The Coso Obsidian Economy and Possible Links to Village Establishment and Cultural Transition in the Rose Valley of Eastern California

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The archaeological landscape of the Rose Valley–Owens Lake region of California's southeastern Sierra province displayed a curious rise in sedentism during the latter Gypsum/Newberry period, which increased in logistical organization during the early Rose Spring/ Haiwee period. Concurrent with the intensification of quarrying at the primary obsidian outcrops at Coso, these first-generation villages portray similar architecture and overlapping subsistence resource patterns, occur at reasonably regular distances, and appear to be aligned along a common access corridor. Similar concurrent settlements are not found within the fertile Owens Valley to the north. This Rose Valley village sequence collapsed dramatically in the latter Rose Spring/Haiwee era, around 1000 BP, in tandem with the demise of long-distance Coso economies and the apparent Medieval Climatic Anomaly, resulting in potential shifts in trade, settlement, and subsistence strategies.

Despite the recognition of the quality of Coso volcanic glass, the detailed documentation of its procurement and its known ties to long-distance transport, surprisingly little work has focused upon the articulation, impact, cultural patterning and expression of the Coso trade system on prehistoric southern California. At the 2005 Society for California Archaeology conference, this author presented a paper which attempted to stimulate interest in the inland archaeological expression of the Coso Obsidian Economic Exchange System. I discussed in overview the possibility that certain villages from the Antelope Valley of the Mojave Desert northward to the Rose Valley of the eastern Sierra began in tandem with the documented rise and peak of Coso quarrying and distribution, and that perhaps this concurrence displayed sufficient linkage to warrant further investigation (Faull 2006:160-161,163).

The temporal parameters identified as offering the greatest opportunity for enhanced inquiry and understanding were the Late Gypsum/ Newberry and Rose Spring/Haiwee periods, two eras of rapidly evolving cultural patterns that eventually imprinted the Late/Marana period that followed. In addition, I discussed how the demise of the more northern villages, found within a corridor from Fremont Valley through Rose Valley, appear to align with reasonable concurrence to the cessation of the major period of specialized Coso quarrying and long-distance trade to coastal Southern California (Faull 2006:162-163). In this paper my intent is to continue this dialogue, focusing more on the disparate prehistoric patterns differentiating the cultural assemblages found within the Rose and Owens valleys of the eastern Sierra region.

In Continued Pursuit of the Coso Obsidian Economic Exchange System

Clem Meighan (1992:2) cautioned researchers studying obsidian systems not to over-reach when in their conclusions:

> I believe that recognition of obsidian sources has sometimes been used to build bigger conclusions than the evidence justifies...Recognition of "alien" obsidian is not necessarily discovery of an "exchange system" nor even trade in all instances. Other evidence has to be brought forward before an "exchange system" can be postulated, and in most of the papers utilizing this somewhat jargonistic term, the "exchange system" is assumed rather than documented.

Meighan (1992:2-3) further elaborated:

> In California, one of the few indications of a trade system involving obsidian is that of obsidian from the Coso source(s), which found its way to coastal southern California and the offshore islands over a long period of time (most prominently between about A.D. 0 and 800). The quantity of obsidian is large enough to be present in hundreds of sites, and the geographic route of travel for traders is well known. Caches of obsidian blanks have been found in areas between the quarries and the coast, showing transport of at least 10-20 pounds of obsidian at a time, carried in the form of large blanks intended for reworking. … Since there is a continuity of Shoshonean speakers between Coso and the Los Angeles area, it is not necessary to propose "foreign trade" to explain the appearance of Coso obsidian in coastal sites in the Los Angeles basin.

The current research on the Coso economic system examines certain temporal patterns within Rose Valley, Owens Lake at the north end of Rose Valley, and Owens Valley north of Owens Lake. The Coso obsidian source lies just east of Rose Valley (Gilreath and Hildebrandt 1997). Owens Valley represents a more productive ecological niche than Rose Valley, largely due to the abundance of eastern Sierra streams that cascade from fault-induced heights into the more arid valley proper. In historic times, Owens Valley was settled by farmers and ranchers who came to live off the land, while Rose Valley and the Coso Mountains to the south were primarily the domain of miners. Perhaps a parallel perspective exited within prehistory.

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The Late Newberry Period

The Gypsum period in the eastern Sierra is more commonly termed the Newberry (Bettinger and Taylor 1974). During this time certain forms of sedentism came slowly to portions of the eastern Sierra. The first apparitions of sedentism, or at minimum more concentrated residential focus, appear to have arisen in Rose Valley during the documented middle-Newberry expansion of specialization and production within the Coso quarry complex (Gilreath and Hildebrandt 1997:178-179, see also Whitley et al. 1988:5). Near the quarry, at CA-INY-372 (the Rose Spring site), midden enrichment at Locus 1 (possibly between 2500 and 2200 BP) was followed by site expansion involving other loci around 2200 BP (Lanning 1963:242, 243, 268, 281; Yohe 1992:94, 140 table 5, 146; Robert Yohe personal communication 2005). Appearing to coincide with the early portion of this phase, a youth inhumation with 1,000 *Haliotis* ring beads suggests connectiion and exchange with the coast (Lanning 1963:243, 260-261, 263, 320).

