

# 4

## **Privatization of Resources and the Evolution of Prehistoric Leadership Strategies**

**Jelmer W. Eerkens**

Over the last century, the Owens Valley of eastern California, and its historic and prehistoric inhabitants, has been the subject of many anthropological and archaeological studies. A majority of these studies have focused on the “unusualness” of the Paiute people (for example, Bettinger and King 1971; Dyson-Hudson and Smith 1978) as they were described by Julian Steward in the 1930s (for example, Steward 1930, 1933, 1934, 1936, 1938). The Paiute were considered “unusual” hunter-gatherers for several reasons. First, although classified as Great Basin hunter-gatherers, they dug irrigation ditches and tended plants. Second, although they were considered to be politically and socially “simple,” they had headmen and other inherited leadership positions. Third, families, villages, and districts owned and defended tracts of land. Indeed, the Owens Valley Paiute did not share these behaviors with other linguistically related Paiute and Shoshone people in the Great Basin—people often noted for their extreme social and technological “simplicity” (Thomas 1981).

Steward and many subsequent Great Basin anthropologists accounted for, or more accurately tried to explain away, these unusual practices as a product of environmental factors. Owens Valley was noted for its abundance of water (a fact not lost upon the city of Los Angeles, which constructed an aqueduct in the early 1900s to carry Owens Valley water to the

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growing city, putting farmers out of business and drying Owens Lake). Increased water and the higher resulting biomass in Owens Valley, it was argued, allowed inhabitants of this valley, unlike Paiute and Shoshone people in most of the rest of the Great Basin, to invest energy and time into other activities, beyond merely eking out a living from the harsh desert.

However, over the last thirty years, many anthropologists and archaeologists working in the region have come to embrace this unusualness rather than try to explain it away. In many social evolutionary models, the Owens Valley Paiute are represented as a society in transition, from foraging to agriculture, from politically simple to socially complex. Consequently, the archaeological record has received much attention as a means to study the very beginnings of these processes. This paper continues in that vein, though it shies away from the notion of unilinear evolutionary models and “transitional” societies—that is, that groups of people not readily classifiable into one of several traditionally defined categories (for example, hunter-gatherer, pastoral, agricultural) must be in transition between those endpoints (for similar critiques see also Arnold, this volume). It follows on work by Bettinger (1982, 1983) and focuses on the development of small-scale leaders within Owens Valley Paiute society. The paper begins with an examination of leaders and leadership as described by Julian Steward ethnographically. Subsequently, it turns on archaeological data from households to help illuminate aspects of economic inequality within villages, which are argued, by extension, to relate to the development of leadership.

**THEORETICAL BACKGROUND**

The focus on “leaders” and “leadership” in this paper and others in this volume is similar in many respects to earlier studies on the development of “social complexity” or “social hierarchies.” The broader questions within these approaches are identical—namely, understanding how certain individuals come to gain unequal access to resources and, similarly, why or how others give up such access. The main difference is the social scale at which these questions are asked, namely individuals vs. more general societal developments. Importantly, this finer social scale necessitates an alternative methodological approach in data collection, focusing, of course, on individuals and their actions.

The difference in focus is likely the product of changes in archaeological theory, including both evolutionary theory and agency theory, which are increasingly interested in the behaviors of individuals to explain the archaeological record. Such changes in focus, of course, require attendant

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changes in the types of data we collect, particularly in this case the scale at which we collect them. Research on “households” in archaeology (for example, Ashmore and Wilk 1988; Flannery and Winter 1976) brings data collection down to a level commensurate with these theoretical models, as does bioarchaeological research on individual burials. The study below draws on these two sources.

In this paper, the word *leader* is used to refer to individuals with the power to make decisions on behalf of others, and more specifically to those with decision-making power beyond the nuclear family. Within-family leaders (for example, adults versus children) have probably always existed in human societies, thus it is really the extension of this power outside the family that is of concern. Certain individuals often use decision-making powers to gain unequal access to various kinds of resources (for example, information, material goods, religious practices, and political connections). Such goods can be used to further a leader’s own agenda, especially increasing personal wealth and political influence, for example, by giving these goods away to create social and economic debt, often to be repaid with interest (for example, Earle 1978; Fried 1967; Harris 1985:235; Upham 1990). Thus leaders are involved in frequent interactions with others in the local community and are usually also active in extralocal trade to gain access to more exotic materials.

