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ARCHAEOLOGICAL INVESTIGATIONS OF TWO ARCHAIC CAMPSITES LOCATED ALONG THE CONTINENTAL DIVIDE, MINERAL COUNTY, COLORADO

by

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INTRODUCTION

The Colorado Division of Wildlife has recently upgraded three irrigation ditches on lands administered by the U.S.D.A. Forest Service in Mineral County, Colorado. The ditches divert water from the western slope of the Continental Divide over Piedra Pass into the eastern slope watershed. The improvements occur primarily along the route of the existing ditches, in a right-of-way ten feet (3 m) each side of the centerline. The project area was initially inspected for cultural resources by Robert York, San Juan National Forest Archeologist, in 1979. The two sites with which this report is concerned, 5ML45 and 5ML46, were recorded by York (1979) at that time. Significance determinations were not made during the survey, however, as it was believed that surficial inspection alone of the sites was inadequate for discerning site eligibility for nomination to the National Register. While certain aspects of the sites, such as their location atop the Continental Divide where prehistoric lifestyles are poorly understood, suggested that the sites may be unique and important, other attributes important to proper evaluation, such as the depth of cultural deposits, temporal span and cultural affiliation, were not known. Consequently, the U.S. Forest Service recommended that further archaeological investigations be conducted at sites 5ML45 and 5ML46 to secure the additional data necessary for determining the sites' significance.

In August of 1981, the Colorado Division of Wildlife secured the services of Nickens and Associates of Montrose, Colorado, to conduct archaeological testing of the two sites. The fieldwork was completed by a small crew during the latter portion of August. An excavation report was subsequently prepared and submitted to the Colorado Division of Wildlife and the U.S.D.A. Forest Service (Reed 1981). This paper is an abbreviated version of the excavation report, and consequently omits much detailed data.

Environmental Setting

The Piedra Pass ditch modification project is located along the Continental Divide in Mineral County, Colorado (Fig. 1). Creede, a small mining town, is approximately 30.6 km (19 miles) northward of the project area, and Pagosa Springs is located 21 miles towards the south. Concentrations A and B are

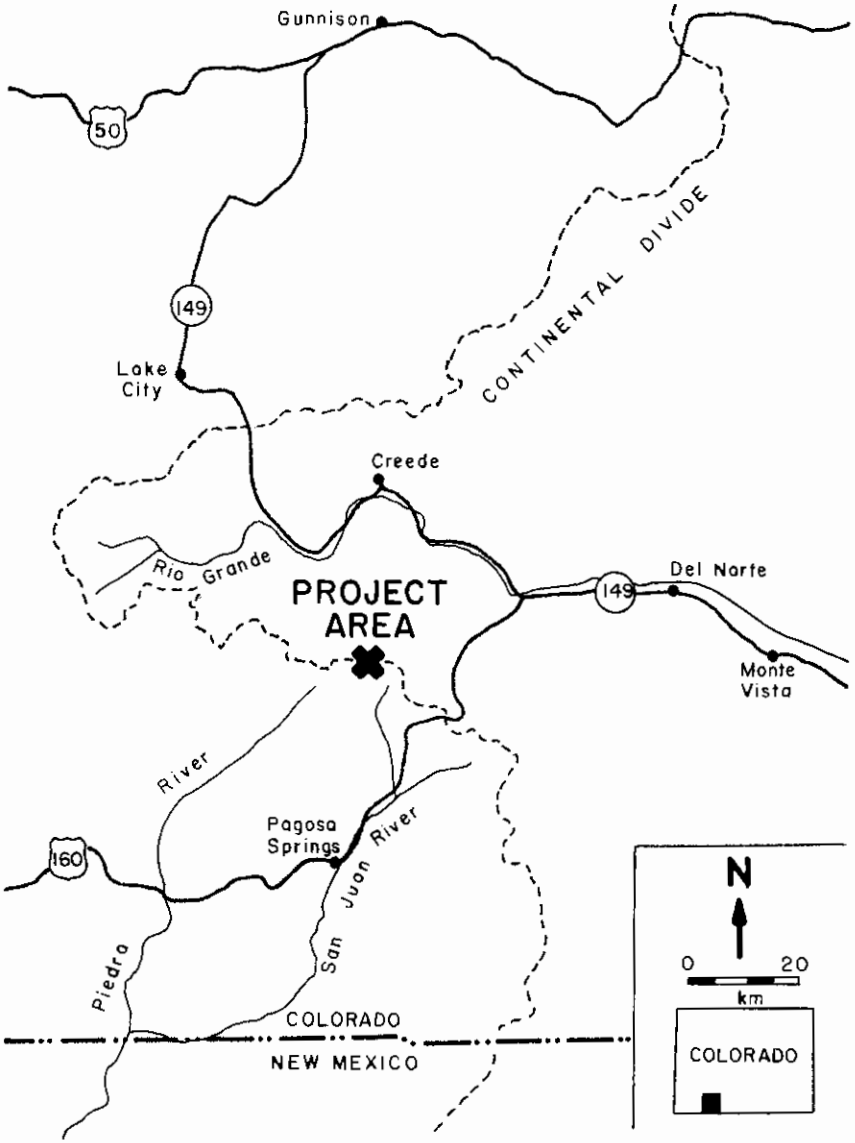

FIGURE 1. General location map.

located atop Piedra Pass: indeed, Concentration A extends onto both the eastern and western slope. These two concentrations are situated at approximately 11,400 feet (3475 m) elevation. Concentration C of site 5ML45 is located approximately 300 m south of Piedra Pass, on a small ridge on the western side of the East Fork of the Piedra River, above a small lake. The elevation of Concentration C is 11,360 feet (3463 m). Site 5ML46 is located approximately 1 km east of site 5ML45, also atop a mountain pass. The pass on which site 5ML46 is situated separates the San Juan and Piedra River drainages, two major river systems on the Western Slope of southwestern Colorado. The Continental Divide is approximately 1 km north of the site.

The Piedra Pass project area is located in the Southern Rocky Mountain physiographic province (Hunt 1967), in the San Juan Mountain Range. The San Juan Range has the topography of a maturely dissected plateau of coarse texture, with streams relatively far apart (Fenneman 1931). Total relief in the San Juans is nearly 6,000 feet (1828 m), a result of hundreds of peaks rising above 13,000 feet (3962 m), a few above 14,00 feet (4267 m), and valleys from 2,000 to 4,000 feet (610 m to 1220 m) deep. Extensive glacial activity has occurred in the valleys above 11,000 feet (3353 m).

The Continental Divide is oriented roughly east to west in the vicinity of Piedra Pass, with the Eastern Slope and the Rio Grande River drainage to the north, and the Western Slope and the Piedra and San Juan River drainages to the south. Spectacular peaks dominate the landscape in the area, including the 13,000 foot (3962 m) South River Peak, and the slightly lower Piedra and Palomino Peaks. These peaks, and the bedrock underlying sites 5ML45, and 5ML46, consist primarily of tertiary volcanic rocks classified as quartz latite.

The soils in the vicinity of sites 5ML45 and 5ML46 are classified as Hossick gravelly loams (United States Department of Agriculture 1981). Soils of this type are moderately deep and well-drained, and form on alpine ridgetops and slopes by the decomposition of quartz latite and other volcanic rocks. The surface layer is generally a brown, gravelly loam, 5 to 20 inches (13 to 50 cm) thick, underlain by a reddish-brown, very gravelly subsoil loam, between 4 and 30 inches (10 to 76 cm) thick. At sites 5ML45 and 5ML46, this subsoil rests directly atop slightly fractured latite between approximately 10 and 40 cm below the present ground surface.

The severity of climate in the project area, detailed below, results in substantial soil perturbations. Frost heaving, causing vertical displacement of soil constituents, appears to be the primary agent of soil disturbance in the Piedra Pass vicinity, although rodent burrowing is also prevalent. For a more detailed discussion of frost heaving and other types of alpine soil disturbances, the reader is referred to Benedict and Olson's (1978) Mount Albion Complex monograph.

The climate at Piedra Pass is quite severe, due to its high elevation. While no climatic data have been gathered in the immediate vicinity, data are available from Wolf Creek Pass, 12 miles (19 km) distant and several hundred feet lower in elevation (10,857 feet or 3309 m). Wolf Creek Pass receives an average of 41 inches (1041 mm) of precipitation per year and most of it as snowfall. Average snowfall is 438 inches (11,125 mm) (United States Department of Agriculture 1981). Average daily temperature over a year is 33.8°(F). A typical year may

have a growing season of 73 days when the minimum temperature is greater than 32°(F). Since site 5ML46 is nearly 1000 feet (305 m) higher than Wolf Creek Pass, precipitation is possibly greater and temperatures are probably lower at the site.

Water is abundant in the project area the year round. That an average of 438 inches (11,125 mm) of snow falls in the region assures deep snow pack, resulting in great early summer runoff. Further, it is likely that some snowbanks endure most of the summer in protected places. In addition to snowfall, a considerable amount of rain falls during the summer months. At Wolf Creek Pass (United States Department of Agriculture 1981), an average of 9 inches (230 mm) of precipitation falls in the months of June, July and August, with an average of 25 days during those months receiving one-tenth of an inch (2.54 mm) of rain or more.

As a result of the great amount of annual precipitation, lakes and flowing streams are common in the area. Four small lakes are present within 500 m of site 5ML45. These lakes are shallow and do not support fish; two of these probably empty completely in dry years. Since the project area is located along the Continental Divide, streams are small and are fed by run-off from nearby peaks. As illustrated in Figure 1, the East Fork of the Piedra River and Red Mountain Creek, the latter a tributary to the Rio Grande River, are permanent water sources emanating from Piedra Pass. The West Fork of the San Juan River, also a permanent water supply, originates less than 300 m east of site 5ML46.