During this era, specialized quarrying at the "primary" Coso outcrops (as opposed to down-slope "lag" deposits) was accompanied by a new pattern of off-site secondary reduction, which likely occurred at INY-372, at the Coso Junction Ranch site (INY-2284), and at *Pagunda* near Little Lake (INY-3826) (Allen 1986:35; Becker 2004:256; Delacorte and McGuire 1993:267; Gilreath and Hildebrandt 1997:iii, 174, 178; Yohe 1992:228-229, 234, 247). These sites apparently refined the Coso product through bifacial reduction before local use or long distance-transport to coastal southern California (cf. Becker 2004:256; Gilreath and Hildebrandt 1997:175).

By the Late Newberry, around 2000 BP, a new cultural pattern began to emerge in the eastern Sierra. This pattern, first documented at CA-INY-30 by Basgall and McGuire (1988:98, 111, 156-157, 344-350), established a paradigm of more widespread sedentism, numerous mostly semi-subterranean house structures, caches of Elko and Humboldt Basal-notched points, bifaces, and milling equipment. As indicated by an extensive suite of radiocarbon dates (Table 1), elements of this pattern occur relatively widely in both the Owens and Rose valleys (Basgall and Delacorte 2003:21, 22, 29, 93, 97, Beta-154726 in appendix; Basgall and McGuire 1988:116; Basgall et al. 2003:31, 134, 137; Bettinger 1989:36; 1991:663; Bettinger et al. 1984:104; Burton 1996:570, 573, 578, 588, 589; Jeffrey Burton personal communication 2006; Byrd and Hale 2003:94, 194, 200, 219, Appendix D; Delacorte and McGuire 1993:289; Delacorte et al. 1995:46, 279-280, 341-342; Markos et al. 1998:58-59, 62, 64, 67, 70-71; Whitley 1998:51; Yohe 1992:93, 94, 140; Zeanah and Leigh 2002:68). In addition, Bettinger (1989:36; 1991:663 table 2) noted similarly dated structures in both the Pinyon Zone and at high-altitude alpine sites within the adjoining White Mountains (Table 2).

As part of this broad new pattern, Late Newberry inhumations tend to include caches of Elko and Humboldt Basal-notched points, milling equipment, and a variety of other tools (Burton 1996:607, 608-609, 615-616; Byrd and Hale 2003:86; Gilreath and Holanda 2000:123, 124-125 table 31; King 2000; Markos et al. 1998:75, 76, 80-82). It appears that such a pattern prevailed into the early Rose Spring/Haiwee era, as burials that include both Elko and Rose Spring (and sometimes Humboldt) points occur at INY-372 (Locus 1, Burial 2), CA-INY-4864 at Manzanar (Locus C) and possibly at INY-1317 (Locus 1) at Olancha-Cartago (Burton 1996:607, 608-609, 615; Byrd and Hale 2003:86; Gilreath and Holanda 2000:123; Micah Hale personal communication 2006; Lanning 1963:243, 255, 263, 314 plate 3; 318 plate 5a, 320 plate 6k; 324 plate 8h).

Such a pattern appears to be reinforced by a house floor at INY-4862 (Locus A) dated to 1430 +/- 90 RCYBP, where an Elko (or early, large Eastgate) point was recovered in proximity to two Rose Spring points (Burton 1996:570, 574, 578, 589). The clustering or caching of artifacts within this house feature fits the general pattern of the Late Newberry phase. Another house floor, at INY-5761 in Independence, has been dated at 1500 +/- 40 RCYBP (corrected), which yielded one Humboldt Basal-notched point in association with five Rose Spring points and several handstones (Basgall and Delacorte 2003:21, 22, 29, 95, 102, Beta-154726 in appendix). It should be noted that both of these structures also yielded contradictory dates (1050 +/- 90 RCYBP [INY-4862] and 1330 +/- 60 RCYBP [INY-5761]) obtained from slightly less reliable source material (Basgall and Delacorte 2003:21, 22, 102; Burton 1996:589).

The Late Newberry phase, apparently most intensive near Owens Lake and Rose Valley, coincided with the zenith of Coso quarrying and long-distance distribution (Gilreath and Hildebrand 1997:iii, 174, 178). The general characterization of this phase is well documented in a variety of eastern Sierra archaeological studies (e.g., Basgall and McGuire 1988; Delacorte 1999; Delacorte and McGuire 1993).

The Rose Valley Villages of the Early and Middle Haiwee

While the Newberry period showed certain cultural differences between the Rose and Owens valleys, the Early/Middle Haiwee phase accentuates these differences towards the extreme. During the early Haiwee, sometime around 1450 to 1500 RCYBP (Table 3), additional villages and support sites tended to arise in a north-south alignment from Owens Lake through Rose Valley (Byrd and Reddy 2004:305; Delacorte and McGuire 1993:67-68, 289; Eerkins 2003:286; Eerkens et al. 1999:280; Gilreath 1995:46; Gilreath and Hildebrandt 1997:69; Gilreath and Holanda 2000:95; Kelly et al. 1987; Yohe 1992:18, 93, 140). At the same time (Table 4), villages at CA-KER-875 and KER-2211, and procurement support sites at KER-250 and possibly KER-6106, arise to the south in the China Lake and Fremont valleys (McGuire et al. 1982:35; Sutton 1990:3, 5; 1991:179; personal communication 2006; Sutton and Hanson 1986:3: Williams 2003; 2004; Audry Williams personal communication 2006). The similar rise, apparent function, and demise of this Kern County assemblage suggest a connection with the assemblages and sequence in Rose Valley (Faull 2006:161-163).

