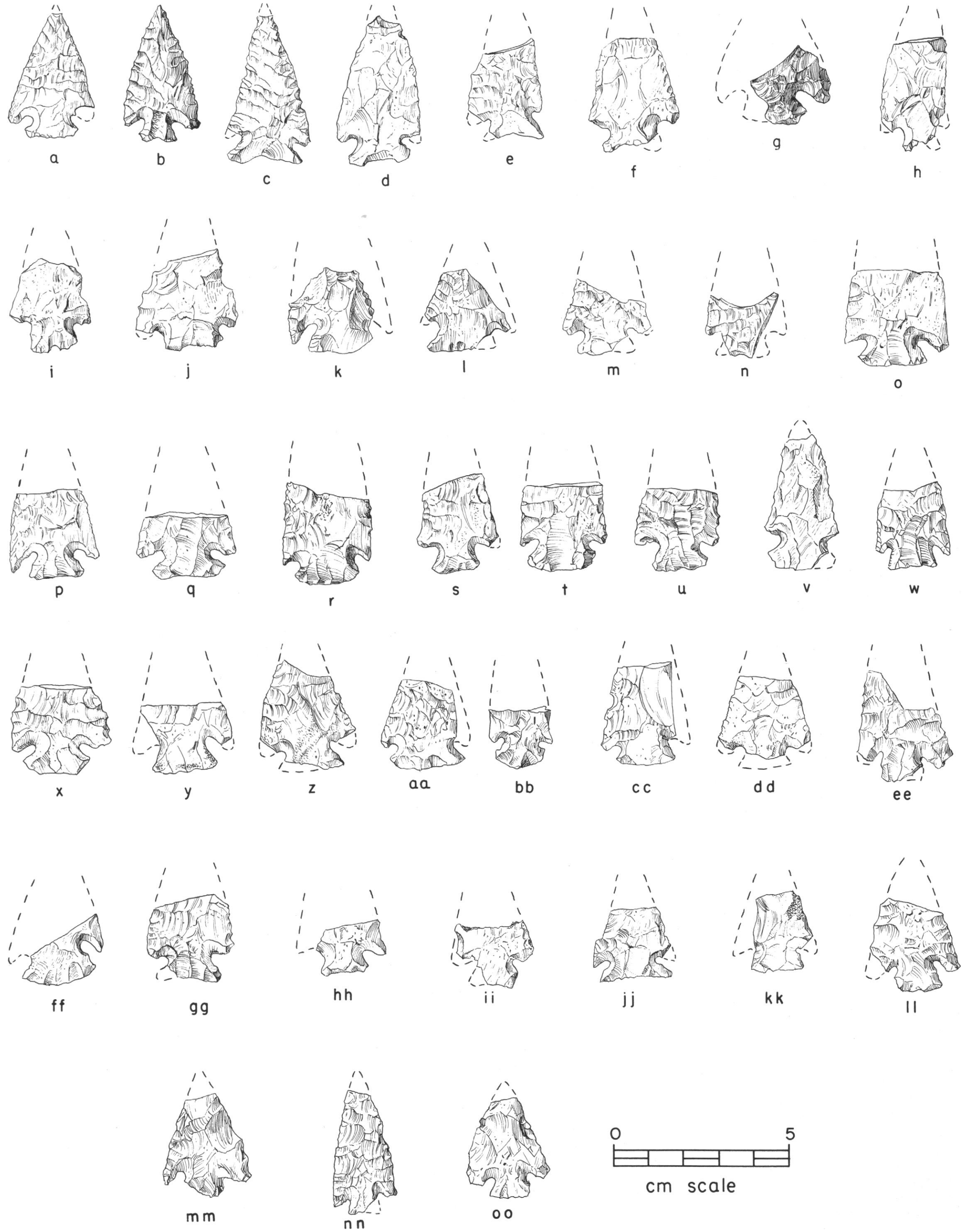

FIG. 46. Elko Corner-notched projectile points.

a. RR2102
b. RR2275
c. RR2352
d. RR2310
e. RR2324
f. RR2099
g. RR2193
h. RR2328
i. RR2851
j. RR2071
k. RR2415
l. RR2369
m. RR2304
n. RR2303
o. RR2404
p. RR2354
q. RR2315
r. RR2077
s. RR2134
t. RR2176
u. RR2864
v. RR2346
w. RR2420
x. RR2402
y. RR2177

(caption continued on p. 348)

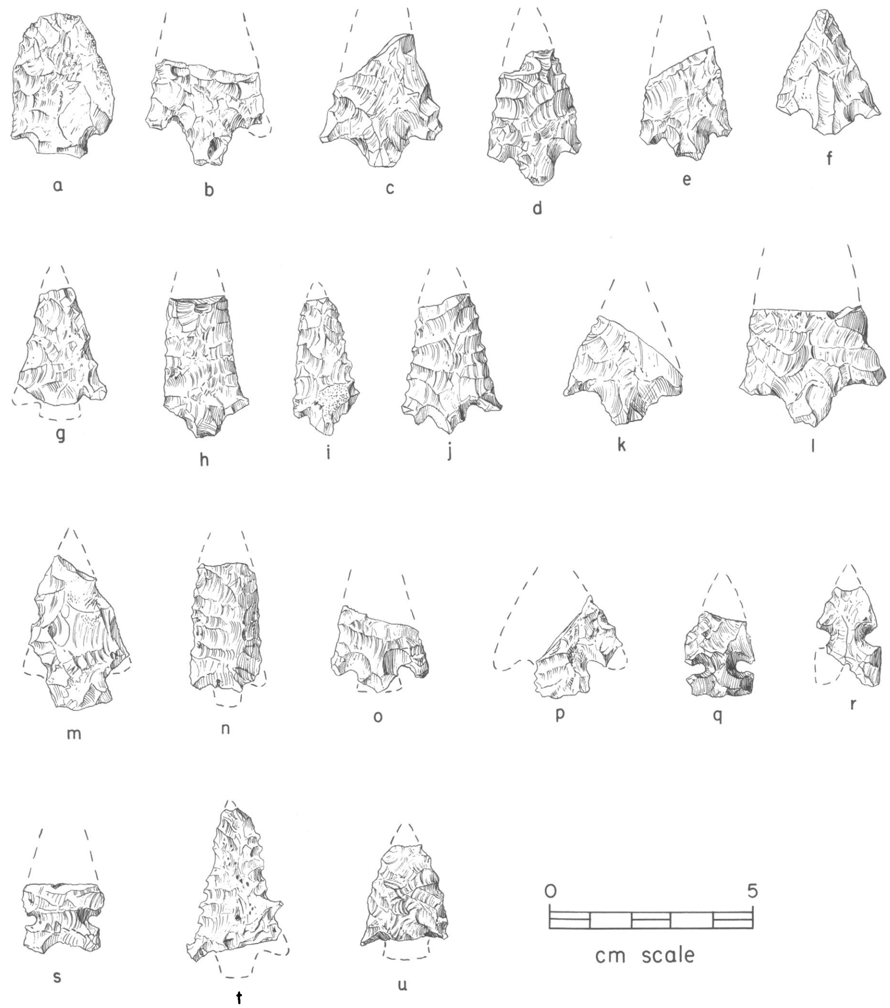

FIG. 47. Elko Contracting-stem projectile points.
a. RR2243
b. RR2197
c. RR2325
d. RR2195
e. RR2371
f. RR2239
g. RR2203
h. RR2403
i. RR2228
j. RR2075
k. RR2248
l. RR2390
m. RR2409
n. RR2418
o. RR2286
p. RR2417

Elko Side-notched projectile points.
q. RR2146
r. RR2061
s. RR2391

Elko Series, type unknown projectile points.
t. RR2434
u. RR2097

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z. RR2808
aa. RR2067
bb. RR2135
cc. RR2182
dd. RR2351
ee. RR2204
ff. RR2070
gg. RR2866
hh. RR2419
ii. RR2237
jj. RR2291
kk. RR2220
ll. RR2250
mm. RR2406
nn. RR2400
oo. RR2344
-2345