There exist primarily two vegetation communities in the vicinity of the two archaeological sites: one comprised of species associated with subalpine forests and the other consisting of alpine and subalpine tundra species. The woodland community is characterized by dense stands of Engelman spruce (*Pinus engelmannii*) and subalpine fir (*Albies lasiocarpa*) and extends in most places to an altitude of approximately 11,600 feet (3535 m). Dwarf Engelman spruce and subalpine fir my extend up to 11,850 feet (3610 m), which is the approximate altitude of tree line (Krummholz limit). The tundra community is characterized by densely-packed, low-growing species. Common species include sedges (*Carex* sp.), showy cinquefoil (*Potentilla* sp.), tufted hairgrass (*Deschampsia caespitosa*), willow (*Salix* sp.), alpine timothy (*Phleum alpinum*), ligusticum (*Ligusticim filicinum*), parry clover (*Trifolium parryi*), American bistort (*Polygonum bistortoides*), and Kobresia (*Kobresia myosuroides*) (United States Department of Agriculture 1981).

Sites 5ML45 and 5ML46 are both located in the open, tundra floral community (Figs. 2 and 3). A few Krummholz trees are scattered atop Concentration A at site 5ML45, but the other concentrations are treeless. Tall Engelman spruce and subalpine fir are present on the slopes above and below site 5ML45, and at least 100 vertical feet (30m) below site 5ML46.

A wide variety of fauna is present in the Piedra Pass area. Field personnel observed mammals such as elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), porcupine (*Erethizon dorsatum*), chipmunk (*Eutamias* sp.), mice, and numerous birds. Fish are not present near the site as streams and lakes are too shallow.

FIGURE 2. Piedra Pass and Site 5ML45, as viewed from the East Fork of the Piedra River.

FIGURE 3. Site 5ML46, located on a saddle separating the Piedra and San Juan River drainages.

RESEARCH DESIGN

The primary goal of the test excavations was to recover, analyze, and synthesize archaeological data in order to determine the eligibility of the sites for nomination to the National Register of Historic Places.

To this end, the following research goals were specified:

1. To establish a chronology for the occupations of sites 5ML45 and 5ML46;
2. To establish the season or seasons during which the sites were utilized;
3. To discern site functions;
4. To define the cultural-historical affiliations of the occupations.

Field techniques were selected for use during test excavations to recover these kinds of data. The efforts were generally successful.

DATA RECOVERY AND DATING

Field Procedures

When the Piedra Pass Project area was originally inspected for cultural resources by U.S. Forest Service personnel in 1979, site 5ML46 was recognized as being comprised of a single artifact concentration, and site 5ML45 was defined as possessing three distinct artifact concentrations. The distinctions between the three concentrations comprising site 5ML45 were made on the basis of artifact distribution and landform. Concentration A is located primarily atop a small ridge and a knoll on the western portion of Piedra Pass and Concentration B is located on a small bench and slope on the eastern side of the saddle comprising the pass, overlooking the East Fork of the Piedra River. Concentration C is located approximately 300m southwest of the summit of Piedra Pass, on a small ridge overlooking a shallow lake and the East Fork of the Piedra River. The archaeological surveys found no cultural features, and a somewhat sparse scatter of chipped stone artifacts. Concentration C was thought to represent the area of most intensive occupation, where some 40 to 50 artifacts were originally noted (York 1979).

The scope-of-work required that a representative sample of the exposed archaeological materials on the two sites be collected in a manner preserving their provenience. In that the survey report implied that each artifact concentration possessed fewer than 50 surface artifacts, it was determined that all surface artifacts should be collected, in order to achieve a sufficiently large artifact sample for analysis. This task was implemented by the field-crew making a number of very closely spaced sweeps across the site areas, pin-flagging all surface artifacts. Temporary datums for mapping stations were established as needed across the artifact concentrations, and azimuths and distances to all of the artifacts from the temporary datums were recorded, with the aid of a pocket transit and a 50m tape. A sequential number was affixed to each artifact as it was mapped and collected, so preserving data concerning its spatial relationship to other artifacts. An exception to this surface collection procedure was made in a small area at Concentration A, site 5ML45, where artifacts were extremely numerous. This area was divided into 13 continuous meter squares and collected by square. When the mapping and surface collection of a concentration was completed, a topographic map with 1m contour intervals was made.

Subsurface Tests

The overall objective of the limited test excavations was to efficiently and economically test the buried strata in such a manner as to achieve maximum data recovery within project parameters. Testing was aimed at detecting the presence or absence of important buried features, such as living surfaces or hearths, and buried artifactual and ecofactual materials.

A total of 36 1 m square test units were excavated. Ten test units each were excavated at site 5ML46 and at Concentrations A and B at site 5ML45; only six test units were dug at Concentration C of site 5ML45. Concentration C was investigated less intensively in that it was located beyond the area of direct impact of the proposed ditch improvements. These squares were located with the aid of a table of random numbers, in reference to an imaginary grid superimposed over the maximum extent of surficial artifact scatter. One exception was made; a test unit (T.U. 10) was non-randomly placed atop a small knoll in Concentration A at site 5ML45, where numerous small obsidian flakes were clustered. Small test units were used because of the likelihood of little soil depth, and because small and numerous sample units tend to provide a more accurate picture of the sample universe than fewer, larger sample units.

The test units were excavated in arbitrary 10 cm vertical increments to either bed rock or a distinctive non-cultural saprolitic soil immediately above bedrock. All fill was screened through ¼-inch mesh. The tundra vegetal mat, a very dense system of roots in the upper most 10 cm, was carefully ripped apart by hand in the screens. Special samples (bulk soil, pollen, charcoal, etc.) were collected as necessary.

Stratigraphy

Excavation of 36 test units at sites 5ML45 and 5ML46 revealed remarkable homogeneity of cultural and non-cultural strata. The stratigraphy at both sites consisted primarily of a dark brown loam yielding artifacts and charcoal flecks overlying a decidedly more yellowish-brown loam devoid of cultural materials. As mentioned in the introductory section, the stratigraphy exposed during excavations conform well with typical Hossick gravelly loam, characteristics described by a soil survey of the Piedra Area (United States Department of Agriculture 1981). In some test units, the dark brown color of the soil within the tundra root zone, a zone approximately 10 cm thick, was slightly different from underlying dark brown loam, but the soil ontogeny is thought to be the same. The dark-yellowish soil underlying the dark brown loam was apparently forming *in situ* by the decomposition of the underlying quartz latite bedrock. In some test units, tongues of dark-yellowish brown loam intruded into the lower portions of the dark brown loam, indicating mixing of soils. Gophers and frost heaving are blamed for the mixing.

The quartz latite bedrock underlying the two sites is somewhat deeper at site 5ML46 than at site 5ML45. Bedrock was encountered between approximately 10 and 30 cm at site 5ML45, and between approximately 25 and 55 cm at site 5ML46. One notable exception occurred in T.U. 2 at Concentration A, site 5ML45, where artifacts and charcoal were recovered down to 80 cm below the present ground surface. This test unit is situated in a small basin where a small pond surely forms in the early summer from snowmelt. Deposi-

tion is great in the basin, and the cultural materials are probably out of their original context.

Neither site 5ML45 nor site 5ML46 revealed cultural features such as firehearths. Firehearths were undoubtedly present, however, given the abundance of charcoal recovered, especially atop elevated areas, which would seem well suited for camping. That the charcoal was produced by natural forest fires seems unlikely, considering that site 5ML46 is above timberline, and the concentrations comprising site 5ML45 are presently devoid of trees, save for a few scattered dwarf spruce or fir atop Concentration A. Treeline would have had to fluctuate considerably for both sites to be covered by forest. It seems likely that the charcoal emanated from firehearths that have since been rendered unrecognizable by frost heaving and rodent disturbances.

Dating

Radiocarbon, obsidian hydration and artifact seriation analyses were conducted in order to determine the age of site occupations. While each of the three dating techniques yielded chronometric or relative dates, their results are not entirely compatible.

Radiocarbon Determinations

Four of the 10 radiocarbon samples collected at sites 5ML45 and 5ML46 were submitted to the laboratories of Radiocarbon, Ltd., of Lampasas, Texas, for analysis. Each sample consists of charcoal collected within a single test unit, although charcoal from several contiguous arbitrary (10 cm) levels may be represented. As discussed above, no features such as firehearths were discovered, necessitating that charcoal, presumably from firehearths destroyed by weathering agents, be collected from the artifact-bearing dark brown loam. Concentration B of site 5ML45 is not represented among the radiocarbon dates processed, due to the sparcity of charcoal encountered during its excavation. As Table 1 illustrates, site 5ML46 is probably the most recently occupied site, dated at 1820 B.C. ± 220, preceded by Concentration A at site 5ML45, which dates between 3720 B.C. ± 170 and 3460 B.C. ± 210, and Concentration C at site 5ML45, which dates 5900 B.C. ± 190 B.C.

TABLE 1. Radiocarbon Dates from Sites 5ML45 and 5ML46

Lab Designation	Site	Concentration	Test* Unit	Levels+	Radiocarbon Age, Yrs, B.P.	MASCA Corrected AD/BC Date
RL-1591	5ML46	——	5	3, 4	3390 ± 130	1820 BC ± 220
RL-1592	5ML45	A	10	1, 2	4690 ± 160	3460 BC ± 210
RL-1593	5ML45	A	8	3, 4, 5	4900 ± 180	3720 BC ± 170
RL-1594	5ML45	C	5	2, 3	7860 ± 190	

*Refers to locations shown on Figures 4, 6, 8, and 10.
+Levels are in 10 cm increments from the surface.

Obsidian Hydration Determinations

Obsidian hydration analysis is perhaps one of the most promising dating techniques being developed for use in archaeology. The method is relatively inexpensive, and provides dates for the artifacts themselves, rather than for features whose association with certain artifacts may be questionable.

The technique is based upon the assumption that obsidian, a natural glass, absorbs water at a predictable rate. A newly exposed obsidian surface, perhaps produced by a flintknapper, absorbs atmospheric water and thereby produces a cortex or rind, which petrographically is termed pearlite. The thicker the rind, the longer the surface has been exposed. When certain variables are known, both relative and absolute dates can be derived by measurement of the hydration rind.

