ORANJEBOOM CAVE: A SINGLE COMPONENT EASTGATE SITE IN NORTHEASTERN NEVADA

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Excavations in Oranjeboom Cave (26EK1722) in northeastern Nevada near the Utah border reveal a single component site containing Eastgate points and Great Salt Lake grayware sherds. The central feature of this site is a prepared living surface covered with stripped juniper bark matting, and an associated single-use hearth. Calibrated two sigma radiocarbon dates place use of the site at about 1100 – 970 B.P., reflecting a single short-term event. Faunal remains indicate preparation and consumption of bison as well as other large-to-medium sized mammals. The lithic assemblage is dominated by broken bifaces, and abundant small pressure flakes, suggesting tool kit repair. Pine and juniper were used as fuel, and food remains include goosefoot, pine nuts, and juniper berries. The assemblage from Oranjeboom Cave shows that Fremont foragers using bows and arrows were exploiting areas west of the Bonneville Basin by at least 970 B.P.

Oranjeboom Cave (26EK1722) is located on the west slope of the Goshute Mountains in northeastern Nevada (Figure 1). Streams on the east slope of the Goshute Mountains drain into the Bonneville Basin. The cave is situated approximately 2,000 m (6,500 ft.) above sea level in pinyon-juniper habitat. The site is located 300 m (1,000 ft.) above the valley floor, and overlooks Goshute Valley to the southwest. Pleistocene Lake Waring filled this valley before approximately 10,000 B.P. (Currey et al. 1984; Mifflin and Wheat 1979; Snyder et al. 1964), and well-preserved lake terraces are visible along the foothill slopes below the cave. Nearby is Top of the Terrace Shelter. This large rockshelter contains the Top of the Terrace woodrat midden, with preserved macrobotanical remains dating back over 40,000 years (Rhode 1998, 2000; Rhode and Madsen 1995).

Oranjeboom Cave is approximately 80 m in depth and its entrance measures 10.5 m in width (Figure 2). The first recording of Oranjeboom Cave as an archaeological site was made by the Elko Field Office of the Bureau of Land Management (BLM) in July of 1993. At this time, a Rose Spring projectile point was found at the base of the steep slope leading up to the cave, and several small tertiary chert flakes were found just outside the dripline in front of the cave. It was apparent that rocks had been piled inside the dripline to level off

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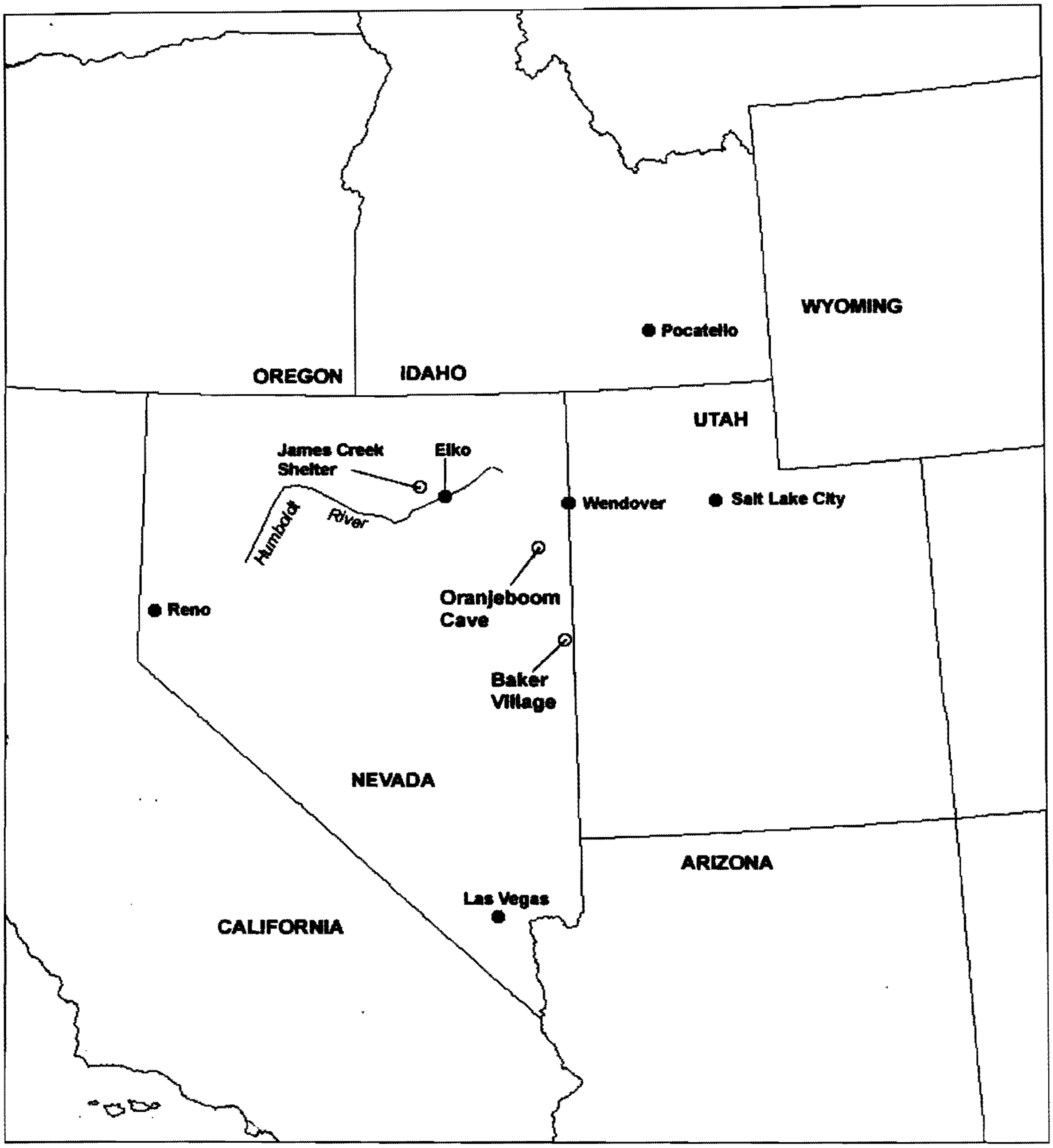