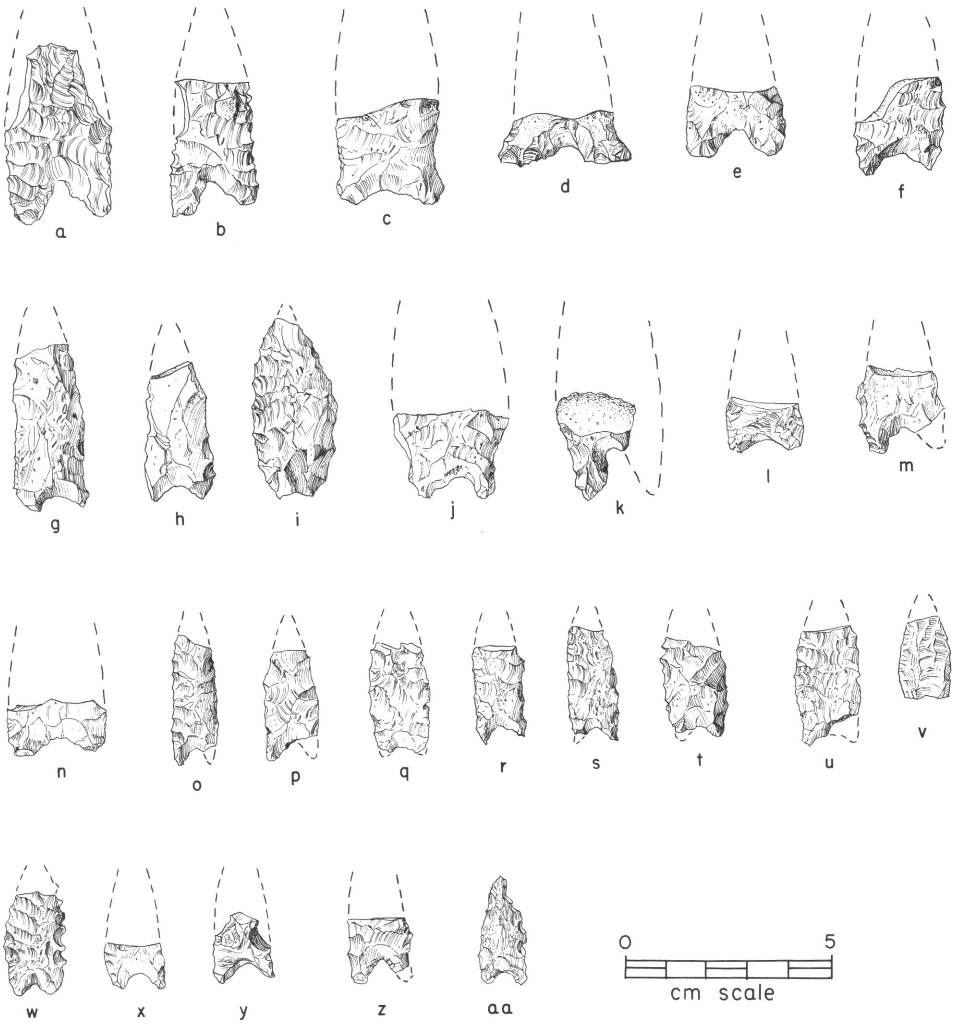

FIG. 48. Humboldt Basal-notched projectile points.
a. RR2280 c. RR2849 d. RR2234 e. RR2384
b. RR2080
Humboldt Concave Base-A projectile points.
f. RR2389 i. RR2189 k. RR2198 m. RR2186
g. RR2323 j. RR2412 l. RR2394 n. RR2380
h. RR2326
Humboldt Concave Base-B projectile points.
o. RR2348 s. RR2353 v. RR2167 y. RR2397
p. RR2184 t. RR2110 w. RR2262 z. RR2229
q. RR2370 u. RR2861 x. RR2388 zz. RR2437
r. RR2853

1969 and especially Madsen and Berry, 1975). Although we do not argue that piñon exploitation was ubiquitous throughout the prehistoric Great Basin, we do think that the Reese River survey strongly validates the presence of this pattern in at least some areas of the Desert West.

There seems to be no other explanation for the high predictability of site localities at Reese River.

PREDICTING SETTLEMENT PATTERNS

With the complete sample of Reese River sites described in some detail, we can now assess just how well the polythetic site definitions performed in actually predicting site location in the Toiyabe Mountains.

The seven polythetic site variables projected potential areas of habitation. A tract of land was called a "locus" whenever five of seven predictors were satisfied. We believed that, on strictly theoretical grounds, each locus should contain an archaeological site. A total of 74 potential loci was delimited on aerial photographs, and this 12-mile transect was entirely surveyed, with the following results:

ARCHAEOLOGICAL SITES

		Present (–)	Absent (+)
Potential Loci	+	63	11
	–	2	∞

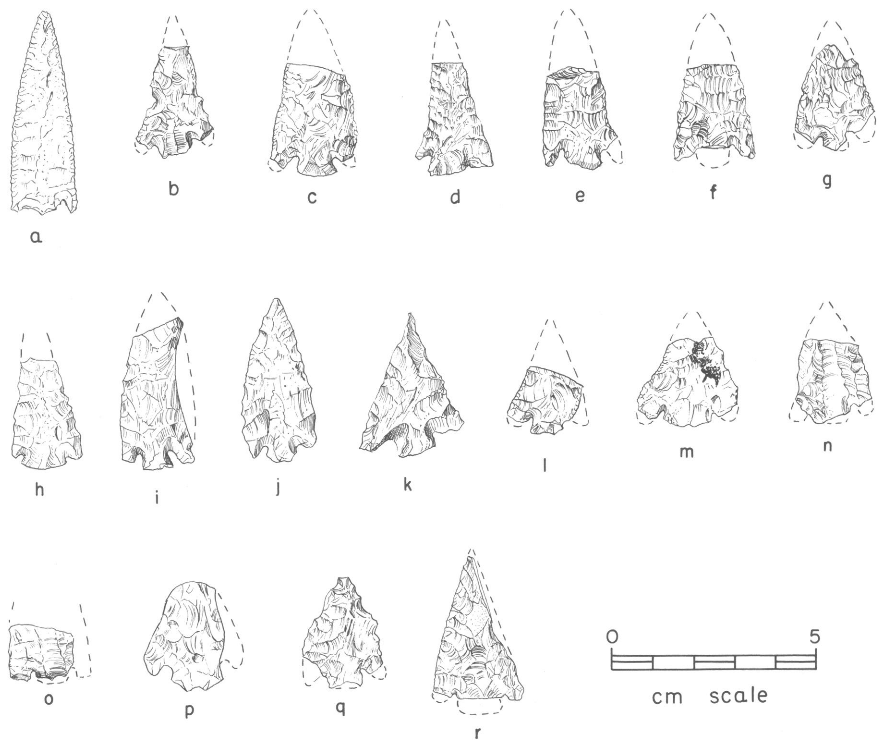

FIG. 49. Eastgate Expanding-stem projectile points.
a. RR2405
b. RR2356
c. RR2423
d. RR2297
e. RR2382
f. RR2279
g. RR2362
h. RR2399
i. RR2232
j. RR2804
k. RR2196
l. RR2272
m. RR2799
n. RR2109
o. RR2101