As Delacorte and McGuire (1993:287; Delacorte 1994) point out, these villages appear unique in the archaeological record for their choice of location, their faunal procurement strategies, and their restriction to the Haiwee period. Eerkens (2003:283) stated, "In order to

Table 1: Late Newberry Phase Signatures (roughly 2000 to 1500 BP). Uncorrected radiocarbon dates listed in radiocarbon years before present. Trinomials arranged from south to north.

Site	Radiocarbon	Association
INY-2284	1900 +/- 90	house floor
	1810 +/- 70	house floor
INY-372	2070 +/- 90	loose charcoal (Locus 1 X-1)
INY-1317	1730 +/- 40	charcoal (Locus 1 CU-18)
INY-6263	1640 +/- 40	charcoal (STU-3)
INY-6021	2020 +/- 40	house floor charcoal and ash (CU-1)
	1920 +/- 40	house floor charcoal and ash (CU-1)
	1520 +/- 40	hearth (CU-4)
	1520 +/- 40	hearth (CU-4)
INY-5967	1740 +/- 40	hearth (CU-2 F1)
	1610 +/- 40	hearth (CU-2 F1)
INY-1991	1690 +/- 59	low carbon sediment (Unit 1 F-3)
INY-30	1860 +/- 70	wood (Structure 12)
	1840 +/- 80	wood (Structure 14)
	1650 +/- 100	wood (Structure 14)
	1600 +/- 70	carbon rich soil (Structure 11)
	1530 +/- 80	wood (Structure 12)
	1460 +/- 60	burnt roof supports (Structure 15)
	1220 +/- 70	wood (Structure 11)
INY-3769	1180 +/- 80	house floor (Locus 6 F1)[a]
INY-2750	1650 +/- 70	*Anodonta* shell (Locus B F1)[b]
INY-4862 A-2	1430 +/- 90	house floor (LocusA U24) MANZ 1993
INY-4903	1500 +/- 50	remnant house floor (Locus B EU-15)
	1450 +/- 60	remnant house floor (Locus B EU-15)
INY-5761 F2)	1500 +/- 40	house floor charcoal chunks (Locus 2
INY-5281	1590 +/- 40	charcoal flecks (Feature 2)
INY-5873/H	2050 +/- 45	artiodactyl bone collagen
INY-1700	1940 +/- 100	*Ovis* scapula (Midden III N3E5)
INY-2146	1500 +/- 100	deer scapula – 4 subsurface Elko pts
INY-1384/H	1740 +/- 80	house floor (Locus 10 F4)
	1780 +/- 70	house floor hearth (Locus 10 F10)

[a] – Chronology of all associated artifacts (5 Elko pts, 4 HBN bifaces, 2 *Haliotis* pendants, several large bifaces) indicates a late Newberry context for the house structure.

[b] – Dating suspect due to the nature of the subject material and possible "dead" carbon.

Table 3: Early through Middle Haiwee Phase Signatures – Rose Valley to Owens Lake (roughly 1500-1450 to 940 BP). Uncorrected radiocarbon dates listed in radiocarbon years before present. Trinomials arranged from south to north.

Site	Radiocarbon	Association
INY-3826	1370 +/- 80	ash lens (CU-4)
	1320 +/- 40	carbonized plant remains (CU-2)
	1320 +/- 50	carbonized plant remains (CU-4)
	1290 +/- 40	carbonized plant remains (CU-2)
	1230 +/- 40	carbonized plant remains (CU-2)
	1220 +/- 70	charcoal concentration (CU-4)
	1100 +/- 40	carbonized plant remains (CU-4)
INY-3004/5	860 +/- 65	floatation derived charcoal (Locus I F4)
INY-4325	930 +/- 80	floatation derived charcoal (Locus B F2)
INY-1923	900 +/- 90	hearth
WP 75-12	840 +/- 80	loose charcoal
INY-2284	960 +/- 160	house floor
INY-372	1400 +/- 50	hearth (Locus 1 X-2)
	1360 +/- 70	hearth (Locus 1 X-1)
	900 +/- 60	hearth (Locus 2)
INY-3812	1600 +/- 60	house floor (Locus 1 post 2)
	1340 +/- 50	house floor (Locus 1 post 10)
INY-1428	1270 +/- 70	floatation charcoal (S3/W12)
	990 +/- 80	floatation charcoal (N7/W8)
INY-1451	990 +/- 80	charcoal (Locus 1 N1017/E1012)
INY-3806/H	1600 +/- 100	charcoal concentration (Unit 2)
	1490 +/- 70	House Feature 2 post
	1400 +/- 80	House Feature 2 timber
	1340 +/- 60	House Feature 1 charcoal
	1180 +/- 70	hearth (Feature 6)
	1160 +/- 90	composite charcoal (Unit 2)
	1160 +/- 60	House Feature 3 hearth

understand the exact processes involved in development of sedentism in Owens Valley, we need to focus on the Haiwee period." These concentrated occupations laid down nearly one meter of midden over perhaps 500 years. Most have house structures, commonly semi-subterranean in nature (Delacorte 1994:6; Delacorte and McGuire 1993:67-68, 242-243; Eerkens 2003:286, 289, 301: McGuire et al. 1982:45-46; Sutton 1988:64, 1990:3, 1991:94, 179; Sutton and Hansen 1986:2; Whitley 1998:51, David Whitley personal communication 2005). However, the Late Newberry pattern of caching significant numbers of artifacts all but disappared.