The basic premise of this paper is that leaders cannot evolve without major adjustments to the egalitarian social order. Leveraging religious systems to provide unequal access to decision-making power is one means by which this change can be accomplished (Bird and Bliege Bird, this volume). Another is to alter the rules that dictate public sharing and/or communal ownership over various economic resources, leading toward increasing levels of privatization (note that religion and ideology can be used to accomplish this also). Rules favoring egalitarian access to economic resources and public goods are present in some form in many small-scale societies and are often reinforced by a range of different social-leveling mechanisms (Bird and Bliege Bird, this volume; Bowser and Patton, this volume; and Wiessner, this volume).

Without exclusive and restricted ownership over resources, and the ability to control their distribution, it is difficult for aspiring leaders to leverage their greater production or differential access into anything unusual. Under such circumstances, there is little incentive to produce a surplus, since it is readily consumed by others without requiring reciprocal repayment or accrual of social debt (Bettinger 1999; Shennan 2002). I refer to this process as freeloading. It is also difficult to gain access to exotic

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goods that aspiring leaders might use to mark their social position within societies, since the exclusive display of such goods is generally taboo, and others might repossess them. As a result, economic units within such settings, usually households, tend to be redundant. Since goods are freely shared, all households tend to produce and have equal access to the same range of materials.

Privatization of resources (that is, restricting access or control over distribution to a small subset of individuals—in the extreme a single person) is one solution to this issue. However, it would have been difficult for a family or an individual to simply begin asserting that some subset of resources previously considered to be public was now private. It is unlikely that individuals could have changed the rules on their own in this manner without everyone agreeing to the new rules. Freeloaders, in particular, stand to lose the most under such rule changes and may be the most vocal about or resistant to potential change.

Instead, I argue that a common way to produce an owned surplus is to invest time and energy in a different kind of resource, one for which the rules about ownership have not yet been well defined (Eerkens 2004). Typically, the ability to access, process, and move such resources should be within the power of individuals or small groups of people and should not require communal or cooperative behaviors. Eventually, it may be possible to shift other resources, previously understood to be public, under the domain of private ownership. However, it seems likely that such shifting would have to happen slowly, over the course of generations, as the notion of privatized goods becomes established, commonplace, and easily translatable to other domains.

Furthermore, within this paper I argue that increases in population density and sedentism create social conditions that favor the erosion of public goods systems. Demographic conditions that force unrelated individuals to live close to one another in sedentary villages will encourage freeloading behavior. For those wanting to overproduce, for example to engage in long-distance exchange, the exploitation of new resources that can be individually controlled and privatized may be an efficient social solution. The technologies employed to exploit such resources are likely to include artifacts that can be produced at the individual or family level and will not require cross-family cooperation to operate. While it is difficult to see the actual breakdown of this social order, the by-product of private ownership and unequal access to resources should be reflected in the archaeological record by decreasing redundancy between economic units

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or households in small-scale settings and new types of technologies that can be individually produced and used.

### LEADERS AND THE ETHNOGRAPHIC RECORD IN OWENS VALLEY

Julian Steward carried out the majority of his fieldwork in the Owens Valley during the late 1920s and 1930s. Although the Paiute had long been settled by the U.S. government into small reservations and *rancherías*, Steward felt he could collect accurate information on precontact lifeways from older informants. The use of such “memory ethnography” can be questioned on many grounds, and there are obvious examples of misinformation, such as informants reporting painting pots in black-on-white styles when not a single prehistoric example of local pottery is known to be painted in any color. Yet, lacking alternative primary sources of ethnographic data (though see Chalfant 1933 for additional information collected from local newspapers), Steward provides a historic anchor point for understanding the development of leadership.