Eastgate Split-stem projectile points.
p. RR2385
q. RR2266

Eastgate Series projectile points.
r. RR2414

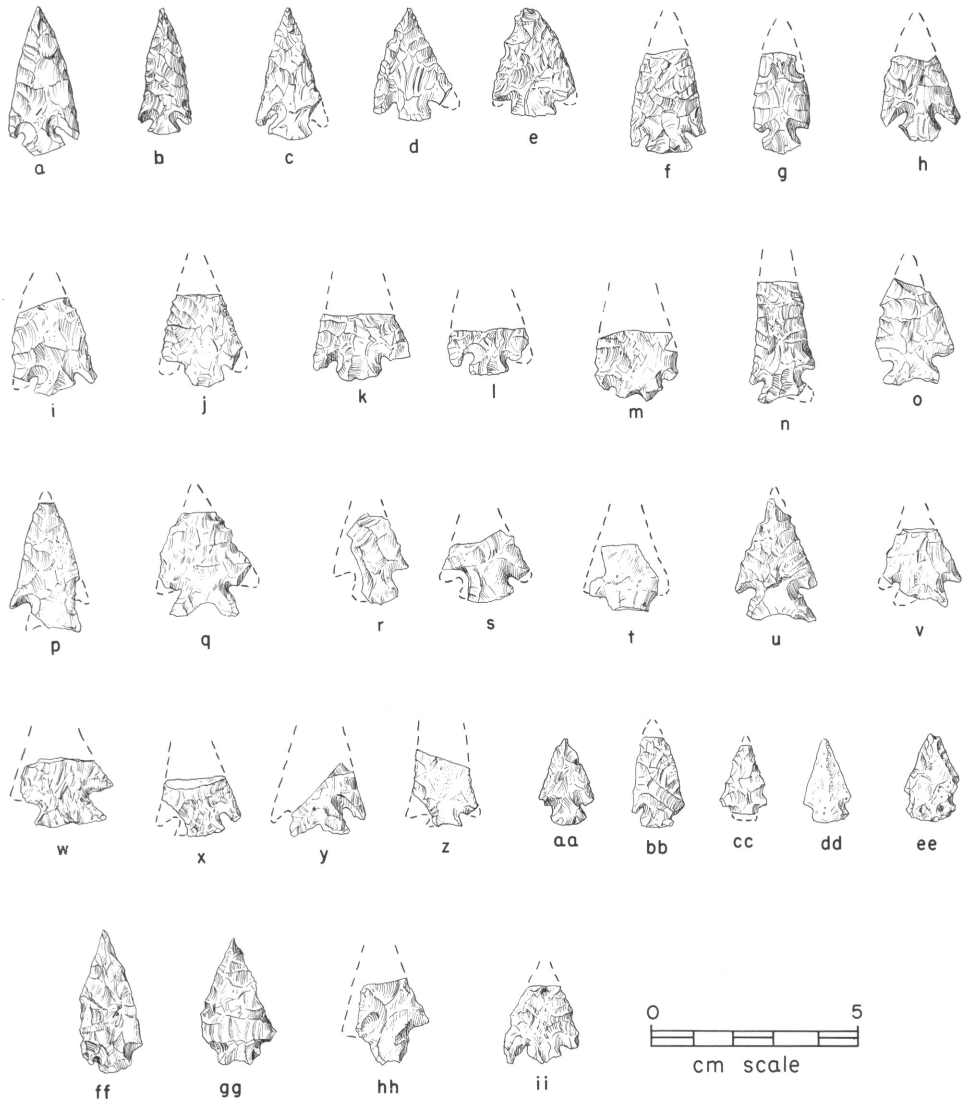

FIG. 50. Rose Spring Corner-notched projectile points.
a. RR2432
b. RR2120
c. RR2319
d. RR2202
e. RR2188
f. RR2271
g. RR2343
h. RR2100
i. RR2372
j. RR2187
k. RR2235
l. RR2255
m. RR2360
n. RR2148
o. RR2858
p. RR2201
q. RR2436
r. RR2261
s. RR2321
t. RR2378
u. RR2416
v. RR2288
w. RR2277
x. RR2367
y. RR2357
z. RR2960
aa. RR2299
bb. RR2231
cc. RR2156
dd. RR2230
Rose Spring Side-notched projectile points.
ee. RR2393
Rose Spring Contracting-stem projectile points.
ff. RR2251 gg. RR2361 hh. RR2413 ii. RR2265

All but two of the 65 sample sites were found to be situated on potential loci, areas that satisfied at least five of the seven critical environmental conditions. The survey disclosed that only 11 of the potential loci were without archaeological debris.[1]

There can be little doubt that the polythetic site definition works. More than 95 percent of the sample sites were situated on potential loci, and 85 percent of the loci actually contained sites. This accuracy is excellent, considering the vagaries of archaeological survey. We find these results to be most gratifying, particularly because of the sparse nature of the archaeological remains involved. The polythetic criteria predict past human behavior and, as such, should seem to be valuable adjuncts for further analysis of prehistoric settlement pattern in the Desert West and elsewhere.

[1] As discussed by Williams, Thomas, and Bettinger (1973, pp. 232-234), analysis using the binomial theorem indicated that this relationship is very highly statistically significant.

DETERMINANTS OF SETTLEMENT PATTERNS AT REESE RIVER

The above section considers the results in terms of holistic predictions. A set of criteria,

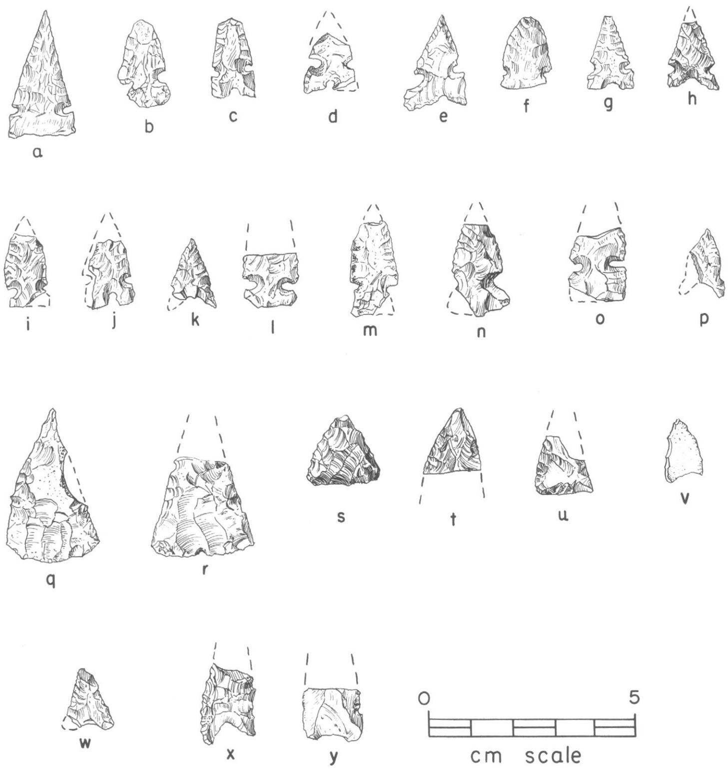

FIG. 51. Desert Side-notched projectile points.
a. RR2244
b. RR2340
c. RR2350
d. RR2062
e. RR2306
f. RR2273
g. RR3891
h. RR2342
i. RR2095
j. RR2073
k. RR6055
l. RR2865
m. RR2349
n. RR6068
o. RR2379
p. RR2336
Cottonwood Series projectile points.
q. RR2359
s. RR2408
t. RR6056
u. RR6069
v. RR2335
w. RR2339
x. RR2322
y. RR2190