One possible exception to this caching pattern could be House Feature 3 at CA-INY-3806/H, where Eerkens (2003:295) ascribed seven points, 36 bifaces, eight millingstones, and 13 handstones as associated with the house floor. However, Eerkens et al. (1999:276) previously ascribed three points and numerous obsidian flakes as being "directly associated with the floor," the possible discrepancy involving artifacts recovered from the fill directly above the floor. In addition, in strong contrast to the Late Newberry caching pattern observed from nearby INY-30, INY-3806/H obsidian artifacts were sourced almost entirely to Coso, which combined with other data from the assemblages appears to indicate a reduced pattern of mobility (as per Eerkins 2003:294; see also Delacorte and McGuire 1993:284-285; Delacorte 1994:3 for a larger context).

Storage pits appear to have developed during the Middle Haiwee phase, as such features have been documented at INY-3806/H, INY-2284, and within the Haiwee component (Feature 5) of INY-30 (Basgall and McGuire 1988:52-53, 350; Eerkens 2003:289; Whitley 1998:52).

On the northern frontier of this village system, the Late Newberry occupations at Lubkin Creek (INY-30) as well as near Olancha and Cartago (INY-1317, INY-1991, and INY-6021) appear to have been abandoned in favor of a new trio of sites midway between. A new village with house structures, INY-3806/H, was established along Cottonwood Creek near the confluence with the Owens Lake playa (Delacorte and McGuire 1993:168-178, 284; Eerkens 2003). This community focused heavily on the procurement of grebes, while within sight (just 2.6 miles/4.2 km to the southwest), a second occupation along Ash Creek (CA-INY-1428) focused on artiodactyls, more specifically bighorn sheep (Delacorte 1994:8-9; Delacorte and McGuire 1993:176-177; Gilreath and Holanda 2000:116, 117, 121, 132). It seems likely that these sites in close proximity interacted in function and purpose, to present one overall outcome. Further indication of the possible site specialization might be discerned from the recovery of 99 Rose Spring points at INY-1428, as opposed to the recovery of only 30 Rose Spring points from INY-

Table 4: Early through middle Haiwee phase signatures from Fremont and Indian Wells valleys (roughly 1450–940 BP). Uncorrected radiocarbon dates listed in radiocarbon years before present. Trinomials arranged from south to north.

Site	Radiocarbon	Association
KER-2211	1300 +/-100	house floor (Locus 1 TU-9)
	940 +/-100	house floor (Locus 1 TU-14)
	940 +/- 80	Hearth 4 (Locus 1 TU-15)
KER-875	1430 +/- 60	house floor post B (Locus 10 Structure 1)
	1420 +/- 50	hearth (Locus 10 TU-9)
	1300 +/- 60	hearth (Locus 10 TU-7)
	1240 +/- 90	house floor post (Locus 10 Structure 1)
	1180 +/- 40	hearth (Locus 1 TU-2)
	1110 +/- 70	house floor post (Locus 10 Structure 1)
	970 +/- 70	hearth (Locus 1 TU-2)
KER-250	1255 +/-110	house floor (N7/E28 F1)
	1050 +/- 90	composite charcoal (N20/E5)
	950 +/- 75	composite charcoal (N7/E27)
	650 +/- 65	composite charcoal (N7/E28)
KER-6106	1130 +/- 60	charred material
	1110 +/- 50	charred material
	1110 +/- 40	charred material

Table 5: Early through middle Haiwee phase signatures from Owens Valley and the White Mountains (roughly 1450–940 BP). Uncorrected radiocarbon dates listed in radiocarbon years before present. Trinomials arranged from south to north.

Owens Valley

Site	Radiocarbon	Association
INY-3769	1180 +/- 80	house floor (Locus 6 F1)[a]
INY-2750	1330 +/- 70	dense charcoal (Locus A F6)
INY-328/H	1280 +/- 80	hearth charcoal (Feature 2)
INY-4862	1050 +/- 90	composite charcoal (Locus A U24)[b]
INY-4903	1040 +/- 50	charcoal from level (Locus A)
INY-5761	1330 +/- 60	house floor AMS (Locus 2 F2)
INY-5281	1280 +/- 40	charcoal flecks (Feature 4)
INY-5285/H	1210 +/- 60	charcoal (Feature 1)
INY-4646	1380 +/- 60	sediment sample (EU E80/N200)
	1290 +/- 60	sediment sample (EU E112/N207)
	1190 +/- 70	sediment sample (EU E113/N204)
	1120 +/- 60	sediment sample (EU E111/N208)
INY-1386	1250 +/- 130	"intrusive charcoal" (Locus 1)

White Mountains Alpine Occupation

Site	Radiocarbon	Association
Raven Camp	1240 +/- 60	--
Corral Camp So.	1190 +/- 70	--

[a] – Chronology of all associated artifacts (5 Elko pts, 4 HBN bifaces, 2 *Haliotis* pendants, several large bifaces) indicates a late Newberry context for the house structure.

[b] – Composite carbon submission from stratum and sidewall collected below a more concentrated ash and charcoal layer related to a presumed structure dated at 1430 +/- 90 RCYBP.