As discussed earlier, the Owens Valley case has been interesting to anthropologists because all Great Basin peoples spoke one of three closely related Numic languages. Indeed, it is now generally accepted that a recent migration of hunter-gatherer peoples out of the Southwest, near Owens Valley, accounts for the linguistic patterns in the Great Basin (Bettinger and Baumhoff 1982; Kaestle and Smith 1992). This migration is commonly referred to as the Numic spread. The implicit assumption of anthropological discussions referring to the unusualness of the Owens Valley case, then, was that this migration must have consisted of simple hunter-gatherers lacking marked positions of leadership. These groups remained simple elsewhere but evolved into more complex organizational forms in the Owens Valley region. The major question, thus, was what caused such unusual social organizations to develop in Owens Valley but not elsewhere in the Great Basin? Steward attributed these developments to the more favorable environments and subsistence opportunities in Owens Valley, particularly the increased availability of water and higher bioproductivity (Steward 1938). Others have offered alternative viewpoints, such as access to resources and trading networks (for example, Bettinger 1982, 1983).

It is possible, of course, that the reverse could have happened—that complex hunter-gatherers spread across the Great Basin but evolved simpler social organizations as they encountered newer environments. Such a logic is inconsistent with social evolutionary models popular during the

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1950s and 1960s that had human societies consistently evolving toward more complex forms over time (for example, Fried 1967; Service 1962, 1975). Such a scenario has not often been considered in Great Basin studies, nor will I discuss it further here, but it is related to an important assumption that underlies this paper. Namely, I assume that the earliest societies in Owens Valley generally lacked marked positions of leadership and that leaders evolved only later in the course of prehistory. There is some indirect archaeological evidence to support this position, but much of it relies on analogies to other ethnographic cases.

At contact, Owens Valley Paiute groups maintained several social and political positions vested with important decision-making power. The most notable was the village headman. Headmen were “intelligent, persuasive leaders, though not always skilled hunters, fighters, etc.” who tended to inherit their positions through paternal relations (Steward 1933: 304). Headmen would organize and control various activities, such as communal hunting or fishing activities (for example, rabbit drives) and war parties; make decisions about village social and political issues (for example, approving or vetoing witch killings); and set the date of, organize, and take charge of community fandangos (Steward 1933, 1938). Such fandangos, held in the fall, were several-days-long festivals where individuals from neighboring villages were invited to dance, feast, gamble, and trade. Quantities of food were provided for guests, and a large brush enclosure approximately 100 meters in diameter was constructed for dancing. Headmen also oversaw the construction and maintenance of the village assembly house (typically 7 to 8 meters in diameter), though these structures were never used for serious rituals or ceremonies. Thus the majority of such decision making involved the gathering and synthesizing of information related to more public and/or communal activities.

Unfortunately, Steward did not specifically state the role of such headmen in exchange relations. Trading was clearly an important activity, and large quantities of goods were traded all around eastern California as well as over the Sierra Nevada into central California. Items typically traded included foods (acorns, pine nuts, seeds, and so on), salt, obsidian, beads, baskets, blankets, and tobacco. Bettinger and King (1971) suggest that headmen controlled all trading activities and that their political offices were supported by such a redistribution network.

Village headmen also had the power to appoint individuals to other positions of leadership. Such positions included, most notably, irrigator. This person would oversee construction and maintenance of irrigation ditches, including construction of the large diversion dam that required

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organizing about twenty-five men (Steward 1933:247). Parallel rows of smaller canals were constructed and maintained to bring water to small plots of land where bulbs and seeds of native plants were sown and harvested. As well, this person would make decisions about how water was distributed to various plots. This activity has not been the subject of much archaeological research but has led some anthropologists to suggest that the Owens Valley Paiute should not be classified as hunter-gatherers but as agriculturalists instead (Lawton et al. 1976). Classificatory monikers aside, this activity serves as another example of the unusualness of Owens Valley groups. With the possible exception of Fish Lake Valley, the next valley to the east, irrigation was otherwise unknown in the Great Basin.