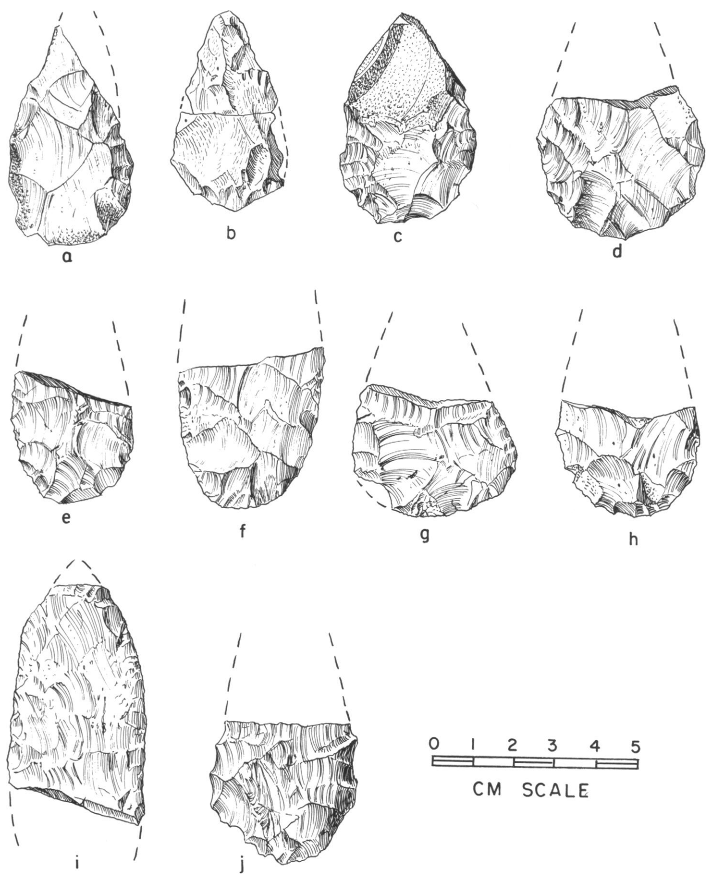

FIG. 52. Bifaces, rounded bases.

a. RR2330
b. RR2295
c. RR2281
d. RR2217
e. RR2794
f. RR2427
g. RR2802
h. RR2131
i. RR2426
j. RR2441

taken together, can tell archaeologists where to prospect for prehistoric sites. But we can also analyze the findings in terms of the specific determinants involved. That is, the sites are predicted using certain variables. Now that the survey has been completed we have 65 new variates that characterize the known sites. These variates can help us to better understand settlement patterns at Reese River, and also function to predict modes of cultural ecology elsewhere.

Figures 60 through 63 present the survey findings in graphic form. Of course, these 65 observations on each variable comprise *variates*, measurements subject to the vagaries of sampling error and chance fluctuation. Let us now attempt to "smooth out" these errors and synthesize the findings in terms of more conventional mathematical structures. That is, models can be proposed for each of the major site determinants.

Consider first the percentage slope of each prehistoric campsite. Figure 60 compares the observed slopes with values to be expected under a perfectly normal distribution. The parametric mean and variance for the normal distribution are estimated by the observed $\overline{X}$ and S^2.[1] The

[1] The theoretical values have been generated using the standardized normal deviate following the methods detailed in Thomas (1976, pp. 285-287).

chi-square value of 2.073 (with $n - 2 = 4 - 2 = 2$ degrees of freedom) indicates that there is no significant difference between the observed slopes and those expected under the theoretical normal distribution. Chi-square tells us that this sample of 65 variates could easily have been randomly selected from a population of normally distributed variates.

Similarly, figures 61 and 62 compare the distances to a water source and to the piñon ecotone against their respective theoretical normal curves. Once again, there is no significant difference between the observed and expected distributions.[1]

[1]The chi-square values are as follows:
Distance to water: $x^2 = 6.368$, $df = 4$
Distance to ecotone: $x^2 = 1.363$, $df = 4$

So the observations closely approximate some mathematical distributions. What do these normal models mean in terms of people? The fact that Indians camped on a relatively flat ground should astound few, but figure 60 indicates a surprisingly tight patterning. The average slope for these sites is about 8 percent, and nearly three-quarters (48 sites) of the sample have slopes between 4 percent and 12 percent. We can project from this that the *ideal* site slope—the parameter—also slopes about 8 percent. But because of the topographic variability within the Toiyabe Mountains, the exact slope on any given site will vary somewhat about this ideal. The point is that the observed variation is *symmetrical.* This symmetrical, linear relationship seems to be responsible for the near-perfect

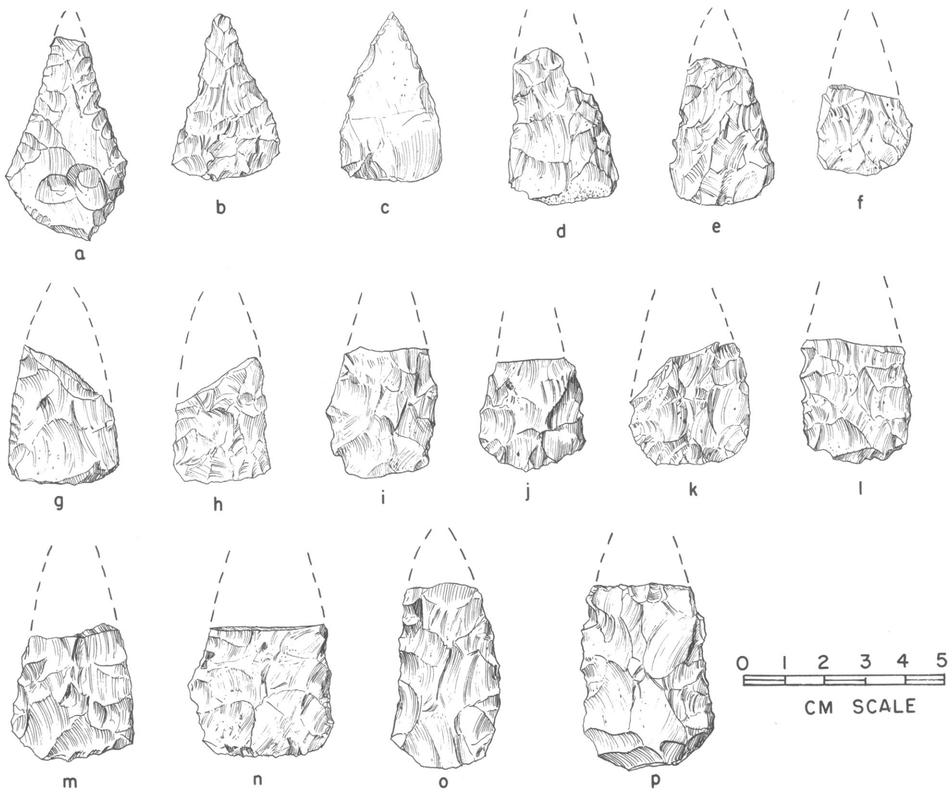

FIG. 53. Bifaces, non-rounded bases.

a. RR2331	e. RR2293	i. RR2208	m. RR2072
b. RR2257	f. RR2205	j. RR2157	n. RR2256
c. RR2318	g. RR2358	k. RR2424	o. RR2209
d. RR2219	h. RR2130	l. RR2218	p. RR2214

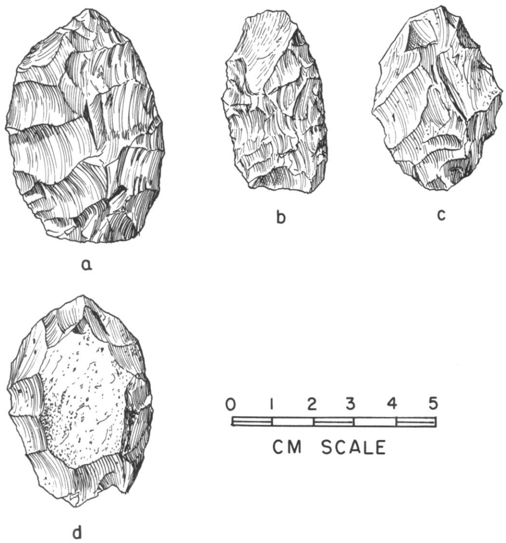

FIG. 54. Blanks or preforms.
a. RR2191 b. RR2213 c. RR2425 d. RR2366

agreement between the projected normal distribution and the actual sites.