The speed at which obsidian absorbs water is dependent upon certain chemical and environmental variables. These variables tend to be quite localized geographically, making determinations of age difficult, unless the variables are carefully identified and the proper adjustments in calculations are made.

While all obsidians are primarily aluminum and silicon, the constituent elements may vary between obsidian sources. The chemicals comprising various obsidians have an important impact upon the hydration rate. To facilitate the comparison of hydration measurements, it is therefore necessary to identify the chemical types of obsidian under study, and so ascribe the proper hydration rate for that material type. In the case of the Piedra Pass Project, this was done by measuring the Refractive Index on powdered samples by the central focal masking technique in a microscope (Fred Trembour, personal communication). Two groups, indicating at least two different obsidian sources, were identified, one with a high Refractive Index between 1.485 and 1.486 and the other with a low Refractive Index between 1.482 and 1.483. According to Fred Trembour (personal communication), the group with the lower Refractive Index may absorb water at nearly twice the rate of the higher Refractive group.

Temperature is another critical variable affecting hydration rates. In general, higher temperatures seem to increase the rate of water absorption (Burns 1981). The primary problem with temperature as a variable, however, is discerning temperature fluctuations affecting the obsidian specimen. While a specimen buried 10 m below the ground surface may hydrate at a slow and constant rate, specimens buried up to 0.5 m are subject to seasonal fluctuations in temperature, resulting in faster water absorption (Burns 1981:34). Obsidian buried less than 0.5 m is affected by both seasonal and daily temperature fluctuations, further affecting the rate of hydration. Surficial specimens are subject to direct sunlight, perhaps with alternating shade, making the rate of water absorption almost impossible to calculate (Burns 1981).

Nineteen specimens were sent to Fred W. Trembour of the Branch of Isotope Geology, U.S. Geological Survey, in Denver, for study. One specimen was too small for processing and so was omitted from analysis. The remaining 18 specimens were processed; they were grouped according to their refractive index and their hydration rinds were measured in microns (μm)^2. The specimen's relative ages were calculated for each refractive index group, based on the

assumption that temperature history is either constant or the same for all members. The results are presented in Table 2. Next, an attempt to ascribe absolute dates to each specimen was made. This was accomplished by squaring the measurement of the hydration rind (μ m)^2 and multiplying it by a constant (K) based upon the speed at which a specific chemical type of obsidian absorbs water at a specific temperature over a thousand year period. In the case of Piedra Pass sites, it was estimated that the mean temperature affecting the material was 0° C. The constant for the higher refractive index group is thought to be 1.1 per millennium, and 2.0 per millennium for the lower refractive index group. The formula for calculating absolute dates is as follows: (μ m)^2 x 1000/K.

Cross Dating of Artifacts

Within the artifact assemblages representing the remains of prehistoric hunters and gatherers in western Colorado, there exist few artifact classes that

TABLE 2. Obsidian Hydration Determinations

Higher Refractive Index (R.I.) Group

Site	Concentration	F.S.*	Test Units	Level	R.I.	μm	(μm)²	RAF*	Date
5ML45	A	56-416	——	Surface	1.486	2.6	6.9	1.2	4312 BC
5ML45	A	22-A	10	1	1.485	3.2	10.2	1.8	7312 BC
5ML45	A	22-B	10	1	1.485	2.4	5.7	1.0	3222 BC
5ML45	A	22-C	10	1	1.486	2.9	8.3	1.5	5585 BC
5ML45	A	28-B	10	2	1.485	2.7	7.1	1.2	4495 BC
5ML45	A	33	8	2	1.485	2.7	7.5	1.3	4858 BC
5ML45	A	38	8	3	1.486	3.3	11.1	1.9	8130 BC
5ML45	A	40	8	4	1.486	3.1	9.5	1.7	6676 BC
5ML45	C	65-140	——	Surface	1.485	3.9	15.6	——	12,221 BC
5ML46	——	14-8	——	Surface	1.485	3.1	9.4	1.3	6585 BC
5ML46	——	12	2	1	1.485	2.7	7.1	1.0	4495 BC

Lower Refractive Index (R.I.) Group

Site	Concentration	F.S.*	Test Units	Level	R.I.	μm	(μm)²	RAF*	Date
5ML45	A	28-C	10	2	1.482	4.4	19.5	——	7790 BC
5ML45	B	50	6	1	1.483	2.6	7.0	——	1540 BC
5ML45	B	45-12	——	Surface	1.482	2.8	7.9	1.0	1990 BC
5ML45	C	69	3	2	1.482	3.4	11.8	1.5	3940 BC
5ML45	C	73	3	3	1.483	2.8	8.0	1.0	2040 BC
5ML46	——	11	8	1	1.483	3.5	12.6	1.6	4340 BC
5ML46	——	22	1	3	1.483	3.2	10.3	1.3	3190 BC

*RAF=Relative age factor
F.S.=Field specimen

serve to readily identify a specific assemblage to its proper cultural or temporal affiliation. Of the various artifact classes, projectile points are one of the most suitable. There exist, however, certain limitations in using projectile points for dating and culturally identifying artifact assemblages. Foremost among them is that some types of projectile points have an extremely wide geographical distribution, and may also have been manufactured over several thousand years. This problem in some instances can be alleviated by extensive excavations within a particular region, that may indicate that a particular type may indeed have a limited temporal span in the region in question. Unfortunately, the number of well-dated excavated sites yielding numerous projectile points is small in western Colorado, so a well-dated projectile point chronology has yet to be developed.

The projectile points recovered at sites 5ML45 and 5ML46 suggest site utilization by Archaic Stage peoples. Further temporal definition is not advisable due to the small sample of recovered projectile points and the problem discussed above.

MATERIAL CULTURE

A total of 2404 artifacts was recovered from the surfaces and excavated test units at sites 5ML45 and 5ML46. All artifacts are stone; no ceramics or perishable materials were found. The absence of perishable materials is undoubtedly due to soil acidity and the severe mechanical weathering agents affecting the shallow, open sites, rather than the nonutilization of such materials. The material culture consists almost exclusively of chipped stone artifacts, as only two metate fragments, found at Concentration C of site 5ML45, were recovered. The stone artifacts have been placed into debitage, utilized flakes and various prepared tool categories, based upon morphological, and to a lesser extent wear-pattern characteristics, and are discussed below according to site or concentration. Tabulations of the various types of stone materials present at the two sites are presented below, as is a discussion of the stages of lithic reduction occurring at each site or concentration.

Site 5ML45, Concentration A

A total of 1927 artifacts were recovered at Concentration A. This includes 10 projectile points, six bifacial knives, six utilized flakes, and one end-scraper. A large number of the total were recorded from the surface; six projectile points and seven other prepared tools were among the 657 surficial artifacts. The distribution of surficial artifacts is shown in Figure 4.

PROJECTILE POINTS:

Ten complete or fragmentary projectile points were discovered at Concentration A. Four of that number are large corner-notched points (Fig. 5 a-d), a very common type in the western United States (Reed and Scott 1980). Not only do these artifacts have a wide geographic distribution, but they also apparently have a wide temporal range spanning from approximately 5,000 B.C. into historic times (Aikens 1970; Heizer and Hester 1978). The large corner-notched points from Concentration A have triangular blades with straight to

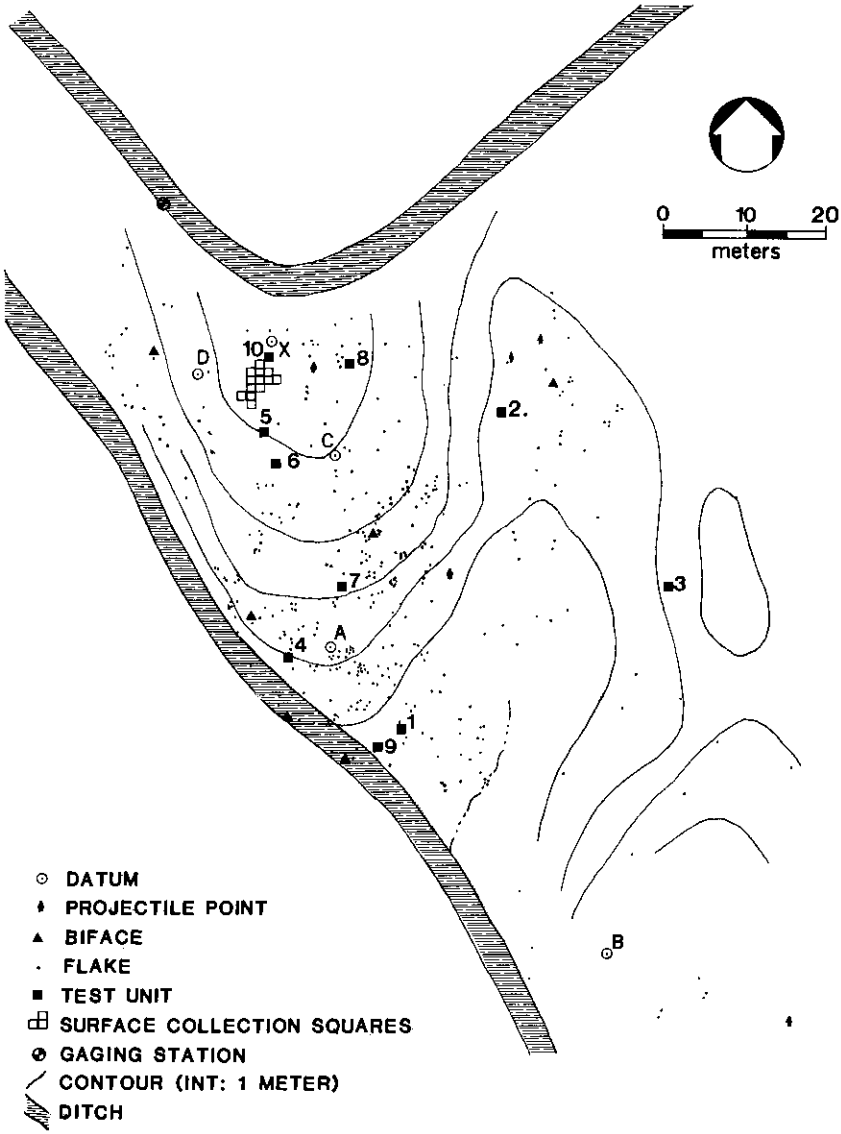

FIGURE 4. Plan view of Concentration A, Site 5ML45.

slightly convex blade margins. Point bases are slightly concave. One artifact (Fig. 5b) has been considerably reworked, perhaps after the tip of the once larger point broke off. That a new tip has been fashioned on the artifact is evidenced by the stubby shape and blade asymmetry.