Shamans also held considerable status and decision-making power in Owens Valley Paiute society and were always distinct from headmen (that is, an individual could never assume the duties of both headman and shaman). Shamans could be of either sex, were primarily healers and doctors, and helped organized some ritual events. Though shamans could also use their powers to do harm to others, and were sometimes feared, village headmen had the power to organize killings of shamans who had overstepped their authority. Shamans were generally paid for their services. As an indication of how much respect people had for the healing powers of shamans, informants told Steward that many commonly available herbs were thought to be of little effectiveness unless administered or first touched by a shaman. Clearly, shamans had something of a monopoly over healing, a service performed for individuals rather than a communal activity. Some of Steward's informants suggested that shamanistic powers, hence shaman positions, were inherited patrilineally. In some cases shamans attained their positions through experience, usually dreams or visions that instructed them to claim such a position.

One other position vested with decision-making power was the owner of a rabbit net. Male elders owned and controlled the use of such nets, which were generally around 1 meter high by 20 meters long and required considerable investment of labor to construct. Steward noted that the plants required for the cordage did not grow in Owens Valley and had to be obtained from Shoshone territories to the south (Steward 1933:253). The owners of such nets would organize and orchestrate communal rabbit drives where large numbers of rabbits would be caught.

In sum, ethnographic leaders in Owens Valley held important decision-making power, particularly in the realms of economics, warfare, technology, and feasting. Outside of the special position of shaman, such powers did not apparently translate into religious or ritual activities. Thus the

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separation of decision-making power with regard to economic versus religious realms, or, alternatively, material goods and public services versus immaterial goods (secretive information) and individual services, is clear (for comparison and contrast, see the chapters by Arnold, Kantner, and Pauketat, this volume). Leadership was often inherited patrilineally but not always, and it could be denied by the broader community to individuals who were not considered “intelligent” or “persuasive.” Thus, the decision-making power held by leaders was often to the benefit of the entire group, for example, in organizing large-scale activities where everyone gained through the communal rather than individual focus. At the same time, leaders likely gained differential access to high-level information, prestige, and perhaps certain material resources as well.

**LEADERS IN PREHISTORIC OWENS VALLEY**

Having described some of the leadership positions that Steward presented for the ethnographic Owens Valley Paiute, I now turn my attention to the archaeological record. What evidence is there to support the presence of these positions prehistorically, and what can we say about their development?

After examining the distribution of obsidian artifacts in central Owens Valley, Bettinger (1983) felt that the archaeological record supported the existence of suprafamily control over such resources and by extension suggested the presence of prehistoric leaders. It was unclear to him when exactly such leaders developed, but he felt that they had some antiquity in the region. He argued further that environmental explanations were unlikely to account for such developments. Instead, he suggested that unequal access to exchange networks was a promising avenue to explore as a means to explain the development of leaders in prehistory (Bettinger 1983:55). Unfortunately, the nature of the data he collected (surface survey) did not allow him to address this issue at the scale of the individual. Bettinger focused instead on higher-level “band”- or “village”-level societal developments.

Following a brief description of the culture history of the region, the remainder of this study follows on Bettinger’s work. But rather than regional-scale data, it turns on the analysis of burials and households in an effort to understand the effects and behaviors of individuals.

**Owens Valley Culture History**

The culture historical sequence in Owens Valley has been established through survey and excavation (for example, Bettinger 1975; Bettinger



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and Taylor 1974). Although important details remain to be worked out, such as the establishment of leaders, the basic sequence has been repeatedly tested through excavation and has held up well. For this paper, the most recent two thousand years of prehistory are of concern. Three widely recognized culture historical units fall within this time frame. Locally, these are referred as the Late Newberry (circa ad 1 to 500), Haiwee (circa ad 500 to 1400), and Marana (circa ad 1400 to contact).