The distance to the ecotone agrees equally well with expectation. The ecotone forms a continuous boundary along the margin of the Toiyabe foothills. Figure 62 denotes that the *ideal* location of a campsite is about 500 meters from the modern ecotone. The relationship is once again symmetrical about the arithmetic mean. Half of the ideal distance downhill (250 meters above the ecotone) seems to have been about as undesirable as half again the distance uphill (750 meters from the ecotone). The surprising symmetry of the relationship truncates, of course, at zero. Distances cannot be negative. Sufficient sites fall into the zero to 200 meter interval effectively to counterbalance the asymptotic potential of camping a virtually unlimited distance uphill. The frequencies, in other words, remain normally distributed.

We cannot state positively that today's piñon

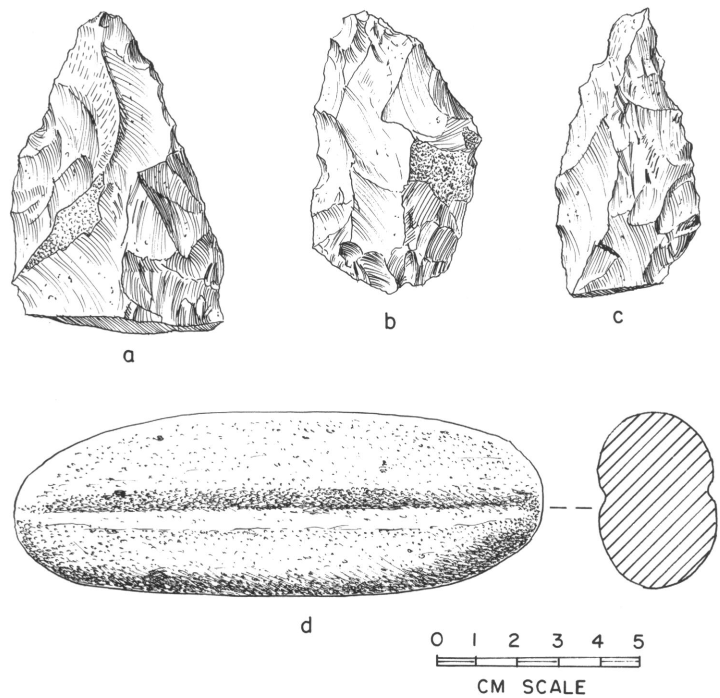

FIG. 55. Roughouts.
a. RR2365 b. RR2375 c. RR2107
Shaft straightener.
d. RR2435

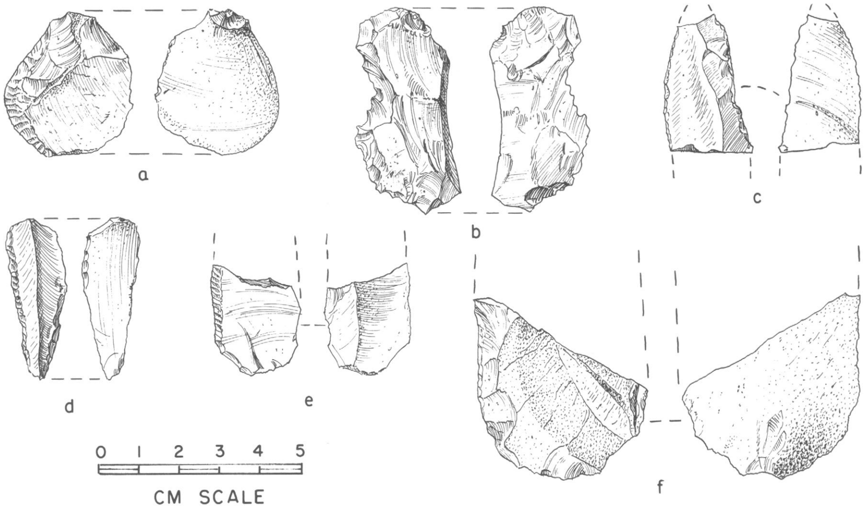

FIG. 56. Unifacial tools.
a. RR2225 c. RR2144 e. RR2282 f. RR2313
b. RR2806 d. RR2801

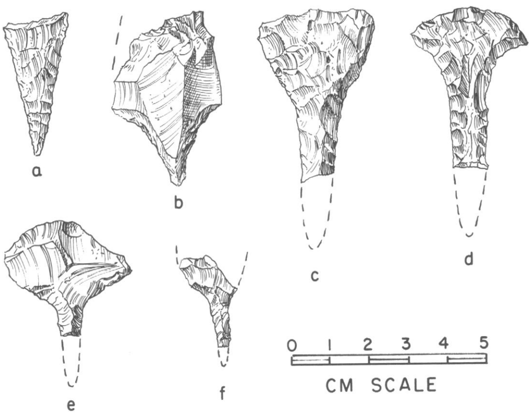

FIG. 57. Drills.
a. RR2311 c. RR2105 e. RR2854 f. RR2278
b. RR2798 d. RR2093

ecotone precisely reflects the prehistoric ecotone. We know, for instance, that the modern ecotone has changed somewhat since our initial fieldwork at Reese River in 1969. We also have photographic evidence indicating a severe fluctuation of the tree line due to intensive mining and ranching in the 1860s (Thomas, 1971b). But the symmetry evident on figure 62 suggests that the modern boundary is a decent approximation of the prehistoric piñon margin. Past fluctuations probably changed only the distance to the lower tree line. The symmetry on figure 62 seems to indicate that if the prehistoric tree line was not relatively stable, at least the fluctuations were probably about the average tree line observed today.

The distance of the sites from potable water also closely follows the projected normal distribution, centering about a mean of 450 meters. The symmetry once again reinforces the veracity of our polythetic criteria f_6 and f_7: sites should be "near" water but "not directly on" that water source.

The remaining site determinant, elevation above the valley floor, poses a somewhat more complex mathematical situation. The observed frequencies show a rather marked departure from the normal expectation ($x^2 = 34.859$, $df = 6$). The variates were then transformed into logarithms, but there remained a significant discrepancy between observed and expected frequencies. The sites thus relate to the valley floor in neither a simple normal nor lognormal fashion. But by taking the square root of each variate, we find a near perfect fit between observed and expected frequencies ($x^2 = 1.363$, $df = 4$). Figure 63 graphs this relationship.

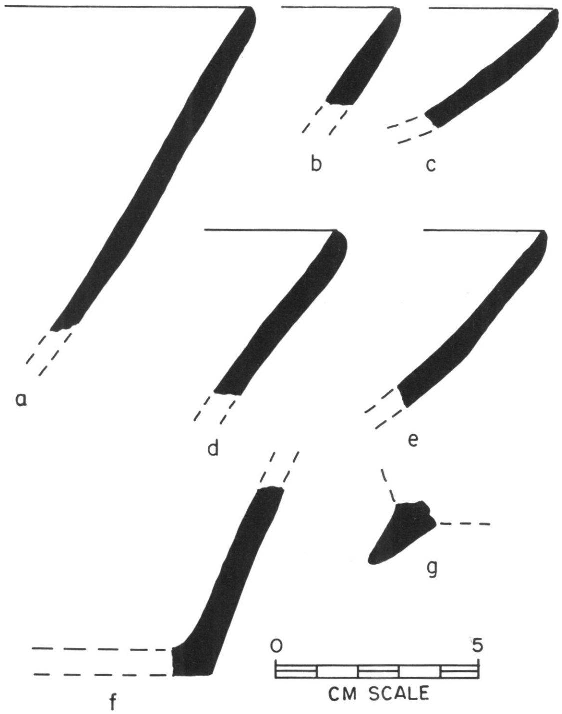

FIG. 58. Potsherds from Reese River.