An Elko Eared projectile point (Holmer 1978; Heizer and Hester 1978) was

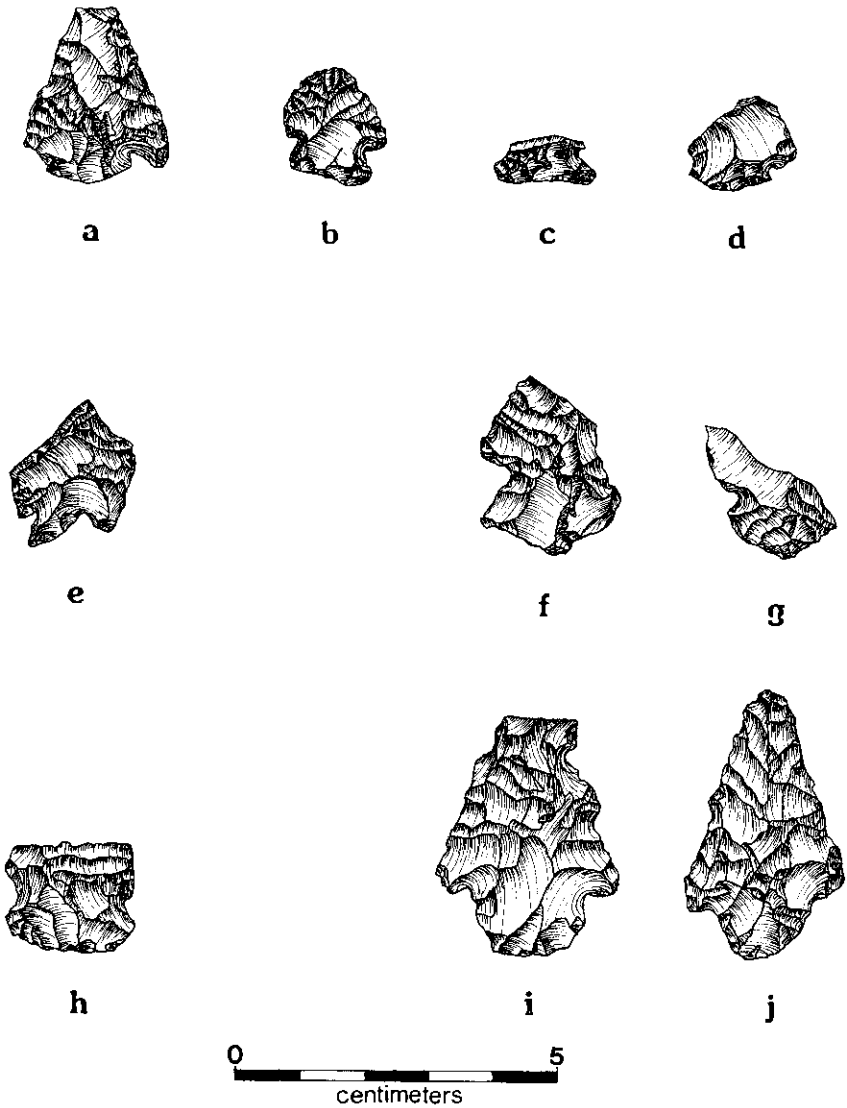

FIGURE 5. Projectile points recovered at Concentration A, Site 5ML45.

also discovered on Concentration A. This fragmentary projectile point is both corner and basally notched (Fig. 5e). Elko Eared points are a rather common Great Basin and Northern Colorado Plateau point type, where they are dated by some between 5500 B.C. and historic times (Holmer 1978). Others (e.g. Heizer and Hester 1978) suggest a more limited temporal range, between 2000 B.C. and A.D. 1080.

Portions of three large side-notched projectile points were found at Concentration A. Two of the fragmentary artifacts consist primarily of one side notch and an adjacent portion of blade (Figure 5f, g), too little to confidently place into a more specific type. They do appear, however, to be more comparable to Northern Side-Notched, San Rafael, or Hawken Side-Notched points, types that date between 4000 and 2000 B.C. (Holmer 1978), than to the more temporally extensive Elko Side-Notched type. One of the large side-notched points also retains a short convex base (Fig. 5h). If the missing blade as lanceolate, the artifact may be similar to Hawken Side-Notched points, which date roughly between 4500 B.C. and 2600 B.C. (Holmer 1978). The point is also comparable to points ascribed to Irwin-Williams' En Medio or Armijo Complexes of the Oshara Tradition (Irwin-Williams 1973: Figs. 5, 6), dating between 1800 B.C. and A.D. 400, or Gooding's (1981) Altithermal Side-Notched type from Vail Pass.

Lastly, two large, contracting stem points were discovered at Concentration A (Figure 5 i, j). Similar projectile points are commonly refererred to as Gypsum Points, which appear to date between approximately 2500 B.C. to A.D. 500 (Chapman 1977; Heizer and Hester 1978; Holmer 1978; Irwin-Williams 1973). Irwin-Williams (1973) found similar points on sites assigned to the En Medio Complex, dating between 800 B.C. and A.D. 400.

BIFACIAL KNIVES:

This category includes tools that have been flaked on both dorsal and ventral surfaces to produce a roughly triangular-shaped implement suitable for general cutting purposes. Six artifacts of this type were recovered at Concentration A. All are fragmentary, having been broken either during use or manufacture. Three of the bifacial knives are broken through the long axis, and three are broken off across the tools' midsections.

END SCRAPER:

A single unifacially flaked scraping tool was recovered. The artifact evinces retouch and unifacial wear patterns along the distal margin. Unlike most end scrapers, however, the tool is very thin along the working edge, suggesting that the tool was used for rather delicate work.

CORES:

Two cores were excavated at Concentration A. Both are chert, brown to black in color, and are less than 10 cm in any dimension. This suggests that the cores were nearly exhausted.

UTILIZED FLAKES AND DEBITAGE:

Six of the 1910 flakes recovered at Concentration A show evidence of having been utilized. They are otherwise unmodified. Five of the six have wear patterns on both dorsal and ventral surfaces, indicative of cutting rather than scraping usage. The remaining are not modified or utilized, and represent waste materials produced by flintknapping. Sixteen flakes (less than 1 percent) possess a cortical surface. The small number of flakes with cortex indicates that primary

reduction of raw stone materials via flintknapping was not a common activity at Concentration A.

Site 5ML45, Concentration B

Concentration B yielded far fewer artifacts than Concentration A; indeed, its total of 116 artifacts was the smallest of any of the site concentrations, perhaps indicating the least intensive prehistoric utilization. Of that total, 97 artifacts were recovered from the present ground surface. The distribution of surficial artifacts is illustrated in Figure 6. Few prepared tools were recovered at Con-

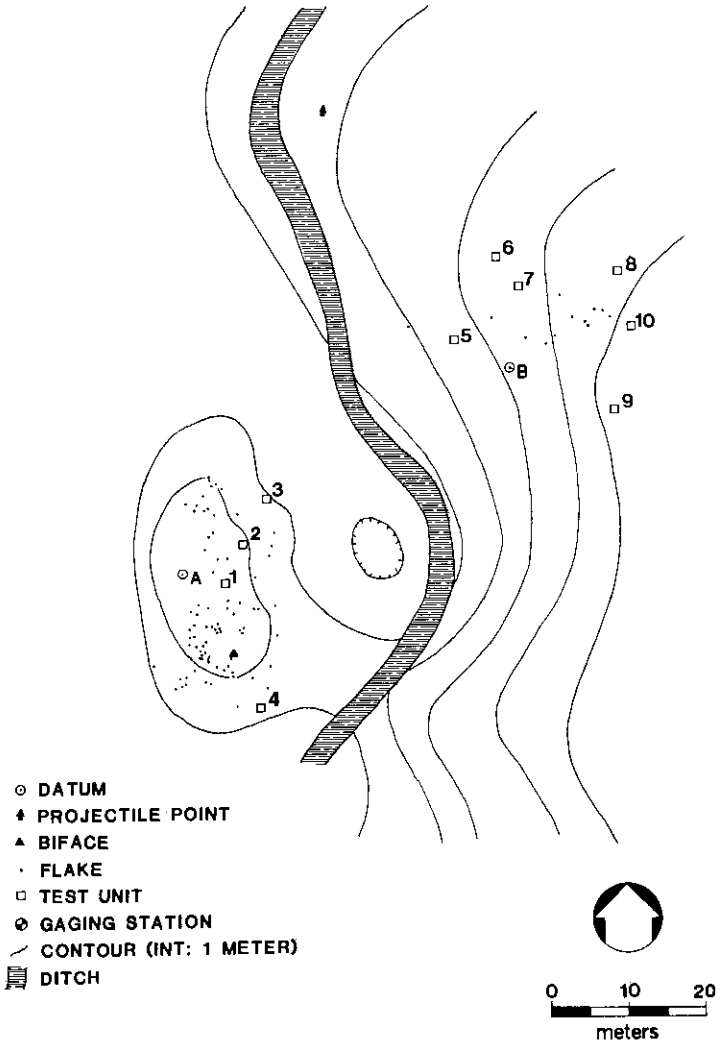

FIGURE 6. Plan view of Concentration B, Site 5ML45.

centration B, consisting of one projectile point, one bifacial knife fragment, and one end scraper.