3806/H (Eerkens 2003:286; Eerkens et al. 1999:280; Gilreath and Holanda 2000:98, 105).

The occupations at INY-1428 and INY-3806/H were originally thought to be bimodal, each appearing to contain a short Middle Haiwee hiatus (Earkens 2003:284, 301; Gilreath and Holanda 2000:i, 96, 132). When analyzed together, radiocarbon and obsidian hydration values from both sites overlap to fill any suspected hiatus, suggesting that occupation in this vicinity was relatively continuous during the Middle Haiwee.

A third Haiwee site of interest, CA-INY-3541 midway between INY-3806/H and INY-1428, shows evidence of lithic reduction and also contains a relatively robust ground stone assemblage which appears "to have been left (cached) at the locus after each occupation" (McGuire 1994:12, 13 figure 1, 21, appendix B). INY-3806/H may bear additional connection to other sites that extend onto the former Middle to Late Haiwee desiccated playa of Owens Lake (see Stine 1995; 2003). Unique specialized processing slabs coined "tabular bifaces" have been noted at INY-3806/H as well as on the former playa (Avina 2002; Eerkens 2003:293). Other evidence may connect these Haiwee sites with procurement activities in the nearby Sierra Nevada, as both INY-3806/H and INY-1428 have yielded acorn and/or pinyon nut remains not found locally (Eerkens 2003:291, 292, Gilreath and Holanda 2000:118, 119, 133). Thus INY-3806/H might be viewed as a primary camp, potentially surrounded and supported by specialized procurement sites in the immediate vicinity.

Centralized semi-sedentary villages ringed by associated activity loci might well prove to be the norm for the Middle Haiwee phase in the greater Rose Valley/Owens Lake corridor. Village placement would have maximized the local procurement opportunities to sustain each community, while potentially including additional strategic values, such as possible positioning to control access to or distribution of Coso obsidian. Such a dual purpose would help to explain the unique strategy of site selection during this era (Faull 2006), which was not duplicated in previous or later times (Delacorte 1994; Delacorte and McGuire 1993).

South of Owens Lake, the other major Middle Haiwee village components in the Rose Valley system are INY-3812 (Sage Flat Village), INY-372 (the Rose Spring site), INY-2284 (Coso Junction Ranch on Portuguese Bench) and INY-3826 (*Pagunda* at Little Lake). These villages, and those of the Fremont Valley to the south, appear to align as an interconnected, probably cooperative network characterized by specialized procurement and the potential redistribution of a variety of resources.

Such specialization apparently extended to other elements associated with this temporal sequence. The Middle Haiwee phase was a time of specialized (possibly off- site) burial practices, for only one undated (and possibly intrusive) inhumation from INY-1428 (Gilreath and Holanda 2000:81-83) is associated with any of the major components of this system. Rose Spring points dominate the assemblages, sometimes prolifically (eg. Gilreath and Holanda 2000:98; Yohe 1992:180), while Humboldt Basal-notched points became a much less prevalent tool. In addition, the Late Newberry through Middle Haiwee periods possibly align with the zenith of the renowned, localized Coso Rock Art Tradition (Gilreath 1999; Grant et al. 1968).

The procurement and distribution of Coso obsidian during this era is well documented. Beyond lithic acquisition and redistribution,

which also involved cryptocrystalline silicates from the El Paso Mountains (Faull 2006; Faull and Sampson 2004; Sampson 2003), specialized jackrabbit (*Lepus*) procurement and redistribution has been documented at KER-250 and possibly at KER-6106 (Basgall 1982:137-138; Williams 2003, 2004). Such a faunal redistribution likely occurred between INY-1428 and INY-3806/H, as well, as noticeable amounts of grebe bone is present at INY-1428, and bighorn (*Ovis*) bone at INY-3806/H (Delacorte 1994:8-9; Delacorte and McGuire 1993:176-177; Gilreath and Holanda 2000: 116, 117, 121, 132). Grebe consumption was not new to the Haiwee; it has been documented in the Newberry assemblages of INY-30 and INY-3807 (Delacorte and McGuire 1993:200; Hildebrandt 1988:324, 326, 329), but such a concentration does seem to be unique to the Middle Haiwee.

Grebes also occur in Middle Haiwee assemblages away from Owens Lake, including INY-3812 and INY-2284 (Delacorte 1994:9; Delacorte and McGuire 1993:249-251; Moore 2005:6). Such a pattern hints further at redistribution. Grebes are notably absent from the faunal remains at INY-372 (Yohe, personal communication, 2006). The occupants of INY-2284, some 17 miles (27.4 km) south of Owens Lake and 24 miles (38.6 km) from INY-3806/H, could have obtained grebes from Little Lake, only six miles/9.25 km to the south. However, excavations of the relatively intense Haiwee occupation on the banks of Little Lake (INY-3826) recovered only one grebe bone (Porcasi 2004:270, 273).

Redistribution is difficult to distinguish from direct access and procurement. Possibly instructive are the percentages of unburned faunal remains, which at INY-3806/H equaled 72% of the grebe assemblage and at INY-1428 equaled 96% of the bighorn assemblage (Delacorte and McGuire 1993:177; Gilreath and Holanda 2000:117 table 28). While specialized and individualized community diets might be a preference of this cultural paradigm, it appears highly likely that the specializations inherent in other aspects of this cultural system also extended to specialized procurement and redistribution of dietary products.