Late Newberry patterns seem to be marked by fairly residentially mobile populations (Eerkens, Spurling, and Gras 2008) moving in a north–south annual round that included the establishment of a number of base camps from which various logistical activities took place. It has been argued that a focus on large game hunting using atlatls, mainly for prestige-seeking males, characterized this period (Hildebrandt and McGuire 2002; McGuire and Hildebrandt 2005). According to Hildebrandt and McGuire, this prestige appears to have been parlayed primarily into differential access to mates rather than into decision-making power. Intensified hunting for large game, argued to be a low-caloric-return activity, was likely underwritten by increased devotion of time and labor to gathering activities by women. An increase in the number of groundstone tools around this time supports this notion. There is also ample evidence that obsidian production, primarily for producing bifaces, peaked at all the major obsidian quarries. Whether such production was for exchange or to support increased hunting activities is not definitely known, but the latter seems likely.

Haiwee (ad 500 to 1400) patterns represent a dramatically reduced settlement system, seemingly representing semi- to complete sedentism (Basgall 1989; Eerkens 2003b). The introduction of new technologies, such as the bow and arrow (Yohe 1998) and more casual flake cutting tools (versus bifaces), marks this period, though diets continue to be fairly diverse, including large game, small game, piñon nuts, and some seeds.

The Marana period (ad 1400 to contact) is marked by continuing semi-sedentism and the introduction of new material technologies. A new type of projectile point is introduced, as are cooking pots, which were used to boil the increasing levels of small seeds that were harvested (Eerkens 2004). There is also a marked increase in the density of groundstone and a focus on the harvesting of “green” piñon nuts—that is, cones that are not yet naturally ripened (Eerkens, King, and Wohlgemuth 2004). All of this indicates a heavy reliance on gathered resources and presumably very heavy demands on the time and labor of women. With the exception of some mass-captured animals, such as rabbits, hunting does not appear to

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*Mortuary data from Owens Valley.*

	<i>Total</i>	<i>% with beads</i>	<i>Average beads</i>	<i>% with points</i>	<i>Average points</i>	<i>Other</i>
Marana	3	0%	0	33%	0.3	
Haiwee	7	17%	0.5	83%	3.7	milling stones; pipes
Newberry	3	33%	333	33%	0.3	
Pre-Newberry	4	33%	0.7	33%	0.7	milling stones

Note: Percentages and averages calculated only for those burials where information was available.

have been particularly important, as seen in relatively low numbers of faunal remains. Indeed, the density of flaked stone chipping waste is generally quite low in domestic sites dating to this period.

**Mortuary Data**

As mentioned in the opening paragraphs, a major challenge in reconstructing and understanding prehistoric leadership strategies is finding an archaeological signature that is consonant with the scale of leaders, namely the individual. Worldwide, analysis of burials has been a common means to achieve this end. In Owens Valley, not only are burials rare but those that have been exposed during the course of archaeological work have been only minimally studied. A tabulation of all known burials in 2000 (Gilreath and Holands 2000) listed only nineteen in the Owens and adjacent Rose valleys, spanning between 7000 bc and protohistoric times. Of these, seventeen could be assigned to one of the culture historical units discussed above. Table 4.1 summarizes the mortuary data.

Of the seventeen burials, twelve could be estimated for ontogenetic age, with ten estimated to be adults, one a child, and one an infant. There is very little information to indicate unequal wealth distribution in any of the time periods. With the exception of a single Newberry child buried with approximately one thousand marine-shell beads, most burials were associated with either no or a small number of grave goods. Excepting this one child, which may have received special treatment due to its age (rather than status), one is tempted to draw the conclusion that individuals were treated fairly equally following death in all time periods. Equal burial treatment is particularly evident in the Haiwee period, which also has the largest sample size. Save one individual, all were buried with multiple projectile points.

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Unfortunately, the small sample size of burials makes it difficult to say much more at this time. Indeed, a single rich adult burial in any of the periods could greatly alter our notions about the relative distribution of wealth.

### Household Data

Households provide a second avenue to examine patterns at a detailed social scale. Although it is difficult to tease out the behaviors of individual persons from domiciles, houses reflect the behaviors of individual economic units, likely akin to extended families (for example, Ashmore and Wilk 1988; Flannery and Winter 1976). Such a scale is more likely to highlight the behaviors of potential or aspiring leaders than analyses of entire sites or regions, precisely because small-scale leaders frequently draw upon the labor of kin to achieve certain political and economic ends (for example, Arnold 1993, 1995a, 2001c, this volume).