Figure 1. Oranjeboom Cave (26EK1722) is located on the west slope of the Goshute Mountains in northeastern Nevada. The cave is situated approximately 2,000 m (6,500 ft.) above sea level and located 300 m above the valley floor. The Scorpion Ridge site (not shown) is located on the outskirts of Elko, Nevada.

a portion of the steeply-sloped cave surface, but the age and nature of this feature were unknown then.

Oranjeboom Cave was test-excavated in 1998 as part of a joint project between the Desert Research Institute (DRI) and BLM. A grid was established using the letter-number system (Figure 3), and three units were excavated and screened with 1/8" mesh. One unit was placed on the steep slope near the dripline of the cave (Unit H10). It produced a few small tertiary chert flakes similar to those found on the surface in 1993. Another unit was placed deeper in the cave (Unit OO12). No artifacts were recovered, but a scant faunal assemblage was retrieved.

A third unit was placed near one edge of the leveled-off section inside the dripline of the cave (Unit AA10). This unit produced two Eastgate projectile points, hundreds of white chert flakes, arrow cane (or reed, *Phragmites* sp.) fragments that likely represents pieces of broken arrow shafts, grayware ceramic sherds, and burned and unburned large mammal bone fragments in association with a matting of stripped juniper bark, burned vegetation, and large chunks of charcoal measuring no more than 10 to 20 cm in thickness. During the Fall of 1998 charcoal recovered from this feature was sent for radiocarbon dating. This sample returned an uncalibrated, conventional ^{14}C date of 1660 ± 50 B.P. (Table 1).

The BLM and DRI returned in 1999 to fully excavate the living floor in collaboration with Ted Goebel, then of the University of Nevada, Las Vegas. The majority of artifacts recovered from the living floor came from a roughly 4 x 3 m area in the artificially-leveled zone just inside the dripline of the cave. Concentrations of bones, ceramic sherds from a single Great Salt Lake jar, and lithic debitage varied in density within this 12 m^2 zone. Barring clean-out of earlier occupations, Oranjeboom Cave appears to have served primarily as a short-term camp during Late Archaic times. The four conventional ^{14}C ages (Table 1) range from about 1100 B.P. to almost 1700 B.P., although the oldest dates may be unreliable (see discussion below).

The living floor consisted mainly of stripped juniper bark matting. An unprepared hearth was built somewhere near the center of the feature. Much of the juniper bark had burned, probably smoldering for some time after the occupants left the cave. The living floor lay exposed for a relatively brief period until sedimentation and the movement of animals in and out of the cave covered its contents. Approximately 10 to 15 cm of very loose silts, rockfall, and degraded owl pellets and their associated faunal remains covered the top of the feature. The contents of this upper, culturally sterile stratum were similar to paleoecological faunal assemblages recovered in other parts of the Great Basin (e.g., Hockett 2000), and are not discussed here. The following sections of the paper describe the stratigraphy and dating as well as the chipped stone tools, debitage, perishables, ceramics, and faunal remains recovered from the living floor. Following these analyses is a discussion of the significance of Oranjeboom Cave in a regional context.

STRATIGRAPHY AND DATING

The excavated stratigraphic profile at Oranjeboom Cave consists of about 35 cm of loose sediment (Figure 4). Layer 1, at the top of the profile, is a moderately compact stratum of woodrat dung pellets, reaching about 20 to 30 cm in thickness. Layers 2a and 2b are deposits of ash. Specifically, layer 2a is a lens of white ash with abundant charcoal; we interpret this as an unlined hearth feature. Layer 2b is a gray ash with little charcoal. This stratum, which becomes less ashy further from the hearth feature, contains a distinct bed of unburned juniper bark as well as the majority of the cave's cultural remains. The ashy matrix of layer 2b could be the result of at least one episode of hearth cleaning. Layers 3 and 4 are thin deposits of silt; layer 3, situated just beneath the hearth of layer 2, is fire-reddened. Layer 5, finally, is the limestone bedrock floor of the cave. Stratigraphically, the hearth (layer 2a) and juniper-bark mat (of layer 2b) appear to be contemporaneous. Together they represent a single human occupation of Oranjeboom Cave.