THE DISPARATE OWENS VALLEY PARADIGM

In striking contrast to what appears to be an organized contemporaneous village system dominating Rose Valley, the more productive Owens Valley seems to have been under utilized during the Middle Haiwee. Despite relatively extensive archaeological study, the Middle Haiwee Owens Valley pattern appears ephemeral and perhaps connected with a round that involved either travel to or trade with the Casa Diablo and Truman Meadow/Queen obsidians sources to the north (see for example obsidian source ratios in Burke et al. 1995:64-67).

Delacorte and McGuire (1993:287) have discussed Haiwee as a period "marked by a profound increase in settlement centralization and intensified procurement of certain key resources (small game)," further stating, "What makes these sites so unusual is that they harbor little or no occupation before or after this interval." While such a pattern holds true for Owens Lake and Rose Valley, the data obtained thus far does not suggest a similar pattern in Owens Valley proper. Delacorte and McGuire (1993:288) noted, "Curiously, no comparable distinctive, early Haiwee period pattern has yet been identified in northern Owens Valley or beyond, suggesting it may be unique to the Coso vicinity." Whitley et al. (1988:8) noted even earlier the possibility of a disparate cultural pattern between the Owens and Rose valley assemblages.

Subsequent fieldwork in the Owens Valley appears to confirm these early suspicions. The patterning of Middle Haiwee radiocarbon data from the Owens Valley (Table 5) portrays an intriguing dichotomy from the Rose Valley complex (Basgall and Delacorte 2003:21; Basgall et al. 2003:31, 239; Bettinger 1991:663; Burke et al. 1995:58, 60; Burton 1996:589; Burton, personal communication 2006; Delacorte 1999:40; Delacorte et al. 1995:46, 279-280, 342; Zeanah and Leigh 2002:68). No incontrovertible house structures are documented from this era north of Owens Lake (but there are possible ones at Locus 6 of INY-3769 and Locus 2 at INY-5761) and some radiocarbon dates attributable to this period in the Owens Valley (INY-1386, Locus 1) have been labeled as "intrusive charcoal" in older deposits (Basgall and Delacorte 2003:21, 22, 29, 93, 97, Beta-154726 in appendix; Basgall et al. 2003:239; Delacorte et al. 1995:279-280). Indeed many multi-component assemblages from Owens Lake north, such as INY-30 (Basgall and McGuire 1988), display a gap in activity (or lighter patterning of transhumance) in the Middle Haiwee, bracketed by reasonably robust assemblages from the Newberry and Late Haiwee or Marana periods. On point, the greater Alabama Gates to Manzanar region appears to portray this pattern (Burton 1996; Delacorte 1999; Delacorte and McGuire 1993; Delacorte, et al. 1995), as does the western Owens Lake shoreline near Olancha and Cartago (see Byrd and Hale 2003; Markos et al. 1998).

While such a patterning of multi-component sites appears relatively consistent through ut the Owens Valley, one caveat regarding possible sampling error should be noted. In Owens Valley almost no CRM work has occurred within the confines of the modern towns of Lone Pine, Independence, Big Pine, and Bishop. These were prime locations chosen by nineteenth-century non-native pioneers, and we should suspect that they also were favored by earlier peoples. CA-INY-4646, which produced four of the 13 mid-Haiwee Owens Valley radiocarbon dates listed herein, lies along the banks of Big Pine Creek just east of the town of Big Pine (Burke et al. 1995). Other sites of potential interest to investigators include INY-3783, also adjacent to the creek in Big Pine, and INY-3711 (recorded as a "major occupation site" of undetermined age) and INY-1421 (presupposed to be of Haiwee age) adjacent to the north fork of Bishop Creek (Burton et al. 1990; Jenkins and Foster 1990; Peak 1974:8-9).

Still unanswered is the overarching question of why eastern Sierran peoples chose to aggressively occupy the more marginal and arid terrains of Rose Valley, during a Middle Haiwee period which apparently was plagued by aridity (see Stine 1995, 2003), rather than areas farther north that normally offer more favorable resources.

THE COLLAPSE OF THE ROSE VALLEY COMMUNITIES

After some 500 to 600 years of occupation, the contemporaneous semi-sedentary villages of Rose Valley apparently collapsed. Whitley et

al. (1988:8) stated, "either there was a major reduction in population at the start of the Shoshonean Period, or a major change in the subsistence pattern towards an archaeologically very-low visibility exploitation pattern." Delacorte (1994:10) also noted this "nearly complete abandonment of earlier settlements." The village and procurement sites found within the China Lake and Fremont valleys to the south also disappeared. Such a pattern of sedentary to semi-sedentary residential centers never re-emerged within either of these districts (cf. Delacorte and McGuire 1993:287; Whitley et al. 1988:8; 1998:55).

In general, this abrupt demise and transition to decentralized societies appears clustered around 940 RCYBP, based on a series of radiocarbon dates (Table 6) and hydration data (Delacorte and McGuire 1993:289; Gilreath 1995:46; Gilreath and Hildebrandt 1997:69; Gilreath and Holanda 2000:95; Kelly et al. 1987; McGuire 1994:12; McGuire et al. 1982:35; Sutton 1990:3, 5; 1991:98, 179; Sutton and Hansen 1986:3; Yohe 1992:18, 93). These data reinforce the previously published hypotheses of Whitley (1988:75; 1998:55) and Sutton (1991:178, 181; 1996:238, 243) regarding possible village cessation and cultural shifting at circa 1000 A.D.