PROJECTILE POINT:

One large corner-notched projectile point was discovered at Concentration B. The artifact is somewhat crude, and is manufactured from white, heat-treated chert. As Figure 7a illustrates, the tool has a triangular, slightly convex blade, and probably once possessed a straight to slightly convex base. Large corner-notched projectile points have a broad temporal span in the western United States, spanning from approximately 5000 B.C. into historic times (Holmer 1978).

BIFACIAL KNIFE:

A small fragment of a bifacially flaked artifact was found. The obsidian artifact is well made and relatively thin, suggesting that it was once part of a triangular bifacial knife or preform.

END SCRAPER:

This end scraper (Figure 7b) is more typical in form than the end scraper recovered at Concentration A, being thicker above the distant, working end than near the striking platform. Edge modification and wear patterns are unifacial, and are confined primarily to the distal end and the dorsal surface.

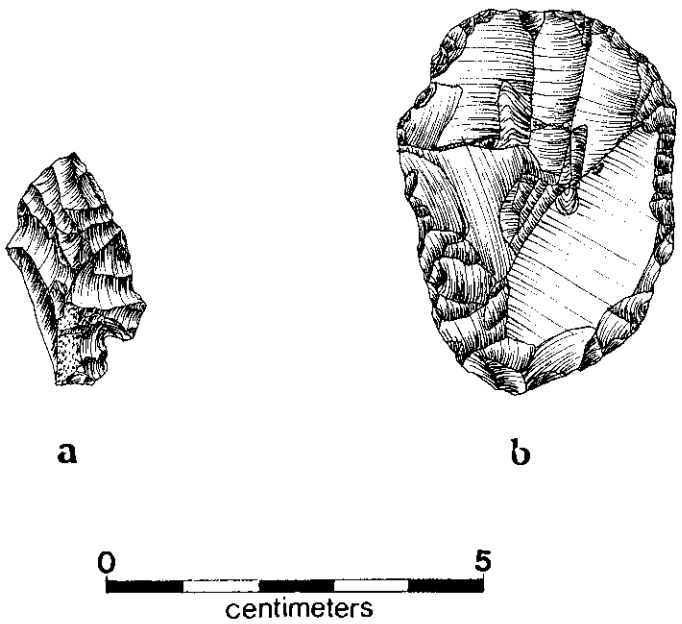

FIGURE 7. Prepared tools recovered at Concentration B, Site 5ML45.

UTILIZED FLAKES AND DEBITAGE:

Two of the 113 flakes collected at this concentration showed signs of having been utilized. The two artifacts evince unifacial attrition along one edge, indicative of being used with a scraping motion, but are otherwise unmodified. The remaining 111 artifacts are classified as debitage. As at Concentration A, Concentration B appears not to have been utilized for the primary reduction of lithic material, as only 4 flakes (3 percent) retain any cortex.

Site 5ML45, Concentration C

Two hundred and ten artifacts were recovered at Concentration C, 166 of which were found on the present ground surface. The artifact assemblage recovered includes 4 projectile points, 6 knives or scrapers, 2 utilized flakes and two metate fragments. The distribution of surface artifacts is illustrated in Figure 8.

PROJECTILE POINTS:

Each of the 4 projectile points found at Concentration C are placed within a distinct type. The ubiquitous large corner-notched variety is represented by one artifact (Fig. 9a). This artifact has a lanceolate blade with straight edges, low, distinct corner-notches, and a small, straight base. As discussed previously, similar projectile points have a very long temporal span, and are geographically widespread, and so are poor "index fossils."

The second projectile point type represented at Concentration C is the large side-notched variety. The artifact (Fig. 9b) has a triangular blade that is relatively straight, shallow-side notches, and a slightly convex base. The base appears to be wider than the blade, but this is probably due to the fact that the corners of the blade above the notches are missing. The artifact is not unlike Hawken Side-Notched points whose blades have been broken and remodified (Frison et al. 1976) and points placed by Irwin-Williams (1973: Figs. 5d and 6d) into the Armijo and En Medio Complexes, dated between 1800 B.C. and A.D. 400. The point may also be comparable to the Altithermal Side-Notched type described by Gooding (1981) in his Vail Pass Camp report.

The projectile point illustrated in Figure 9c, is a square stemmed variety. The shortness of the triangular blade and especially its asymmetry strongly suggests that the blade has been reworked, possibly after the original tip was broken. It is likely that the artifact was used as a cutting implement after remodification; wear patterns in the form of edge crushing tend to support this interpretation. A reduction of the blade may have changed the appearance of the hafting element. It is possible tangs may have been removed, and that the point may have been corner-notched. A similar projectile point is illustrated by Benedict and Olson (1978: Fig. 38p), which was recovered at the high altitude Hungry Whistler Site. It may be noteworthy that Benedict and Olson (1978: 53) recovered two such points, and that both had wear indicative of secondary usage as knives. In an analysis of projectile points collected in the Rio Grande National Forest, Reed (1979) writes that square base, stemmed points appear at approximately 3000 B.C. and were manufactured until A.D. 1000.

FIGURE 8. Plan view of Concentration C, Site 5ML45.

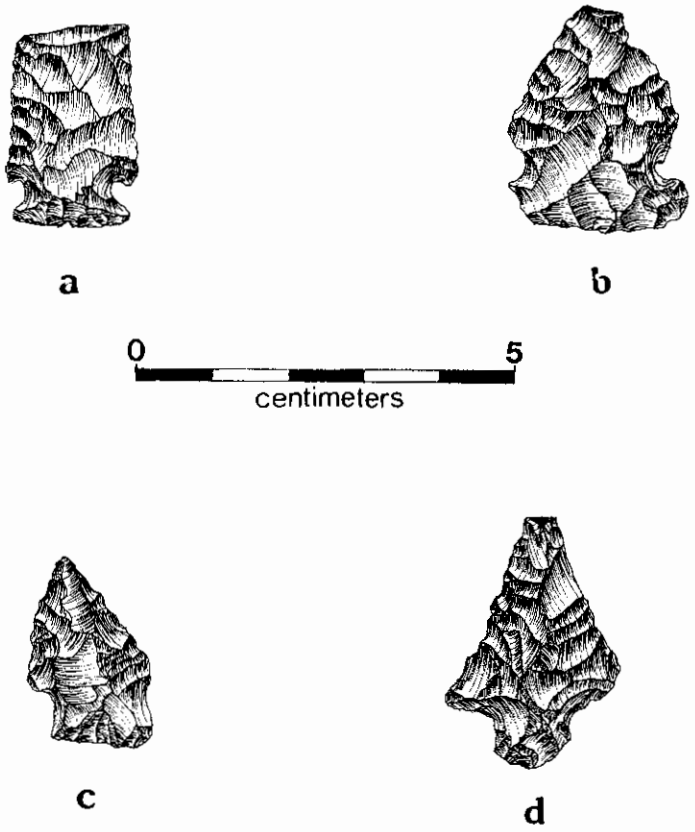

FIGURE 9. Projectile points recovered at Concentration C, Site 5ML45.

A projectile point with a triangular, slightly concave blade and a contracting stem was also recovered at Concentration C (Fig. 9d). This point is similar to others classified as Gypsum points, which generally date between 2500 B.C. and A.D. 500. Irwin-Williams attributes similar points found in northern New Mexico to the En Medio Complex of the Oshara Tradition, dating between 800 B.C. and A.D. 400.

BIFACIAL KNIVES:

Two artifacts are included in this category, both evincing bifacial flaking and wear. One artifact consists of the finely flaked tip of a bifacial knife that was probably once triangular in form. The obsidian artifact is broken both parallel and at right angles to the longitudinal axis of the tool. The other bifacial knife is quartzite, and is more crudely chipped than the above artifact. The tool is roughly oval in outline.

SCRAPING IMPLEMENTS:

Four scraping tools were recovered at Concentration C. Two of the artifacts may be classified as end scrapers, with unifacial modification and wear at the distal ends; the other two evince unifacial modification along some other portion of their edge.

UTILIZED FLAKES AND DEBITAGE:

A total of 198 flakes was recovered at Concentration C, of which two were utilized. One specimen had evidence of bifacial attrition on one edge and possible unifacial attrition on another. The other utilized flake had unifacial attrition along one edge. Five of the 198 flakes (3 percent) retained some amount of cortex, and so represent a primary or secondary stage of lithic reduction. This percentage is quite small, suggesting that reduction of raw lithic materials was not a common occurrence at the site.

GROUND STONE:

Concentration C yielded the only ground stone recovered during the investigations of the Piedra Pass sites, a fact that suggests that seed processing was not a primary task being performed at the sites. Both ground stone artifacts consist of fragments of metates. The artifacts are both portions of slab metates, manufactured out of local quartz latite. The grinding surfaces are smooth with little pecking, and the edges of the metates show no evidence of modification.

Site 5ML46

A total of 151 artifacts was collected during the investigation of 5ML46, 116 of that number being found on the present ground surface. The artifact assemblage includes 5 projectile points, 2 bifacial knives, a drill, and 2 utilized flakes. A map of the distribution of surfacial artifacts is shown in Figure 10.

PROJECTILE POINTS:

Five projectile points were found on the present ground surface. They have been classified into four distinct types. Two of the five points are classified as large corner-notched points. One artifact has a triangular blade with straight edges, large and deep side notches, and a slightly convex base (Fig. 11a). The point is rather crude, being distinctly concave-convex when viewed from either end, and plano-convex when viewed from the side. The other large corner-notched point has similar blade and base configurations, but is broken along one blade margin and at the tang on the opposite side (Fig. 11b). Large corner-notched points date from approximately 5000 B.C. into historic times (Holmer 1978).

The second point type is represented by a projectile point with a triangular blade with serrated edges, and an expanding stem that is wider than the blade and concave at the base (Figure 11c). The artifact is somewhat similar to Holmer's (1978) Pinto Shoulderless type, dated in the Great Basin between 6300 and 4200 B.C. (Holmer 1978), but is more similar to artifacts ascribed to Irwin-Williams' (1973) Armijo Complex of the Oshara Tradition, dated between 1800 and 800 B.C.