Unfortunately, sites and regions have generally been the focus of excavations and research in Owens Valley, due largely to the dominance of cultural resource management (CRM) archaeology. I do not intend to imply a failing or shortcoming on the part of CRM archaeology, only that the focus of CRM is somewhat different than that required for the approach followed here. CRM archaeology frequently turns on mitigating impact or disturbance to “sites” and generally focuses on that scale of analysis. Almost by definition, then, CRM archaeology is unlikely to focus on individual- or family-level data often required in neo-evolutionary and agency studies.

The number of excavated houses in Owens Valley is still relatively low due to the depth at which most are buried (0.5 to 2.0 meters) and the time it takes to properly excavate, analyze, and report such remains (for example, Basgall and McGuire 1988; Bettinger 1989). However, the sample available is worthy of a preliminary analysis into differential access to resources. To examine diachronic change in household access to material goods, I examine the distribution of goods in domiciles from three domestic sites from southern Owens Valley: CA-INY-30, CA-INY-3806, and CA-INY-3812 (see Eerkens and Spurling forthcoming). These sites are within 20 kilometers of one another near the shores of what, prior to water diversions by the city of Los Angeles, was Owens Lake. The former two sites have seen fairly intensive excavation, and both contain multiple house floors and other domestic features (for example, hearths and pits), the basis of the comparisons. CA-INY-3812 was excavated briefly in the early 1990s, when a single large structure was found. In total, fourteen houses were excavated between these three sites.

In most cases, a single 1- to 2-meter-wide trench was dug across a house.

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Floor zones generally consist of a saucer-shaped, 5- to 10-centimeter-thick zone of compacted sediments with large amounts of charcoal and other organic debris. This and other evidence suggests that these archaeological features represent the remains of small- (2 to 3 meters in diameter) to medium-sized (5 to 6 meters in diameter) circular huts, with cane or wooden posts supporting a brush superstructure.

For this study, only artifacts found directly on or within 20 centimeters above a floor (thus within the house fill) were included. As houses appear to have been occupied over multiple seasons and/or years, and were likely cleaned of large debris at regular intervals, the majority of artifacts included in this analysis consist of smaller items, such as beads and pressure flakes, though larger groundstone, flaked stone, worked bone, and other artifacts are also found. Thus these items consist either of artifacts missed during cleaning events (small pressure flakes) or those that were left in the house before the final occupants left, never to return and reuse them.

All houses in the study have internally consistent age determinations placing them within the period of interest. As well, all are single component, dating to only one chronological period, either Marana, Haiwee, or Newberry, and represent primary archaeological deposits. Additional structures from these and other sites in the region could have been included in the analysis but were eliminated because they have artifacts or age determinations consistent with multiple chronological periods (for example, both Marana and Haiwee).

I examined interhousehold differences among two types of nonlocal materials, obsidian and *Olivella biplicata* beads and compared these materials to a sample of materials available in the more immediate area. While obsidian is derived primarily from sources within the Great Basin (to the north, east, and south of the sites in this study), *Olivella* beads come from the Pacific Coast, with chemical evidence suggesting production in southern California (Eerkens et al. 2005). Table 4.2 shows the obsidian data (derived from Eerkens and Spurling forthcoming), including a sample-size adjusted measure of geochemical, the Shannon-Wiener Diversity Index (SWDI) for geochemical types, and the frequency of highly exotic obsidians from geochemical sources greater than 100 kilometers distant. Note that the first measure removes the positive effect of sample size on diversity by bootstrapping diversity measures and reporting diversity relative to a common sample size, in this case the number of obsidian sources per twenty artifacts.