Four radiocarbon ages were obtained from materi-

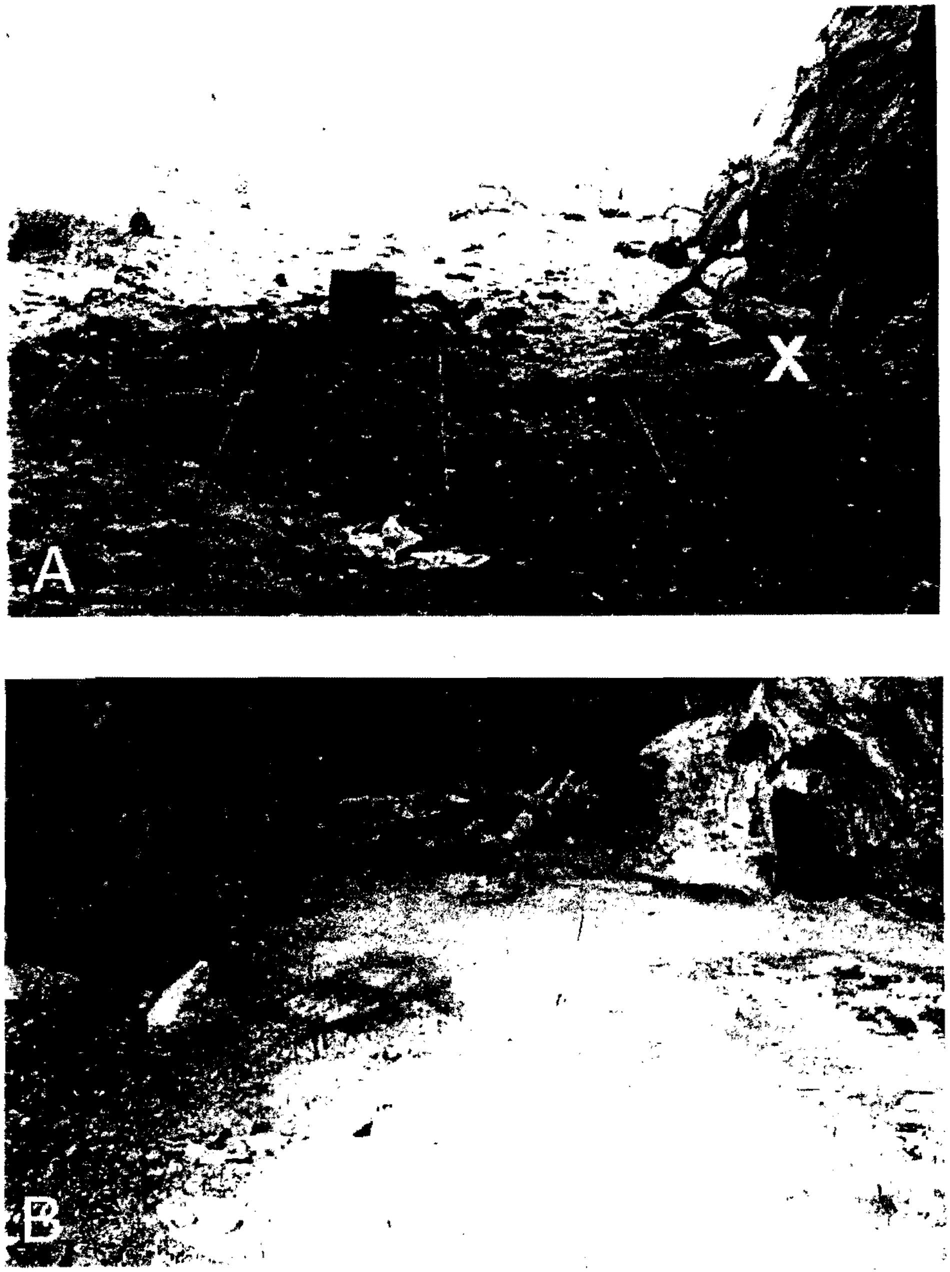

Figure 2. Inside Oranjeboom Cave. View A is looking from the excavated area out toward Goshute Valley. The white "X" marks the southwest corner of unit AA9. View B is looking toward the back of the cave. Note the large tree toward the rear.

als collected from layer 2, the cave's cultural deposit. Charcoal and unburned organic material such as matting and twigs were abundant in the deposit. Two large pieces of clean wood charcoal (probably juniper) from the central part of the feature (units AA10 and BB10) were submitted for radiocarbon dating to Beta Analytic laboratories. A large handful of the intact cedar bark matting (from unit AA11) was also submitted. Finally, soot from the exterior of one of the GSL grayware sherds (artifact CRNV-11-8055-97) was scraped and submitted for an AMS date.

Results are shown in Table 1. The two oldest dates

Table 1. Radiocarbon dates from Oranjeboom Cave.

Sample	Material	Provenance	Method	Measured 14C age	Fractionation 0/00	Conventional 14C age	2-sigma range (method B)	Calendar age**
Beta-144436	Soot/charcoal smudging	BB09, level 2	AMS	1060 ± 40	-22.8	1100 ± 40	1078-930 B.P.	AD 882-1019
Beta-144731	Juniper bark matting	AA11, level 2	radiometric	1220 ± 60	-25.0*	1220 ± 60	1275-1049 B.P.	AD 664-977
Beta-144732	Wood charcoal	BB10, level 2 "inside hearth"	radiometric	1440 ± 60	-25.0*	1440 ± 60	1422-1262 B.P.	AD 532-686
Beta-121768	Wood charcoal	AA10, Feature 1, Stratum 2, level 1	radiometric	1660 ± 50	-23.2	1690 ± 50	1713-1509 B.P.	AD 240-435