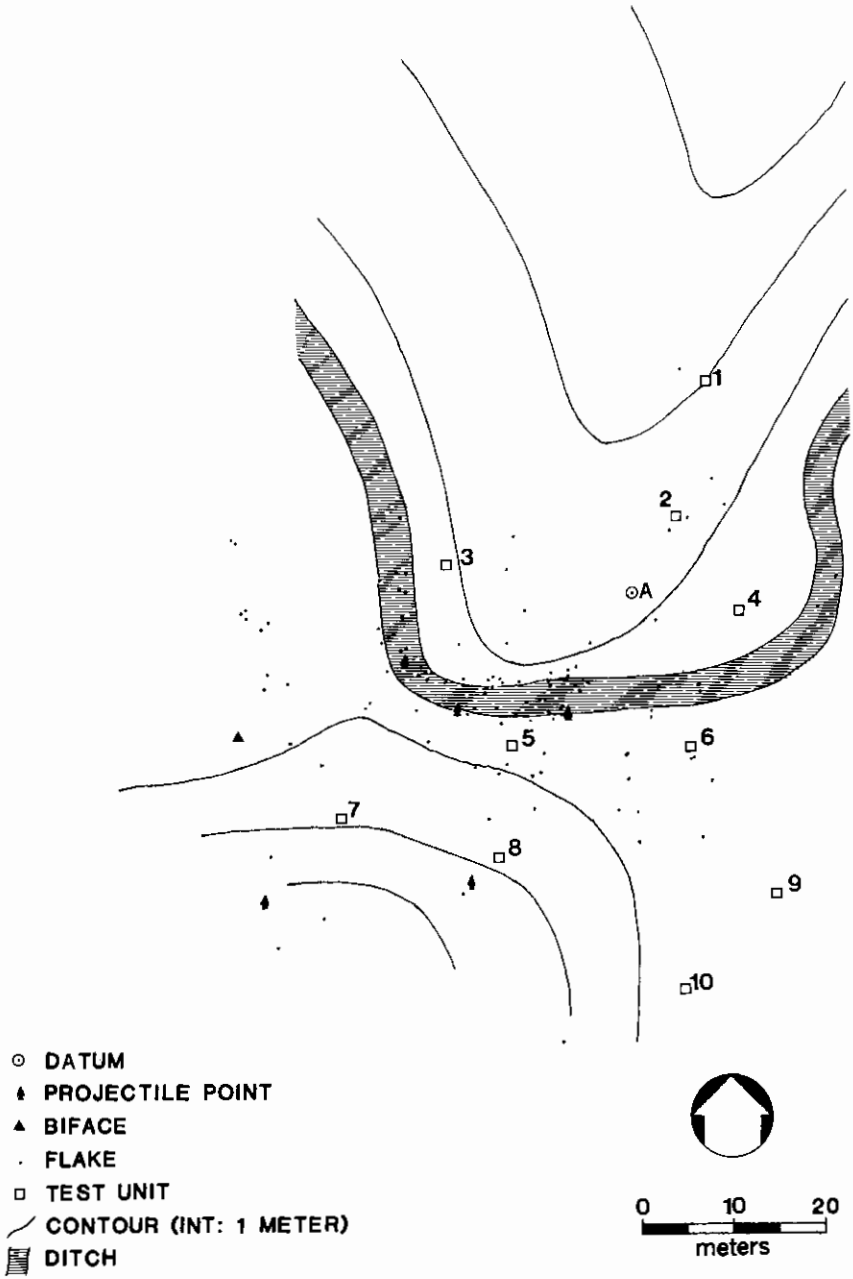

FIGURE 10. Plan view of Site 5ML46.

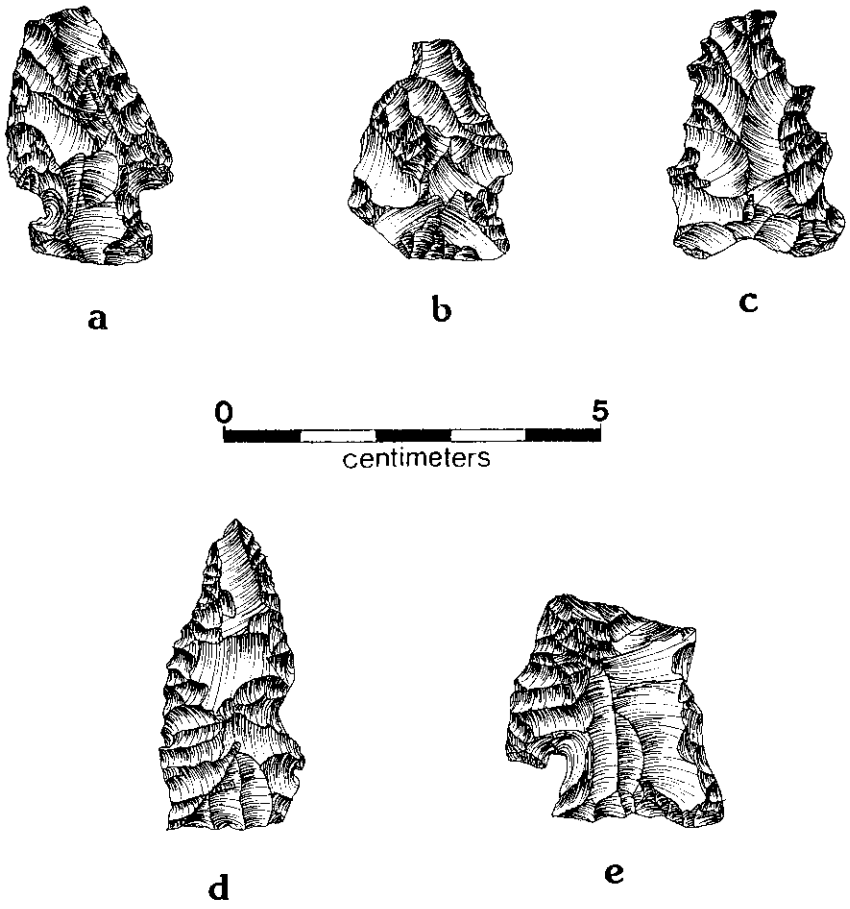

FIGURE 11. Projectile points recovered at Site 5ML46.

The artifact illustrated in Figure 11d is lanceolate in form and has an indistinct stem. The blade edges are slightly convex and serrated. The stem and base are straight and are perhaps slightly ground. The quality of workmanship is excellent. A very similar projectile point is illustrated by Irwin-Williams' (1973: Fig. 4) monograph on the Oshara Tradition; she assigns the point to the San Jose Complex, which spans between 3000 and 1800 B.C.

A large based-notched projectile point represents the final point type recognized at site 5ML45. The tool is fragmentary; missing is the tip, a portion of the blade, and all or part of both tangs (Figure 11e). The blade present is slightly convex. The base is slightly concave, and the basal-notch is deep and diagonal to the longitudinal axis of the tool. Similar projectile points are reported from the Rio Grande National Forest (Reed 1979) and from the Vail Pass

Campsite (Gooding 1981). Little temporal data is available for this point type, but Gooding (1981) posits that the point type may be a horizon marker for the Late Plains Archaic in the Southern Rocky Mountains, which would date it between approximately 500 B.C. and A.D. 1750.

BIFACIAL KNIVES:

Two artifacts are classified as bifacial knives. One specimen is an especially well-flaked tool, being very thin relative to its size. This artifact is broken at its midsection and the tip is missing. Although some evidence of bifacial wear is present, it is possible that the artifact represents a tool blank, which may have been designed for subsequent re-working into a projectile point. The other bifacial knife is complete and more crudely flaked. The artifact is plano-convex in cross section and shows edge-rounding near the tip.

DRILL:

A complete stone drill was recovered in the test excavation of site 5ML46. The artifact has a thick bit, and a flat handle indicating that the tool was hand-held in use.

UTILIZED FLAKES AND DEBITAGE:

One hundred and forty-one flakes were collected at site 5ML46. Only two of that number show signs of utilization; both have unifacial attrition, indicative of a scraping function. Flakes retaining cortical surfaces are rare, comprising approximately one percent of the total. This indicates that the flintknapping activities occurring at site 5ML46 were aimed at reworking existing tools and blanks rather than reducing nodules of raw lithic material.

Material Preference

The types of lithic material found on a site are a function of many factors, including the distance between a site and various lithic sources, the nature of inter-band trading networks, the ease of collection or extraction at the sources, the type of activities occurring at a site, the suitability of different material types for those activities, and the perceived flaking quality of the various material types. Substantial differences in the frequency of various material types between sites or concentrations within a site may, therefore, indicate the presence of different cultures, different site functions, or different periods of occupation.

Debitage from site 5ML46 and the three concentrations comprising site 5ML45, excluding "chunks" without typical flake characteristics, was classified into various material types on the basis of color, quality or translucence, inclusions or lack thereof, and rock ontogeny. Debitage from the three concentrations at sites 5ML45 and 5ML46 was analyzed simultaneously, so that the material types defined would be somewhat uniform between sites.

Three general groups of stone were present in the four artifact assemblages: cryptocrystalline quartzes, quartzites, and igneous extrusives. It should be noted that the visual qualities of obsidian are largely a function of the speed of which the molton volcanic matter cools; a single volcanic extrusion might produce clear black obsidian, opaque black obsidian and obsidian with obvious spherulites (Fred Trembour, personal communication). The frequency of oc-

currence of lithic types at sites 5ML45 and 5ML46 is presented in following Table 3.

Inspection of Table 3 indicates heavy exploitation of igneous extrusives, especially obsidian, and considerable differences in the frequency of the three major material types between concentrations. Concerning the latter observation, it is noteworthy that the differences in material type frequencies appear greater between Concentration A and B at site 5ML45, which are quite close to each other, than between other possible combinations.