It is clear from the table that Marana-period houses have not only higher overall geochemical diversity, indicating acquisition from a broader geographic range, but also greater interhousehold differences. Thus some

**Table 4.2**  
Obsidian data from Owens Valley.

Cultural period	Site	Structure	Est. size (m <sup>2</sup> )	<sup>14</sup> C date	Obsidian geochem. diversity	SWDI obsidian	Percent exotic obsidian	Olivella beads	Bone beads	Groundstone	Bone tools
Marana	INY-30	1	11.3	310±70 470±70	3.1	0.79	.03	-	-	2.5	1.5
	INY-30	5	10.2	410±80	3.0	0.73	.15	-	1.5	-	0.4
	INY-30	6	14.5	none	4.5	1.19	.20	1.6	-	1.6	2.0
	INY-30	7	8.0	480±60	1.4	0.12	.03	3.0	1.0	1.5	-
	INY-30	8	9.1	270±70 470±50	3.8	1.05	.10	4.9	0.9	-	0.3
	INY-30	9	12.0	180±60	3.3	0.95	.12	21.5	2.2	-	0.4
	INY-30	10	12.0	330±60 390±90	4.1	0.97	.25	0.1	0.6	0.3	0.3
	Haiwee	INY-3812	1	19.6	1340±50 1600±60	1.0	0	0	-	-	0.1
INY-3806		1	8.0	1340±60	1.0	0	0	-	-	0.5	-
INY-3806		2	19.6	1400±80 1490±70	1.0	0	0	0.2	-	0.2	-
INY-3806		3	21.2	1160±60	1.4	0.13	0	-	0.8	-	0.6
Newberry	INY-30	12	15.9	1530±80 1860±70	2.5	0.75	.30	0.2	-	0.5	0.6
	INY-30	14	13.9	1650±100 1840±80	2.0	0.54	.23	0.6	-	1.3	0.5
	INY-30	15	18.1	1460±60	2.5	0.43	.13	0.1	-	0.3	0.9

Notes: Geochemical diversity is adjusted for sample sizes. Olivella beads, bone beads, groundstone, and bone tools recorded in numbers per square meter of house floor excavated.

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Marana households have very little (for example, structure 7), and others (for example, structure 6) very high geochemical diversity.

By contrast, Haiwee-period houses have virtually no geochemical diversity, with all but one flake from the Coso Volcanic Fields. Newberry houses display slightly greater geochemical diversity, but still significantly less than Marana houses. However, when Newberry houses accessed obsidian, a higher percentage of it was from sources over 100 kilometers away. Newberry inhabitants had ample access to distant obsidian, likely through high mobility on the part of male hunters (see Eerkens, Spurling, and Gras 2008), but the number of such distant geochemical types for any individual house was low (usually only one). Moreover, both Newberry and Haiwee houses show very little interhousehold differentiation, indicating that each household generally had access to the same acquisition networks as others.

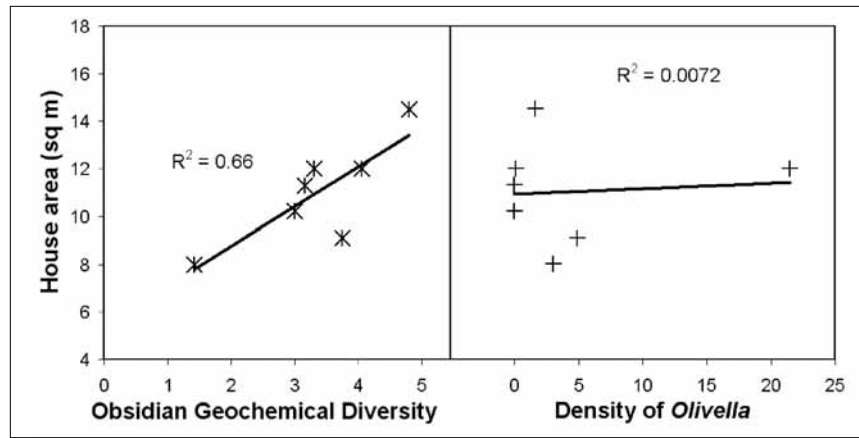
Similar patterns are evident in highly exotic *Olivella* beads. Marana houses show high interhousehold variance in the density of *Olivella* beads, with some displaying high numbers (for example, structure 9) and others low (for example, structure 10; structures 1 and 5 had no beads). By contrast, Newberry and Haiwee houses all have lower densities and more even interhousehold distribution.