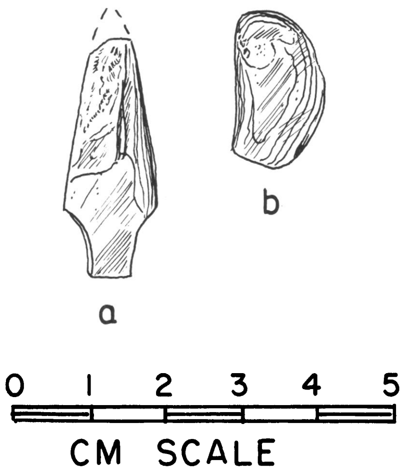

FIG. 59. Haliotis ornaments.
a. RR2083 b. RR2112

The square root transformation was appropriate here because the untransformed frequency distribution was so badly skewed to the right. There were too many sites between 25 and 75 meters off the valley floor, even though the mean elevation was about 95. The log transformation failed to remedy this skewness, but the square roots of each variate proved to be in almost precisely normal distribution.

These settlement pattern determinants can thus be viewed in a rather mechanistic fashion. The first three variables follow a symmetrical, linear distribution. The *ideal* slope is about 8 percent. The observed variation is symmetrical about this mean. The frequencies are also linear. If one moves four units away from the *ideal*, that locality becomes four times less desirable. Six units from the mean is six times less desirable. Four units away is "twice as bad" as two units away. (Here we are assuming site density to be an indirect indicator of desirability.)

This same relationship holds for the distance from the piñon ecotone and the distance to water: site frequencies are directly and linearly proportional to the distance from the *ideal* (the parametric mean).

A slightly different situation holds for elevation above the valley floor. *Ideal* site location is 9.25^2 or about 85 meters above the valley floor. But as one moves from the *ideal* spot the desirability decreases, not in linear fashion, but rather as the *square root* of the linear distance. In this case, if three units from the mean is "bad," then nine units (rather than six) is "twice as bad." That is, once one moves camp above the *ideal* elevation, the distance to the valley floor becomes less critical. Nine is only twice as bad as three; 81 is only twice as bad as nine. This relationship indicates that sites must have been chosen only "some distance" above the valley floor. Beyond this critical distance, the elevation mattered less and less.

The question was raised earlier as to how independent these determinants are from each other. The initial seven predictor values certainly are not independent, nor need they be to function in a polythetic definition. But these seven predictors have now been reduced to four somewhat less redundant variables. To see how much redundancy remains unpurged, the following linear correlation coefficients were computed:[1]

	Distance to Water	Distance to Ecotone	$\sqrt{\text{Elevation above Valley Floor}}$	Percentage of Slope
Distance to Water	–	–	–	–
Distance to Ecotone	0.2088	XXXX	–	–
$\sqrt{\text{Elevation above Valley Floor}}$	0.0449	0.2873	XXXX	–
Percentage of Slope	0.0507	–0.2104	0.0384	XXXX

[1] Because r assumes a bivariate normal distribution, the square root transformation has been applied to the variates for elevation above the valley floor.

Five of these six values do not differ significantly from zero (see Thomas, 1976, table A11). Assuming $r = 0.00$ to indicate absolute statistical independence between two variables and

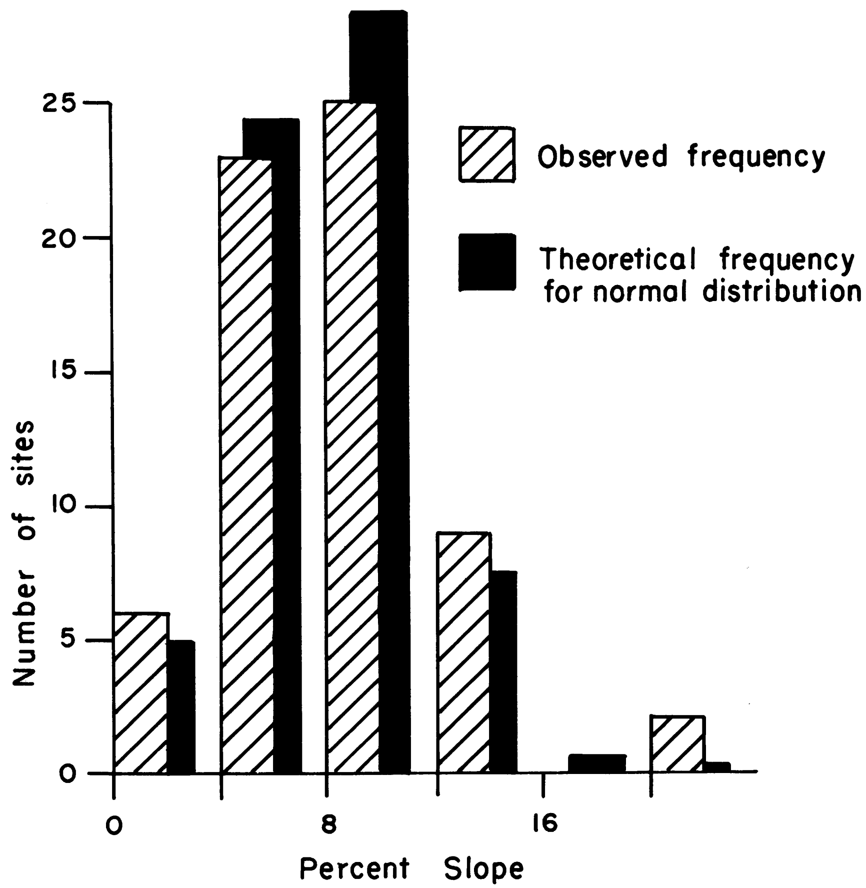

FIG. 60. Bar diagram comparing the expected normal distribution (for $\mu = 8.4\%$, $\sigma = 4.2\%$) with the observed slope of 65 Reese River sites.

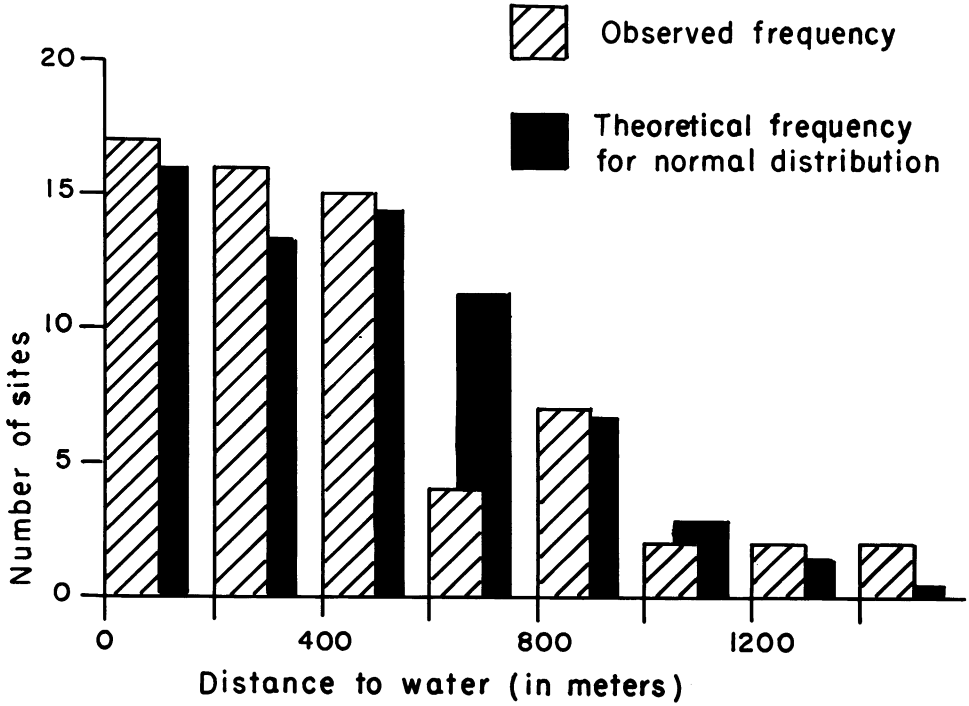

FIG. 61. Bar diagram comparing the expected normal distribution (for $\mu = 451$ meters, $\sigma = 355$ meters) with the observed distance to nearest water at 65 Reese River sites.

$r = \pm 1.00$ to denote absolute dependence, these figures tell us that five of the six relationships are wholly independent.