INTERPRETATIONS

Chronology

Radiocarbon dates obtained at sites 5ML45 and 5ML46 indicate occupa-

TABLE 3. Frequency of Debitage Lithic Material Types

	Sites							
	5ML45 Concentration A (N=1914)		5ML45 Concentration B (N=95)		5ML45 Concentration C (N=189)		5ML46 (N=138)	
Material	No.	%	No.	%	No.	%	No.	%
Igneous Extrusives								
Speckled Gray Obsidian	1208	63	6	6	22	12	20	14
Clear Black Obsidian	133	7	1	1	28	15	11	8
Opaque Black Obsidian	4	1	0	0	0	0	0	0
Basalt, Tuff, Rhyolite	11	1	1	1	2	1	0	0
Subtotal	1356	71%	8	8%	52	28%	31	22%
Cyptocrystalline Quartzes								
White Chert	161	8	6	6	22	12	0	0
Gray Chert	30	2	12	13	10	5	27	20
Pumpkin Chert	27	1	0	0	0	0	0	0
Jasper	50	3	0	0	5	3	0	0
White Breccia	0	0	14	15	33	17	20	14
Gray Breccia	0	0	0	0	0	0	12	9
Chalcedony	107	6	3	3	17	9	4	3
Other	153	8	13	14	20	11	32	23
Subtotal	528	28%	48	51%	107	57%	95	69%
Quartzites								
Gray	0	0	37	39	19	10	7	5
Black	0	0	2	2	0	0	0	0
White	0	0	0	0	8	4	0	0
Red	0	0	0	0	2	1	0	0
Other	30	2	0	0	1	1	5	4
Subtotal	30	2%	39	41%	30	16%	12	9%
GRAND TOTAL	1914	101%	95	100%	189	101%	138	100%

tions between approximately 5900 B.C. and 1800 B.C., which falls in the early and middle portion of the Archaic Tradition. Site 5ML46 was evidently the most recently occupied site, with a date of 1820 B.C. ± 220. Site 5ML45 was occupied somewhat earlier; Concentration A was dated at 3720 B.C. ± 170 and 3460 B.C. ± 210 and Concentration C was occupied at 5900 B.C. No radiocarbon dates were obtained at Concentration B. The projectile point types recovered generally corroborate the radiocarbon dates, although the temporal spans ascribed to most of the point types are somewhat tenuous. The obsidian dates from the two sites are mostly older than the radiocarbon dates, suggesting that shallowness of burial and concomitant rapid temperature fluctuation has accelerated hydration rates. The exception to this is at Concentration C of site 5ML45, where the two obsidian dates are somewhat younger than the radiocarbon date. Considering the shallowness of the soil at Concentration C, it seems unlikely that the effects of daily or seasonal temperature fluctuations would be less there than at the other concentrations. It is feasible that the radiocarbon date is too early as a result of contamination or, more likely, that the obsidian sample represent a later occupation undetected by the single radiocarbon sample.

The temporal distribution of the radiocarbon dates suggest that the concentrations comprising site 5ML45 represent distinct occupations of Piedra Pass, and not different activity areas of a single occupation. Substantial differences in the frequencies of lithic material types found at the three concentrations supports this conclusion.

Site Function and Seasonality

Lithic scatters are commonly classified into one of two functional groups. One functional group (including kill sites, hunting blinds, and quarries), represents extractive tasks, through which people gather and process specific raw resources for subsequent utilization, but do not engage in the full gamut of domestic activities. The other functional group includes sites that served as habitation locales. Habitation sites are settlements which Chang (1962:29) defines as "any place occupied by one or more individuals for one or more nights for any purpose that falls within the ordinary, expected, and predictable round of activities of the society in question." Such activities may include the preparation and consumption of foodstuffs and the manufacture of tools. Habitation sites are often a central place from which hunting or collecting parties emanate to engage in extractive tasks. Archaic sites evincing a habitation function in southwestern Colorado were probably occupied on a seasonal basis, for a period of time determined largely by the abundance of favored foods.

The distribution of extractive-task sites and habitation sites differs. The former site type will likely be situated either at the location of the exploited resource or at a location nearby, perhaps one offering a vista overlooking the desired resource. Decisions regarding placement of habitation sites, on the other hand, are more likely to take into consideration other factors than the distribution of a single resource. Factors may include gentleness of slope, quality of shelter, and propinquity of fuel, water, and a variety of food resources. Artifact assemblages are also likely to vary between the two functional groups. Extractive-task sites likely will contain fewer tool types than habitation sites,

the tool types being dependent upon the type of resource being collected. Habitation sites are likely to possess a more diverse artifact inventory, one which includes relatively immobile artifacts such as manos and metates. Habitation sites are also more likely to possess features such as firehearths.

Toll (1977), in his thesis on the archaeology of the Dolores River in west-central Colorado, devised a polythetic model for distinguishing habitation sites from extractive-task or limited activity sites, requiring that a site display a number of attributes in order to be confidently classified. Toll (1977:46) selected the following attributes as indicative of habitation sites, and required the possession of at least three for group membership: prepared tools, ground stone, fire, flat area, overhang, structure, or ceramics.

Sites 5ML45 and 5ML46 meet Toll's criteria for being classified habitation sites. The concentrations comprising 5ML45 and 5ML46 are all located on gently sloping saddles or small ridges, possess a variety of prepared tools, and suggest the presence of firehearth. Concentration C yielded groundstone. The horizontal extensiveness of the concentrations further suggests intensive occupations, and so habitation functions.

Artifacts represent a variety of subsistence and maintenance activities. The presence of metate fragments at Concentration C suggests that wild seeds and other foodstuffs were procured nearby and milled at the site. The absence of groundstone at the other artifact concentrations does not necessarily indicate the nonutilization of floral foodstuffs during the occupations they represent, as numerous plants can be used as potherbs and in other fashions not requiring milling. Perhaps the dearth of ground stone in the Piedra Pass Project area is due primarily to the absence of raw material such as river cobbles suitable for use as grinding implements, and a general reluctance of the prehistoric peoples to have to haul such materials to the top of the pass. Bifaces, scrapers, and numerous projectile points suggest that work related to the processing of animal products and perhaps certain vegetal materials were major activities performed at sites 5ML45 and 5ML46. A stone drill found at site 5ML46 suggests that leather-working may have been performed.

Little primary reduction of raw stone materials occurred at either site. Rather, flintknapping appears to have focused upon the repair of existing tools and the production of new tools from tool blanks or selected flakes brought up from the lower elevations. No natural occurrences of stone suitable for flintknapping were observed in the Piedra Pass Project area, so the energy required to carry stone to the top of the Continental Divide was undoubtedly carefully considered prior to the hike up to the pass. As discussed in the section on material culture, very few cores were discovered, and flakes retaining cortical surfaces indicative of primary reduction of raw materials account for less than 3 percent of the debitage totals. The small size of the waste flakes recovered at the two sites also suggests that primarily the last stages of lithic reduction were practiced. Average flake length ranged from 1.0 cm at Concentration A to 1.5 cm at Concentration C and site 5ML46; the mean flake length was 1.3 cm at Concentration B.

In one sense, sites function at a more complex level than that discussed above. In a highly mobile hunting and gathering culture, sites function to fulfill certain economic needs or desires. Hunters and gatherers in prehistoric Colorado

moved within an "annual territory" during the course of a year. This annual territory was probably bounded by various topographic features, and probably had some overlap with the "annual territory" of other groups. Bands moved within the annual territory on a seasonal basis, in accordance with the availability of certain desired resources. The desirability of resources likely was affected by the ease of collection and/or processing and, for foods, their perceived palatability.

Resources in a land as environmentally diverse as western Colorado are not evenly distributed. Assuming that prehistoric hunters and gatherers had an intimate knowledge of the distribution of resources within their annual territory and the approximate dates of their fruition, it is likely that bands made conscious decisions concerning location of their next move, considering the risks of resource failure as opposed to the expected returns.

Sites 5ML45 and 5ML46 were selected for habitation because of the resources that were available nearby. They functioned, then, to meet the economic needs of a group of people during some portion of their annual rounds. Macrofloral data suggest that tangy mustard, huckleberries, wild onion, blackbrush, currants, ground berries, and a species of chenopodia may have been procured in the Piedra Pass vicinity and consumed at Concentration A. Observations by field personnel indicate that herds of elk and deer are plentiful in the area, and may have attracted prehistoric hunters. Perhaps the most abundant edible resources observed by field personnel, however, were mushrooms. The frequent afternoon showers that fell during the testing phase permitted a variety of mushrooms to flourish; large clumps undoubtedly weighing several pounds were scattered about the forested hillsides near Piedra Pass. It seemed plausible that one could gather a great quantity of the fungi in a relatively short amount of time with little energy expenditure. While field personnel only identified one edible type, belonging to the Coral Mushroom family (Clavariaceas), other edible species were likely present. Mushrooms, while relatively low in protein content per fresh weight, are rich in vitamins of the B Group, as pantothenic acid and niacin, as well as vitamin C (Jordan 1975:20).

A variety of other floral and faunal resources are undoubtedly also present within a short distance of the two sites. The sites' situation in an ecotone between alpine tundra and subalpine forests and meadows, atop passes providing easy access into two major drainages, maximizes the number of resources available within a small area.

Considering the extreme climate of the Piedra Pass Project area, it is unlikely that the sites were occupied between October and May. Utilization of the sites probably coincided with the maturation of certain desired resources. The pollen and macrofloral studies completed at site 5ML45 suggest that the plants selected for exploitation were the same species that grow and were exploited at lower elevations (Scott and Seward 1981). Wright (1978) points out that such species mature at later dates in the higher elevations, and implies that prehistoric peoples timed their ascent into the high country with the delayed maturation dates. It seems likely, then, that sites 5ML45 and 5ML46 were occupied in the late summer, probably during the months of August and September.