are on wood charcoal and are considered too ancient. It is likely that old wood was used as fuel for the fire. Many pieces of dead wood are found today in the cave, including most of a large tree trunk that was dragged to the back of the cave (Figure 2b), as well as woody materials deposited by wood rats. We consider the two more recent conventional dates of 1100 ± 40 B.P. and 1220 ± 60 B.P. to be the best estimate of when the cave was occupied. At the 95 percent confidence interval, the two dates overlap slightly (Table 1), and when averaged and calibrated, result in a two sigma range of 1100 – 970 B.P. Cedar bark, being readily stripped from the exterior of nearby living trees (the bark found in the site was still fresh-looking and -smelling), would not exhibit the "old wood problem" (Schiffer 1982) of charcoal found in the hearth. The soot scraped from the exterior of the burned sherd and dated through AMS may have been charcoal adhering to the outside of the vessel from placement in a hearth or fire, possibly even from somewhere other than Oranjeboom Cave. The most likely calendar age of occupation for the site is therefore 1100 – 970 B.P.

LITHIC ASSEMBLAGE

The Oranjeboom lithic assemblage consists of 1,114 artifacts, including two cores, 1,054 pieces of debitage, and 58 tools. By far the most frequently occurring raw material type is cryptocrystalline silicate (CCS, 97.9 percent), while limestone, basalt, obsidian, and quartzite artifacts are rare (Table 2). Unit AA11 had 613 lithic artifacts, more than half the entire assemblage (Figure 3).

The core assemblage at Oranjeboom is small and characterized by one multidirectional flake core and one bipolar core. The multidirectional core is CCS and is less than 50 percent covered with cortex. The bipolar core is also CCS but does not possess cortex. Maximum linear dimensions (Andrefsky 1998) for both cores are 32.4 mm and 33.8 mm, respectively, and core weights are 7.77 g and 3.26 g, respectively. The relatively small size of the Oranjeboom cores, combined with their multiple platforms and fronts, suggest they were discarded at or near the ends of their use lives.

Debitage makes up the majority of artifacts in the lithic assemblage, with 1,054 pieces occurring (Table 2). Approximately 88 percent of debitage consists of retouch chips (i.e., pressure flakes and biface thinning flakes). Among retouch chips, there are 322 (34.8 per-

Table 2. Lithic assemblage from Oranjeboom Cave.

	Raw Material types					
	Obsidian	Basalt	CCS	Limestone	Quartzite	Total
Debitage	**3**	**2**	**1,035**	**11**	**3**	**1,054**
Angular Shatter			*13*	*3*		*16*
Cortical Spalls			*16*	*1*		*17*
Cortical Spall Fragments			8	1		9
Primary Cortical Spalls			1			1
Secondary Cortical Spalls			7			7
Flakes		*1*	*93*	*2*		*96*
Flake Fragments			45	2		47
Flakes		1	44			45
Blade-like Flakes			4			4
Retouch Chips	*3*	*1*	*913*	*5*	*3*	*925*
Retouch Chip Fragments		1	317	3	1	322
Retouch Chips			422	2	2	426
Biface Thinning Flakes	3		174			177
Cores			**2**			**2**
Multidirectional Cores			1			1
Bipolar Cores			1			1
Tools		**3**	**55**			**58**
Unhafted Bifaces			*43*			*43*
Biface Fragments			40			40
Knives			2			2
Preforms			1			1
Hafted Bifaces			*4*			*4*
Eastgate Projectile Points			4			4
Unifaces			*6*			*6*
Retouched Flake Fragments			2			2
Retouched Flakes			3			3
Burins			1			1
Groundstones		*3*	*2*			*5*
Groundstone Fragments		3	2			5
Total	3	5	1,092	11	3	1,114