During the Middle Haiwee cultural phase a general north-to-south alignment of villages and activities prevailed, with side forays to procure resources from the Coso Mountains and the southern Sierra. An apparent conversion at the end of this phase towards a greater east-west alignment seems to have accompanied the return of a more mobile, decentralized hunter-gather society (Steward 1933; 1938).

Concerning this apparent clustering of radiocarbon dates, two more observations may be relevant. At Owens Lake, Stine (1995:9; 2003:435-436, 445) discovered tufa-encased shrubs that dated to 930 cal B.P. and playa-bound Rose Spring projectile points and other artifacts that appear to document a severe desiccation of Owens Lake. Avina (2002:22-24) found 70 processing tools ("tabular bifaces") and a predominance of Rose Spring/Eastgate points on the modern exposure of the normally inundated Owens playa. Stine has also published wider data on an extended interval of intense aridity or "epic drought," which he has coined the Medieval Climatic Anomaly, between AD 800 and AD 1350 (Stine 1994:546, 547, 549). The collapse of the Rose Valley villages appears to date near the center of the first of two main droughts posited by Stine (1994:549; cf. Sutton 1996:238).

There may be further evidence of the localized impact of the Medieval Climatic Anomaly. Mehringer and Shepard (1978:159, 163, 165) documented a yet undated, aberrant layer of desiccation in two cores taken at Little Lake (Core I at 0.66m and Core II at 2.37m). These thin layers of friable, blocky strata disruptrf an otherwise fairly consistent deposition of *Chara* ooze from circa 3000 B.P. to the present. A reexamination of the Little Lake cores combined with additional fieldwork could help to clarify any impact the Medieval Climatic Anomaly had in Rose Valley.

Early Hints at Post-Rose Valley Village Patterns

Several intriguing preliminary patterns emerge concurrent or nearly concurrent with the demise of the Rose Valley villages. The first involves the adjacent Coso Mountains. Four radiocarbon dates from the Sugarloaf Mountain region of the Coso range (Table 7) appear to be at or just after the apparent cessation of the Rose Valley village complex (Gilreath and Hildebrandt 1997:69 table 12; Kelly et al. 1987; Yohe 1992:18). Although highly speculative, the apparent absence of Late Newberry-phase radiocarbon dates and the presence of only four *terminal* Mid-Haiwee dates from the vicinity of the Coso Volcanic Field could reflect the specialized association of the primary Coso quarries with the adjoining Rose Valley villages, followed by the cessation of such a relationship upon village abandonment necessitating a rejuvenated need to camp at or near the quarry during the Late Haiwee phase.

That a rudimentary Coso trade pattern appears to have sputtered on for a period beyond the village cessation deserves further attention. Although the most prominent flow of obsidian to coastal southern California may have been between A.D. 0 and 800 (Meighan 1992:2), the punctuated or terminal cessation of Coso obsidian delivery to coastal southern California has been placed at AD 1200 (Meighan 1978:160), perhaps 200 years after village abandonment or dissolution in the Rose Valley.

Table 6: Apparent terminal dates for the middle Haiwee phase in Rose through Fremont valleys. Uncorrected radiocarbon dates listed in radiocarbon years before present. Trinomials arranged from south to north.

Site	Radiocarbon	Association
KER-875	970 +/- 70	--
KER-2211	940 +/- 80	--
	940 +/- 100	--
KER-250	950 +/- 75	--
	650 +/- 65	--
INY-2284	960 +/- 160	--
INY-3004/5	860 +/- 65	--
INY-4325	930 +/- 80	--
INY-1923	900 +/- 90	--
WP 75-12	840 +/- 80	--
INY-372	900 +/- 60	--
INY-1428/3806/H	990 +/- 80	--
INY-1451	990 +/- 80	--

Table 7: Late Haiwee-phase radiocarbon dates from near Sugarloaf Mountain. Uncorrected radiocarbon dates listed in radiocarbon years before present.

Site	Radiocarbon	Association
INY-3004/5	860 +/- 65	floatation derived charcoal (Locus I F4)
INY-4325	930 +/- 80	floatation derived charcoal (Locus B F2)
INY-1923	900 +/- 90	hearth
WP 75-12	840 +/- 80	loose charcoal

Table 8: Possible Late Haiwee Pulse South into El Paso Mountains. Uncorrected radiocarbon dates listed in radiocarbon years before present.

Site	Radiocarbon	Association
KER-5043	880 +/- 50	hearth (TU-3 F1)
KER-250	650 +/- 65	composite charcoal (N7/E28)
KER-261	640 +/- 75	hearth at cultural base (S38/E4 F1)

Besides the aforementioned post-village radiocarbon data near the Coso quarry, three sites within the El Paso Mountains to the south provide Late Haiwee radiocarbon dates (see Table 8) in conjunction with Late Haiwee obsidian hydration patterning (hydration rims clustered between 3.7 and 4.0 microns), which indicate a remnant flow of Coso obsidian and continued use of a few holdover Haiwee sites (Faull and Sampson 2004; Gardner 1998:130, 132; Harvey and Gardner 2003:54, 58; McGuire et al. 1982:35, 41). This hydration pattern is faintly present within the Fremont Valley to the south (Sutton 1991), at Oak Creek near Mojave (Sutton and Everson 1992) and possibly into the Antelope Valley beyond (Sutton 1988:83).