But the r between distance to ecotone and elevation above valley floor is significantly different from zero ($0.01 < p < 0.05$), although this difference is not highly significant. The 95 percent confidence limits for this coefficient range from +0.50 to +0.678 (computed by methods described in Thomas, 1976, pp. 393, 394). Thus, although r differs slightly from zero, the value is certainly not equal to one. In fact, r is considerably closer to that for independent variables (zero) than for those totally dependent upon one another (unity). It seems safe to term these two variables "virtually independent," particularly because this low value of r accounts for only $100r^2 = 8.25$ percent of the total variance involved.

We think that these determinants can be summarized even further in terms of two simple probabilistic models. The first such model is the familiar bell-shaped curve, projected into three dimensions (fig. 64). This model applies to three of the four settlement pattern determinants: percentage of slope, distance to piñon ecotone, and elevation above the valley floor (transformed to square roots). All three variables truncate at zero, and increase in a single direction ("steeper," "further from the ecotone," and "higher"). The ridge along the top of the curve represents the maximum probability and corresponds to the parametric mean of the three dimensional distribution.

A second model is presented on figure 65, which applies to distance from the campsites to water. Previously, in figure 64, the two distance variables (from ecotone and above valley floor) logically progressed in a single direction: up. This was specified in the polythetic definitions of site location. But the distance to water is different because direction is unspecified. Consider a stream flowing out of the Toiyabes as a perfectly straight line. The bell-shaped probability curves must extend on *both sides* of that stream (fig. 65). Let us stand at a water source (zero distance) and then walk away in a perpendicular direction. As this distance increases, so does the probability of finding an archaeological site. The most probable spot is at the parametric mean (in this case estimated by $\overline{X} = 450$ meters). Once past this point, the probability of finding a campsite diminishes and ultimately approaches zero. Had we chosen to walk the other direction from the stream (180 degrees away), exactly the same probability distribution would have been involved. In other words, because the water sources at Reese River tend to flow linearly (as ephemeral streams), the sites are predicted by two bands of probability, each running parallel to the water source.

We find these two probabilistic models to be useful descriptions of our Reese River data. The piñon ecotone camps can be viewed as a sample of $n = 65$ sites, drawn at random from a hypothetical universe of all possible samples which exist under similar conditions.[1] The probabilistic models in figures 64 and 65 are thus theories to be tested in other localities. Pragmatically speaking, the true role of science in archaeology is to take such primitive theories and see just how well they perform in predicting phenomena elsewhere. By so doing, we can ultimately define the hypothetical population from which the Reese River sample was drawn.

Consider, for example, the sites in nearby Monitor Valley. Do the Reese River site determinants operate similarly in Monitor Valley? Do the sites tend to average 450 meters from water?

[1]The concept of the hypothetical universe is discussed by Thomas (1976, pp. 441-447).

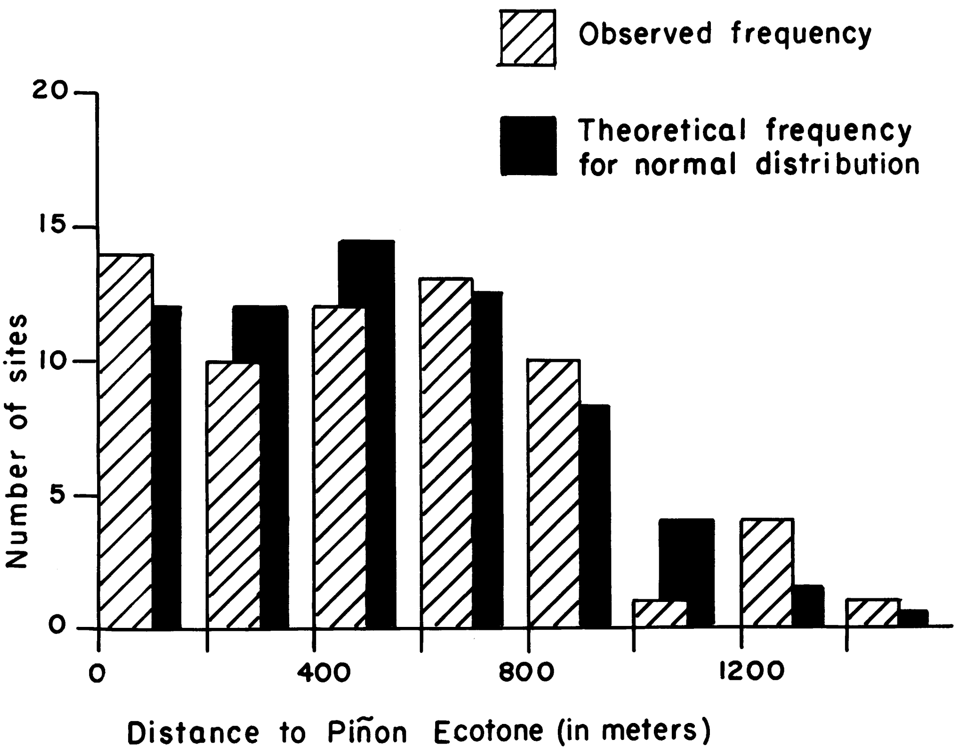

FIG. 62. Bar diagram comparing the expected normal distribution (for $\mu = 521$ meters, $\sigma = 357$ meters) with the observed distance to the piñon ecotone at 65 Reese River sites.

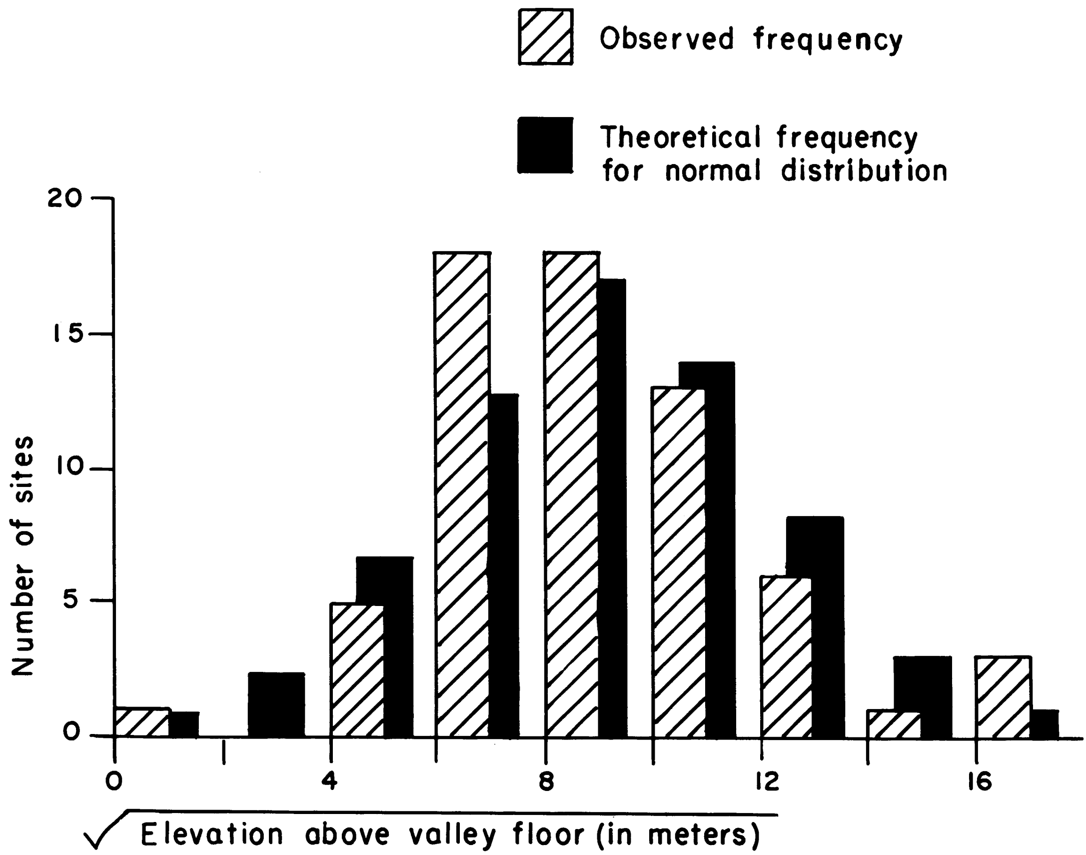

FIG. 63. Bar diagram comparing the expected normal distribution (for $\mu = 95$ meters, $\sigma = 63.5$ meters) with the elevation above the valley floor at 65 Reese River sites. The elevations have been transformed to square roots.