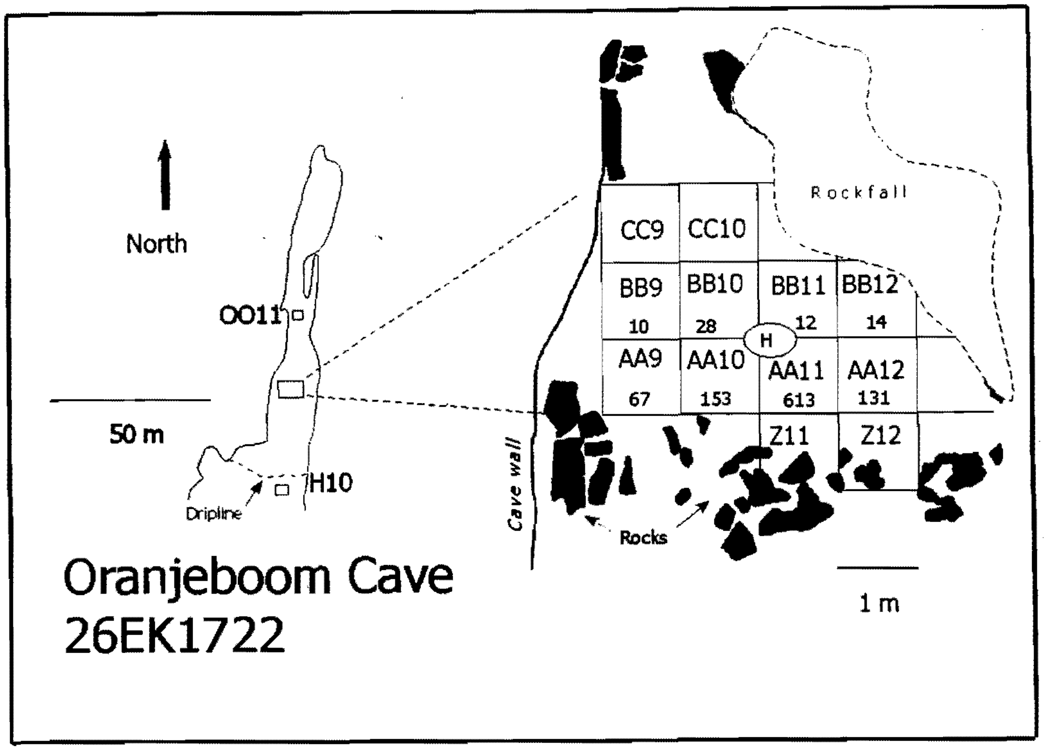

Figure 3. Plan map of cave floor. The oval with the "H" marks the location of the fire hearth. Unit names are shown in the upper part of each square (i.e., AA09).

cent) retouch chip fragments, 426 (46.1 percent) complete retouch chips, and 177 (19.1 percent) biface thinning flakes. When comparing debitage to raw material use (Table 2), it is interesting to note that for each debitage type CCS was utilized more than 80 percent of the time.

The number of dorsal flake scars was analyzed on 1,044 pieces of debitage. Only one piece of debitage exhibits no dorsal flake scars, 5.3 percent possess one dorsal flake scar, 30.1 percent exhibit two dorsal flake scars, 43.1 percent possess three dorsal flake scars, and 15.0 percent exhibit four or more dorsal flake scars.

Size value was scored for the debitage pieces possessing platforms. Among 916 pieces of debitage measured, the majority (92 percent) of pieces are smaller than 1 cm^2, while 7percent of the pieces are small (1-3 cm^2), and 1 percent are medium in size (3-5 cm^2). The abundance of very small flake debitage coupled with the high frequency of flakes with multiple dorsal scars suggest that the major reduction activity at Oranjeboom Cave was tool maintenance and resharpening.

The Oranjeboom lithic assemblage includes 58 tools, mostly fragmentary. Tools include 47 (81.1 percent) bifaces, six (10.3 percent) unifaces, and five (8.6 percent) groundstone pieces. Among bifaces, 40 (85.1 percent) are untypable fragments of late stage bifaces, four (8.5 percent) are Eastgate points (Figure 4a-c), two (4.3 percent) are unhafted bifaces, and one (2.1 percent) is a biface preform. The mean width of all bifaces and fragments is 15.1 mm (the length was seldom measured since the fragments are too small). The bifaces and fragments are all made of CCS, dominated by gray, white, and translucent colors.

The Eastgate points include two medial fragments and one lateral-proximal fragment, missing the tip and one lateral margin (Figure 4b). Among the unifaces, one (16.7 percent) is a burin on a flake, two (33.3 percent) are retouched flake fragments, and three (50.0 percent) are