Between the Coso quarry and the El Paso Mountains, these hydration readings are mimicked by a cache of 26 Coso obsidian bifaces recovered near Little Lake (Garfinkel et al. 2004:90). Thus certain initial evidence appears to provide documentation of a continued low-profile obsidian transport network after the demise of the Rose Valley village system, which could align reasonably with the published results for coastal sites.

Table 9: Late Haiwee phase shift towards Owens Valley. Uncorrected radiocarbon dates listed in radiocarbon years before present. Trinomials arranged from south to north.

Owens Lake North to Owens Valley Site	Radiocarbon	Association
INY-5984	880 +/- 40	house floor hearth (STU 3 F1)
	720 +/- 40	house floor hearth (STU 3 F1)
INY-1991	840 +/- 70	wood (Unit 7)
INY-30	960 +/- 100	charcoal flecks (Locus C F5)
	870 +/- 230	charcoal from submidden (Unit 35)
	830 +/- 100	hearth (Feature 7)
	760 +/- 100	charcoal flecks (Locus C F5)
	710 +/- 70	wood (Structure 13)
INY-3769	780 +/- 110	house floor (Locus 5 F1)
INY-2750	920 +/- 60	*Anodonta* shell (Locus A F1)[a]
INY-4899	710 +/- 50	charcoal at base of deposit (Locus B EU-20)
INY-5397/H	660 +/- 50	bulk carbon (Locus 1 F1)
INY-5763	820 +/- 70	carbon and burned rock (Locus 1 F2)
INY-1700	800 +/- 130	Structure 7 (Midden II)
INY-1386	995 +/- 160	"intrusive charcoal" (Locus 1)
White Mountains Alpine Occupation Site	Radiocarbon	Association
Shooting Star	870 +/- 50	
Corral Camp South	830 +/- 60	
Rancho Deluxe	870 +/- 50	
	760 +/- 60	

[a] – Dating suspect due to the nature of the subject material and possible "dead" carbon.

A POTENTIAL LATE HAIWEE SHIFT INTO THE OWENS VALLEY

Perhaps the most intriguing pattern that appears to post-date Rose Valley village cessation is from Owens Valley. Judging by available radiocarbon dates (Table 9) and hydration data, the 500-600 years of decreased use during the Mid-Haiwee was followed by a resurgence of activity in the Late Haiwee era. This phase witnesses the possibly renewed expression of residential structures, as well as renewed evidence of inhumations. This parallels to some extent the pattern of village cessation in Rose Valley (Basgall and Delacorte 2003:21; Basgall and McGuire 1988:116; Basgall et al. 2003:31, 239; Bettinger 1989:182; 1991:663; Burton personal communication 2006; Byrd and Hale 2003:243; Delacorte 1999:40; Delacorte et al. 1995:46, 182, 279; Markos et al. 1998:58). Delacorte and McGuire (1993:288) note, without commenting on the implications, that preliminary "radiocarbon assays for northern Owens Valley Haiwee components appear somewhat younger, on average, than those from the south."

Several Owens Valley studies have shown a concordant rise and peak in Fish Spring obsidian hydration values that center around 3.0 microns. Basgall and Delacorte (2003:259-261; see also Basgall 2000) noted just such a peak in Fish Spring obsidian activity and its apparent alignment with the Medieval Climatic Anomaly while conducting studies near Independence, although their conclusions differed from the hypotheses offered here. Burton (1996) documented a nearly identical curve during early trials for the National Parks Service at Manzanar. In particular, INY-4864/H displayed a pronounced hydration peak between 2.5 and 2.9 microns. Only a few miles south at Alabama Gates, Delacorte et al. (1995:279) documented a similar cluster of Fish Spring obsidian values between 2.6 and 2.9 microns associated with a Late Haiwee house floor at INY-3769. To the north Burke et al. (1995:Figure 12) documented yet another Fish Springs obsidian peak around 3.0 microns following a Mid-Haiwee slump at INY-4646 just east of Big Pine.

POSSIBLE IMPLICATIONS OF A LATE HAIWEE SHIFT

The Middle Haiwee villages of Rose Valley appear to occupy less-productive areas at the same time as a rather ephemeral use in the more productive ecosystems of the Owens Valley. Why did prehistoric people establish villages in more marginal terrain? Was this in part linked to the production and distribution of Coso obsidian? Were the Rose Valley communities interlinked, as certain evidence appears to indicate?

Furthermore, when these villages failed, did the people abandon the eastern Sierra region, remain and revert to less sedentary practices, or migrate north into the Owens Valley in search of less drought-impacted environments? Could the suite of convergent Late Haiwee radiocarbon dates and hydration readings be evidence of such a migration? And if so, could the unique sedentism and social structure observed within the Owens Valley Paiute community, discussed by Steward (1933; 1938) and others, have originated earlier in villages centered on the trade of Coso obsidian?

One thing does stand out in the archaeological record—Rose and Owens valleys portray disparate Middle/Late Haiwee through Marana assemblages. Such diversity offers opportunity for future targeted research, dialogue, and debate to clarify the cultural connections that produced these disparate cultural patterns.

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