Are the densities symmetrical and parallel to the water sources as suggested by figure 65? Do the sites average 8 percent slope? Are sites normally distributed with respect to the piñon ecotone?

These and similar questions cannot be answered using Reese River data. They must be tested elsewhere. If the Reese River determinants satisfactorily predict site occurrences in Valley X, then Valley X must fall within the same hypothetical universe as the Reese River sites. But suppose that the Reese River theory fails to predict site localities in Valley X? What becomes of our theory? The answer is—nothing. The theory still explains (predicts) the past of the Reese River Valley, just as before. But we now know that Valley X belongs to a different hypothetical universe from that containing Reese River. We would now have *two* theories: one explaining the universe containing Reese River and the other predicting a population which contains Valley X. Should we study a third area—Valley Y—we can now test two alternative theories. Perhaps Y will be grouped with Reese River, perhaps with Valley X, perhaps neither. Valley Y could conceivably belong to yet a third universe of possibilities, a universe governed by still different site determinants.

The point to be made here concerns the highly touted "method of multiple working hypotheses" (see, for example, Thomas, 1974a, pp. 71-72). To criticize archaeologists, as for instance Cowgill (1975, p. 271) has done, for not *beginning* with multiple working hypotheses is a barb that misses the target altogether. Of course, we need multiple working hypotheses—the more the better. But these hypotheses must often develop hand-in-glove with the testing procedure. Archaeologists, as scientists, are not out to *prove* how good their theories are. They should be trying to *disprove* the bad ones. The ultimate objective should be to isolate the theory that best seems to explain one's data. It matters little whether this theory came about early in the investigation or was finally isolated from dozens of competitors. The theory either works or it does not.

We put forth these parameters (figs. 60-63) and probability distributions (figs. 64 and 65) as theories that predict settlement patterns at Reese River. We have presented data that support this contention. Should the theories explain settlement patterns elsewhere, then we will be pleased. If they do not, and it becomes necessary to frame alternative theories, then so be it. We think that the testing/revising/retesting strategy has suitable veracity to elucidate the requisite hypothetical universes of concrete archaeological reality. In this respect, we differ from skeptics, like Doran and Hodson (1975), who seem to opt for a somehow unspecified, rather mysterious mode of epistemology.

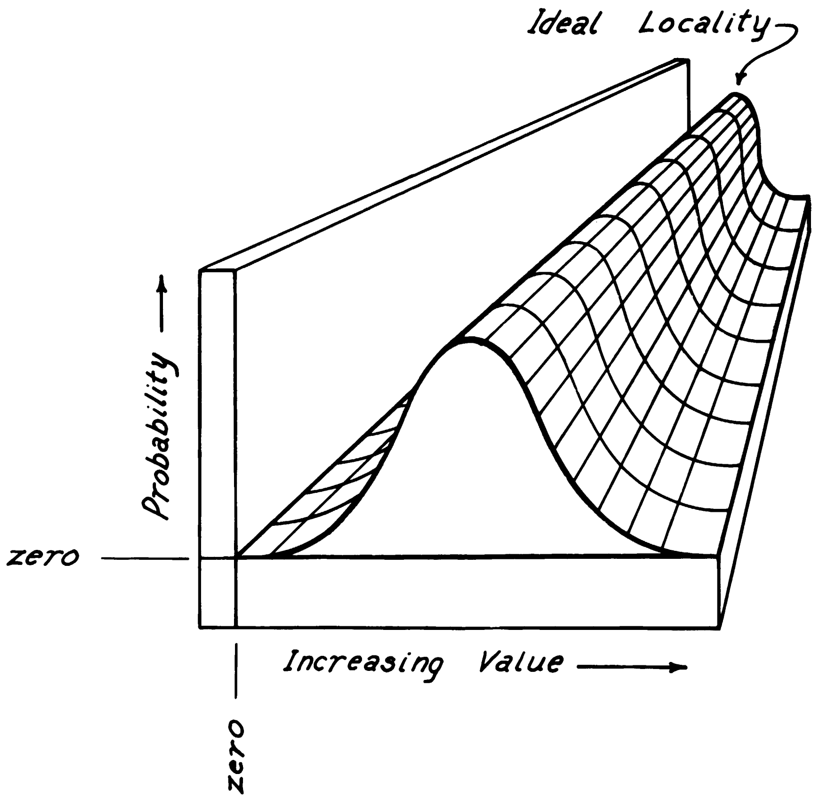

FIG. 64. Three-dimensional probability model applicable to three site determinants at Reese River: percentage slope, distance to the piñon ecotone, and elevation above the valley floor.

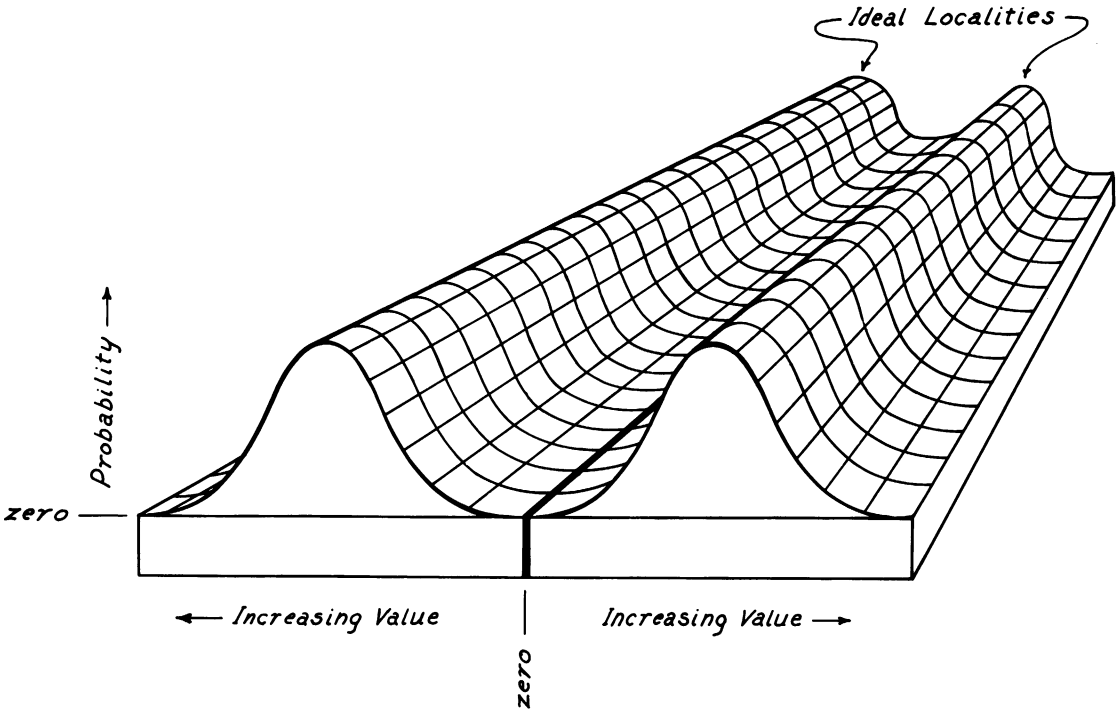

FIG. 65. Three-dimensional probability model describing distance to water for piñon ecotone camps at Reese River.

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