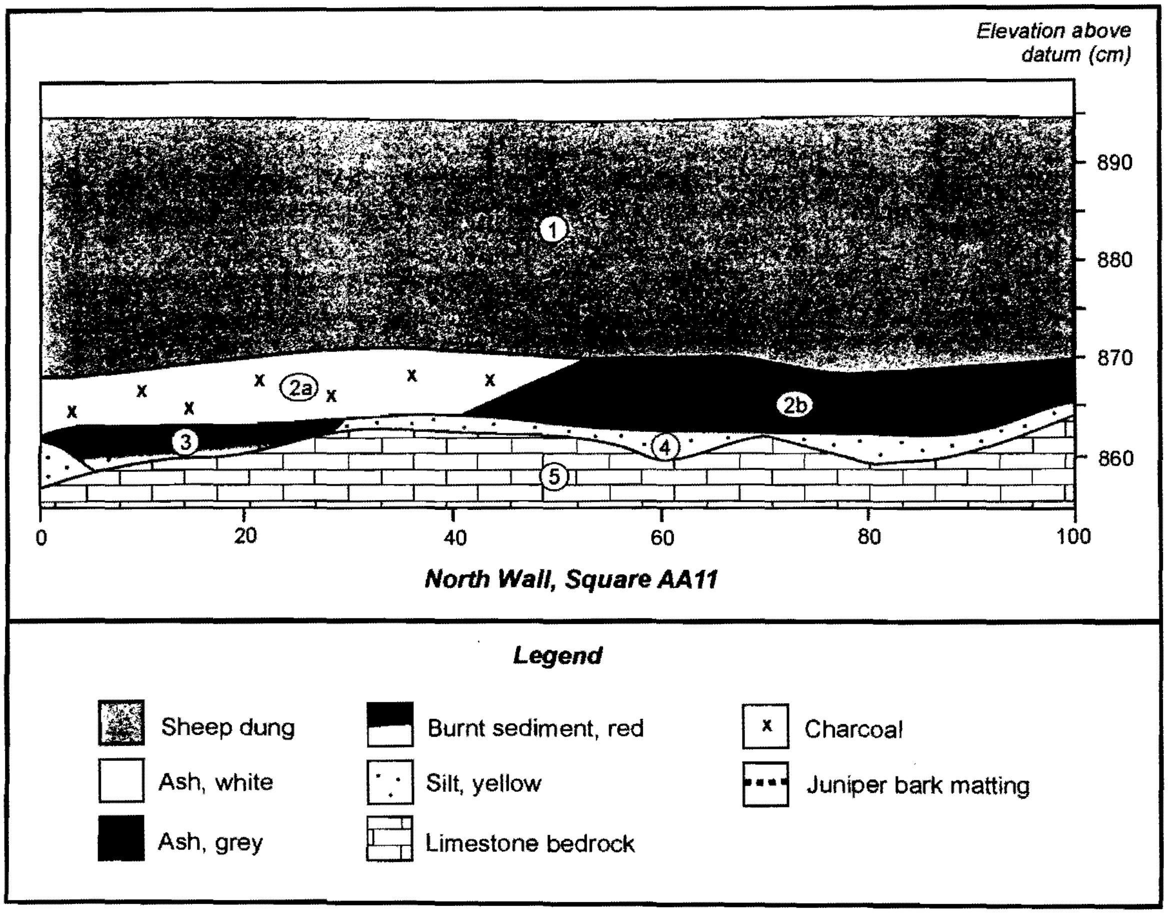

Figure 4. Stratigraphic profile of north wall of Unit AA11. Layers 2a and 2b contained most of the artifacts found at Oranjeboom Cave, including the juniper bark matting.

retouched flakes.

The groundstone artifacts are all untypable fragments; they may represent hammerstones or abraders. All of the chipped-stone tools and two of the groundstone fragments were manufactured on CCS, while the remaining three groundstone fragments were manufactured on basalt (Table 2).

DISCUSSION

The Oranjeboom lithic assemblage consists of 1,114 artifacts. CCS is the most common raw material type; however, basalt, obsidian, limestone, and quartzite are also present. The few cores recovered from the site were reduced intensively, apparently to the point of exhaustion. The debitage assemblage is characterized chiefly by retouch chippage. Very little cortex occurs on the debitage pieces, and the majority are small in size and bear multiple dorsal flake scars. The tool assemblage is dominated by small biface fragments and only four Eastgate points, all made of CCS. The biface fragments could have come from a small number of discarded projectile points. Thus, lithic technological activities appear to have been limited to the production of Eastgate points, biface maintenance, and the expedient manufacture of a few unifaces.