Cultural Affiliations

One of the major research questions being posed by archaeologists investigating prehistoric utilization of Colorado's Rocky Mountains concerns the cultural affiliation of those prehistoric groups. This is not an easy puzzle to solve, considering the similarity of prehistoric hunter-gatherer adaptations, especially technological, over wide geographical areas, and the comparative dearth of archaeological research in the Rocky Mountains. The question is, however, integral to developing a culture history for Colorado's Rockies.

Reviewing available literature concerning the cultural affiliation of prehistoric exploiters of Colorado's mountains, one of two possibilities are usually cited. One idea suggests that the Colorado Rockies were home to an indigenous population, whose culture area may have been largely defined by the perimeters of the Southern Rocky Mountain physiographic province in Colorado (cf. Black 1980). The other possibility suggests that the mountains were utilized seasonly or sporadically by peoples of adjacent physiographic provinces, such as the Great Plains, the Colorado Plateau, or the Wyoming Basin. Considering the severity of the winters in the Rocky Mountains and the concomitant migration of game animals into lower elevations, it seems that the second possibility is more likely. It is acknowledged, however, that some portions of the extreme periphery of the Southern Rocky Mountain physiographic province may be low enough in elevation to serve as wintering areas for large game, and mild enough for human occupation.

In the latter case, gronps that spent some portion of the year in the lower physiographic provinces probably included nearby mountainous areas in their annual territory. While the annual territory of several groups may have overlapped somewhat, especially if the mountains were utilized on a sporadic basis, it is unlikely that they were ever a "no-mans" land utilized by a variety of groups, at least during the Archaic and subsequent traditions. Consequently, it may be possible to identify distinct culture areas within the Colorado Rockies, based upon similarities of technology and perhaps settlement patterns, between archaeological sites in the mountains and sites on the lower, and archaeologically better understood, adjacent physiographic provinces.

Analysis of the data collected as part of the Piedra Pass Project and from the nearby Rio Grande National Forest and San Luis Valley, suggests that the Upper Rio Grande Valley may represent a distinct culture area in the Colorado Rockies, extending from the Continental Divide down through the San Luis Valley and into New Mexico. The Archaic Tradition manifestations in the Upper Rio Grande drainage, have long been recognized as distinctive from Archaic sites in other areas of Colorado. In 1944, E. B. Renaud of the University of Denver, defined the "Upper Rio Grande Culture" after several field seasons of archaeological reconnaissance in the region. This pre-ceramic culture was characterized by the following traits, as enumerated by Honea (1969:67):

1. The apparently extensive, to exclusive use of black, or at least dark rocks in the making of flaked stone tools;
2. percussion based flaked-stone technology;
3. smooth stem projectile points;
4. predominance of side scrapers;

5. bifacial knives;
6. choppers;
7. gravers, and;
8. unshaped one-hand manos.

In addition, Renaud (1942) posited that a new projectile point type, termed "Rio Grande Points", was representative of the Upper Rio Grande Culture. Honea (1969) excavated an Archaic site in northern New Mexico that yielded numerous black, volcanic stone artifacts, including several projectile points, similar to Renaud's Rio Grande Points. Due to the geographic proximity of Honea's excavated site to the prehistoric culture area defined by Renaud, and similarities in material culture, Honea utilized Renaud's culture concept. Honea did, however, redefine the Upper Rio Grande Culture as a *complex,* based upon inherent difficulties in ascribing specific cultural labels on the basis of excavated lithic assemblages. Honea (1969) also redefined Renaud's Rio Grande projectile point, type, eliminating from the type triangular-shaped, stemmed-indented base points, but retaining as Rio Grande Points, large, lanceolate points with long straight or slightly concave stems and faint shoulders.

While the attributes ascribed to the Rio Grande Culture or Complex have changed through the years, sites having in common large percentages of black igneous lithic material and often certain styles of stemmed projectile points are well documented in the Upper Rio Grande Valley (e.g. Button 1980; Honea 1969; Nickens 1979, Renaud 1942; Ungnade 1963; Van Elsacker 1972; Wendorf and Miller 1959). There appears to be less variation between Archaic sites in the Upper Rio Grande Valley, than between the Upper Rio Grande sites and other Archaic sites in the Colorado Rockies to the north. While certain projectile point types found in the Upper Rio Grande Valley are common not only in the mountains to the north, but to the Great Plains and northern Colorado Plateau, there appears to be a much higher occurrence of Rio Grande or Jay points in the area in question, as well as expanding-stemmed points such as the specimen found at site 5ML46, and points illustrated by Irwin-Williams (1973: Fig. 5a) and Button (1980: Fig. 4). Further, the black stone industry does not appear to extend beyond the upper reaches of the Rio Grande River northward, over the Continental Divide. Archaeological surveys by Black (1980) and Stiger (1977) in the Gunnison and Crested Butte areas, Greiser and Greiser (1977) in the Sargents area, and Cassells (1978) in the Cochetopa Pass area, do not report sites yielding large percentages of black igneous lithic materials. Very little survey has been conducted west of the headwaters of the Rio Grande River in the vicinity of Silverton, but here too, indications are that the black stone industry is absent (Reed and Scott 1980). This suggests that the Continental Divide in Creede area served as the northern and western boundary for the Rio Grande Complex. It seems plausible that such a topographic feature would function as a boundary for a culture area, as it would be easily recognizable, permit easy navigation within one's culture area, and would also more or less equally divide the resources distributed in the various environmental/elevational zones in a mountain pass situation between two groups. That the Upper Rio Grande prehistoric peoples were somewhat a cohesive group is also suggested by the distribution of obsidian quarried in

the Jemez Mountains of New Mexico, which are approximately 30 to 40 miles west of the Rio Grande River. Burns (1981), researching a thesis concerning obsidian artifacts recovered on archaeological sites in the Rio Grande National Forest, conducted X-ray florescence tests, a chemical "finger-printing" technique, on a sample of Rio Grande National Forest artifacts and on material recently obtained at several known sources, including localities in the Jemez Mountains. Burns (1981) found that approximately 20% of the archaeological obsidian in his sample came from sources in the Jemez Mountains, and that approximately 80% came from an unidentified source. That substantial quantities of obsidian had been carried from the Jemez Mountains 100 km northward to the upper reaches of the Rio Grande River suggests some degree of travel by groups up and down the Rio Grande River Valley, and probably the existence of a loose, informal trading network.

If the Upper Rio Grande Valley does indeed represent the activities of different cultural groups than those present in the more northern portions of Colorado's Rockies, then a discussion of the cultural affiliation of the Rio Grande peoples is in order. Presently, data indicates that the Rio Grande Complex has ties with Archaic manifestations in northwestern New Mexico. These investigations, conducted by Cynthia Irwin-Williams, have led to the definition of the Oshara Tradition, a Four Corners region expression of the Archaic Tradition and alleged precursor of the Anasazi culture (Irwin-Williams 1973). Irwin-Williams includes the Upper Rio Grande Culture as defined by Renaud (1942) in the Oshara Tradition. The Rio Grande Complex does indeed appear to be a local expression of the Oshara Tradition, based upon similarities in artifact assemblages. Archaic sites in the Colorado Rocky Mountains may have been divided into several broad culture areas, with the Upper Rio Grande Valley being affiliated with southern Colorado Plateau groups. The eastern slope north of the Rio Grande Valley may have been associated with Archaic adaptations influenced by Great Plains groups, and the western slope by northern Colorado Plateau groups (cf. Black 1980: 199). Analysis of this hypothesis, however, is beyond the scope of this paper.

SUMMARY

Sites 5ML45 and 5ML46, two prehistoric lithic scatters located along the Continental Divide in western Colorado, were investigated to determine their eligibility for nomination to the National Register of Historic Places. These investigations took the form of mapping and collection of all surficial artifacts, the controlled excavation of thirty-six 1 m by 1 m test units, and a limited reconnaissance for other cultural resources in the immediate vicinity. The surface collection and mapping resulted in the preservation of hundreds of artifacts and information on their spatial content. The limited reconnaissance lead to the discovery of one site along the East Fork of the Piedra River. Limited excavation indicated that both sites possessed subsurface cultural material, but that the culture-bearing strata were rather shallow and disturbed by mechanical weathering agents. While no firehearths were discovered, charcoal, presumed to be remnants of firehearths, was found in sufficient quantities to date site 5ML46 and Concentrations A and C at site 5ML45. The dates indicate oc-

cupation of the sites in the early and middle portions of the Archaic Tradition. Numerous obsidian artifacts were recovered, and obsidian hydration dates were obtained for a small sample. The dates, however, may not be reliable due to shallowness of burial and concomitant temperature fluctuation.

The prepared tools present indicate that both sites served as habitation loci. The material culture suggests that sites 5ML45 and 5ML46 are similar to other sites in the Upper Rio Grande River Valley that are attributable to the Rio Grande Culture or Complex, which is considered a manifestation of the Oshara Tradition, an Archaic adaptation defined on the southern Colorado Plateau in northwestern New Mexico.

Both sites 5ML45 and 5ML46 are horizontally extensive, indicating intensive or repeated utilization. While the culture-bearing strata are not particularly deep and evince disturbance by natural or human agents, significant data are probably therein contained. If the limited testing program is any indication, a large inventory of projectile points and other tool types are buried at the sites, which potentially can further the development of a well-dated projectile point sequence for western Colorado. Charcoal is present in the cultural strata in sufficient quantities to yield additional radiocarbon dates, and suggests that intact firehearths may be present. Additional chronometric dates would provide insight into the possibility of multiple occupations. Considerable information on the types of flora possibly exploited at Concentration A at site 5ML45 was recovered. That these data were recovered in a good state of preservation and from a bulk soil sample suggests that similar data can be obtained at the other concentrations comprising sites 5ML45 and 5ML46. The large quantity of obsidian recovered at the two sites may facilitate the refinement of obsidian hydration dating, especially in that radiocarbon dates are also available for the site. Lastly, sites 5ML45 and 5ML46 are important cultural resources because they can yield information concerning the prehistoric utilization of a relatively unique topographic feature—high altitude mountain passes. Both sites are regarded as being eligible for nomination to the National Register of Historic Places.

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