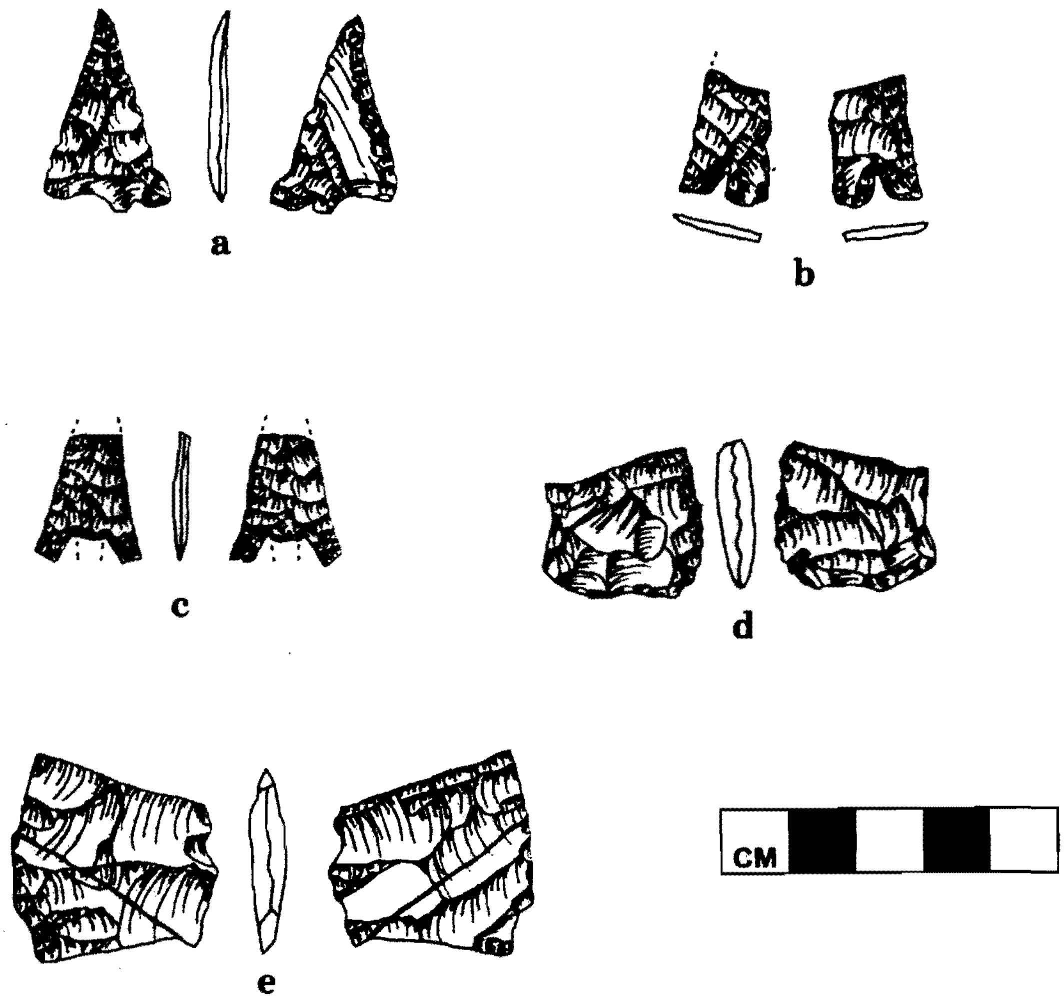

Figure 5. Selected stone tools from Oranjeboom Cave: (a) Eastgate point, ref. no. CRNV11-8055-130, unit BB11, level 2; (b) Eastgate point, ref. no. CRNV11-8055-33, unit AA10 (SW), stratum 2, level 1; (c) Eastgate point, ref. no. CRNV11-8-55-34, unit AA10, Fea. 1, stratum 2, level 1; (d) late stage biface, ref. no. CRNV11-8055-7-1, unit AA09, level 2; (e) late stage biface, ref. no. CRNV11-8055-7-2, unit AA09, level 2.

CERAMIC ARTIFACTS

The 24 ceramic sherds in the collection appear to be from a single Great Salt Lake Gray wide-mouthed jar (Madsen 1977). The surface is plain, and the construction method is coil and scrape with very uneven smoothing. Wall widths range from 3.2 to 6.4 mm. The non-plastic inclusions appear to be added as temper since biotite is present in large fragments. The temper consists of abundant frosted quartz with coppery mica. Also present in lesser amounts are black volcanic grains and other unidentified rock fragments.

One re-fired sherd contains a piece of another sherd, tempered with frosted quartz, besides the above constituents. Another has a streak of fugitive red pigment across the interior surface. Since none of the other sherds exhibit this pigmentation, it may have been applied after breakage. All of the sherds are burnt, most throughout the cross-section, suggesting the burning occurred after breakage. If this is true, then the vessel may not have been used for cooking and the wide-mouth might suggest storage of dry material, rather

Table 3. Organic artifacts from Oranjeboom Cave.

Description	Reference Number	Provenience	Dimensions	Comments
Twine fragments	CRNV-11-8055-35	AA10, Feature 1, Stratum 2, level 1	35 mm x 4mm dia.	2 strand S-twist; Z-spun (Emery 1966)
Conical wooden stick	CRNV-11-8055-13	AA10, Stratum 3, level 1	23 mm x 7 mm	Tapers to a blunt point; rasp-like abrasion on taper; unburned
Bone bead	CRNV-11-8055-82	BB10, level 2	3.5 mm x 2.5 xx dia.	Possible bird bone, undecorated

than liquid.

Four sherds were selected for more detailed laboratory analysis. Microscopic examination of these specimens in thin-section indicates a fine-grained granitic temper containing plagioclase feldspar, quartz, biotite mica, amphibole, and clino-pyroxene. After refiring, the sherd containing rounded quartz in its temper (CRNV-11-8055-43) was a recognizably different color from the other sherds, perhaps reflecting a mixture of clay sources.

The characteristics of these sherds fall within Madsen's (1977) description for Great Salt Lake Gray, dating from A.D. 400 – 1350, although the difficulties of classifying Fremont ceramics into distinct types is recognized (e.g., Madsen and Simms 1998). An uncalibrated AMS radiocarbon date of 1100 ± 40 B.P. (Table 1) was obtained from the outside of sherd CRNV-11-8055-97. The two sigma calendar age is A.D. 882 to 1019, clearly within the temporal range of this style. The core area is around Great Salt Lake and Utah Lake, although this pottery style has a wide distribution across Utah and into Nevada, southern Idaho, southwest Wyoming, and northwest Colorado (see Madsen and Simms 1998).

ORGANIC ARTIFACTS

By volume and absolute number, organic artifacts numerically dominate the Oranjeboom assemblage. The shredded juniper matting which formed the living floor is essentially a large organic artifact covering several square meters. Several samples of this surface were collected (the largest ~ 1 kg), including one from unit AA11 which was directly radiocarbon dated at 1275 – 1049 B.P. (Table 1). These samples were removed intact, and were not screened or sorted, and at least one contains visible lithic debitage and no doubt other artifacts as well. This surface was removed, screened, and discarded over much of the excavated area shown in Figure 3, with only samples retained in the collection.

A number of other interesting organic artifacts and objects were recovered from this screened matting, although none are diagnostic (Table 3). These include a single small bone bead, a short piece of twine, and a curious conical unburned wooden object. The conical wooden object is about the size and shape of the writing end of a standard no. 2 wooden pencil, which is unpainted and undecorated. Abrasion marks created apparently by a rasp-like stone are clearly visible on the entire surface. There is no evidence of impact damage to the blunt tip. Fragments of juniper wood and sticks were abundant, some partially burned. Fragments of arrow cane were also common, although none were longer than a few centimeters and none had traces of paint or other evidence of use or manufacture. No fragments of arrow or dart shafts were seen, although some pieces of the *Phragmites* spp. may reflect these artifacts.

MACROBOTANICAL REMAINS

Two soil samples (comprising 4.2 liters) from the hearth and burned area found in AA11 and BB10 were sent to the Paleoethnobotany Laboratory, Institute of Archaeology of the University of California Los Angeles for analyses. The samples contained primarily charcoal and there were a few seeds (Popper and Martin 2000). Identifiable carbonized seeds include *Chenopodium* sp. (goosefoot) and *Juniperus* sp. (juniper). Other plant parts recovered include small branchlets of *Juniperus* sp., a possible *Pinus* sp. nutshell fragment, and an unknown fruit. Most of the identified wood charcoal was *Juniperus* sp. and *Pinus* sp., with small amounts of *Artemesia* sp. cf. (sagebrush), *Rosaceae* cf. (rose family), and an unidentifiable conifer.

Most of the macrobotanical remains from Oranjeboom suggest that they were use as fuel, while the goosefoot seeds, juniper seed, and the possible pine nutshell possibly represent food items (Popper and Martin 2000). Each of the taxa recovered was locally available.

FAUNAL REMAINS

A total of 270 large mammal bone fragments was found in direct association with the living floor. Of these, 249 (92 percent) were unburned and 21 (8 percent) were burned. The vast majority of faunal remains (238, or 88 percent) were recovered from just six units: Z12, AA10, AA11, AA12, BB11, and BB12.

Of the 270 total bones recovered, 262 (97 percent) were unidentifiable large mammal bone fragments. Some of these were from a large ungulate (elk or bison-sized), and some were from a much smaller ungulate (pronghorn, mountain sheep, or deer). The extensive breakage of these bones suggests that marrow extraction was an activity that occurred within the cave.

The eight bones identified to element are listed in Table 4, and six of them were identified as bison (*Bison bison*). The bison distal first phalange fragment was thoroughly charred, while the remainder of bison bones were unburned. No cutmarks are visible on any of the identified or unidentified specimens. The rib fragment identified as large mammal is probably bison as well. The small ungulate second phalange compares most favorably with sheep, but could not be confidently assigned to either mountain sheep (*Ovis canadensis*) or domestic sheep (*Ovis aries*). This second phalange was found near the contact zone of the upper, disturbed stratum and the living floor, and because domestic sheep have been herded in the region for some time, the bone may belong to a domestic animal carried into the cave by a carnivore.

The identification of bison in Oranjeboom Cave is a bit surprising given its location above the valley floor. The time period between approximately 1600 and 600 B.P., however, was a period of increased summer precipitation, with subsequent expansion of grassland habitats across the northern and eastern Great Basin regions (Currey and James 1982). This period also witnessed the expansion of bison populations in northeastern Nevada (Murphy and Hockett 1994; van Vuren and Deitz 1993), and the appearance of bison in many eastern Great Basin archaeological sites containing Fremont ceramics (Lupo et al. 1994; Lupo and Schmitt 1997).

SUMMARY AND CONCLUSION

The assemblage from Oranjeboom Cave seems to represent a small short-term occupation (perhaps even a single or very limited number of visits) that took place around 1100 – 970 B.P. by Fremont Complex (Madsen and Simms 1998) foragers. The spatially limited, prepared area indicates a small group, perhaps even a single hunter. Repair of hunting equipment seems to have been the dominant activity, as indicated by the large number of small retouch chips and the prevalence of broken (irreparable) biface fragments. Fremont cultural affiliation is suggested by the presence of a single, broken vessel of Great Salt Lake Gray ware. Botanical remains are not very revealing, suggesting mainly that pine and juniper were used as fuel. Goosefoot, juniper, and pine nutshells were also found, possibly indicative of their

Table 4. Faunal remains identified to element at Oranjeboom Cave

Unit	Element	Identification
AA11	first phalange	*Bison bison*
AA12	rib fragment	*Bison bison*
AA12	rib fragment	*Bison bison*
BB9	sesamoid	*Bison bison*
BB9	rib fragment	large mammal
BB10	second phalange	*Bison bison*
BB11	second phalange	small ungulate
BB12	rib fragment	*Bison bison*

use as food.

The only large mammal bones identified to species were those of bison, and thus the partial remains of at least one bison were probably cooked and eaten in the cave. These and other large- and medium-sized mammal bones were very broken, suggesting marrow extraction. The faunal data suggest that the small hunting party consumed bulky and less calorie-rich parts of the bison carcass inside the cave (e.g., Binford 1981). Perhaps a bison was killed along the foothill slopes below the cave. The hunting party may have sought shelter inside the cave, carrying portions of the bison carcass such as ribs and lower legs to the cave to cook and consume meat and marrow. The highest meat-yielding portions of the carcass would have been consumed at the kill site or at another camp located some distance from the cave.

The data from James Creek Shelter (Elston and Budy 1990) and Scorpion Ridge (Hockett and Morgenstein 2002) suggest that the bow-and-arrow entered northeastern Nevada by at least 1200 B.P. The two sigma age range for acceptable dates from Oranjeboom Cave overlap with this date, suggesting that deposits in Oranjeboom Cave were left behind by some of the earliest bow-and-arrow wielding foragers in northeastern Nevada (Hockett and Morgenstein 2002). Additionally, Oranjeboom Cave documents that early Fremont foragers were exploiting environments west of the Bonneville Basin. These data add to the number of sites that document early occupation of the eastern and northern Great Basin regions by Fremont foragers (e.g., Henderson 2002), as the Fremont ceramics from Oranjeboom Cave pre-date the peak of Fremont sedentary villages in northern Utah and east-central Nevada (Madsen and Simms 1998).

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