Interhousehold distribution of artifacts that can be made from locally available materials, including bone beads, groundstone, and bone tools, tends to be much more evenly distributed among houses, even in the Marana period. This pattern holds for potsherds as well (data not shown), though generally only Marana houses have sherds (Eerkens and Spurling forthcoming; Eerkens 2004).

Interestingly, while there is a slight correlation between obsidian source diversity and the density of *Olivella* beads during the Marana period, the correlation is far from perfect. Thus houses with the highest obsidian geochemical diversities do not necessarily have the greatest density of *Olivella*, nor do houses with the lowest obsidian diversities have the lowest counts of beads. This again points out the heterogeneity of Marana households. If we assume these goods were largely moved via exchange in the Marana period, as would be suggested by reconstructions of mobility patterns (Basgall 1989; Eerkens 2003a; Eerkens, Spurling, and Gras 2008), it further suggests that various households may have been acquiring these goods via discrete networks.

There is a further pattern in obsidian source diversity measures relating to house size during the Marana period. There is a strong and positive linear correlation between estimated house size and obsidian source diversity ( $r^2 = .66$ ), shown in figure 4.1. If house size is an accurate predictor of

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**Figure 4.1**

*House area versus obsidian source diversity and density of Olivella beads for Marana-period houses.*

the number of individuals in a household, this correlation may indicate that larger households have bigger social networks, with a corresponding increase in access to goods from a larger geographic region. More detailed examination of the specific obsidian sources present within the houses indicates further that smaller houses had access mainly to the most proximate obsidian sources while larger houses had access to more distant sources. This pattern does not hold for *Olivella* beads, also shown in figure 4.1. A correlation between house size and the density of beads is much less clear ( $r^2 = .01$ ). Even if we remove structure 9, the medium-sized house with the highest density of beads, the correlation between house size and bead density is not as strong ( $r^2 = .23$ ) as with obsidian diversity.

### DISCUSSION

The studies above suggest sharp changes over time in both the overall intensity and interhousehold variability of exchange. These differences are quite pronounced in household data but are lacking in mortuary contexts. In particular, the results suggest marked changes around six hundred years ago, at the beginning of the Marana period. Prior to this time, households formed fairly redundant units with relatively equal access to exotic goods, as represented by obsidian and shell and stone beads. After this time, households seem to be quite independent of one another and exhibit considerable heterogeneity in access to exotic goods. On the other hand, representation of more local materials is much more redundant over all time periods.

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These results are very much in line with previous research (Eerkens 2003b, 2004) that demonstrates marked changes in subsistence activities, from a more generalized diet incorporating a range of foods to one focused on small seeds, also right around six to seven hundred years ago. I have argued that the shift toward seed-intensive economies represents a renewed focus on resources that are individually collected and individually processed using technologies that are also easily produced by small household units. Families could have claimed such resources for private use more easily than communally collected resources, which would have been more openly and freely shared and hence were easier to appropriate by freeloaders. Importantly, harvesting and processing seed resources individually rather than communally does not result in a decrease in return rate efficiency, unlike the hunting of most game and the processing by pit-hearth roasting of roots and tubers, communal activities that reduce many of the costs and increase overall return rates.

Furthermore, I have argued that processing and especially storage of these resources also seemed to frequently take place within the domicile, out of view of others in the community. Greater visibility subjects such resources to greater scrutiny, such that they might be claimed by members outside the household unit. The distribution of various artifacts across sites, especially potsherds (found primarily within houses), supports this notion (Eerkens 2004). I attributed these patterns to a movement away from open and public sharing to a more privatized and closed system (see also Wiessner 1982)—in other words, to a focus on the individual household as the basic unit of economic productivity rather than the village or some broader social unit.

The spatial distribution of obsidian sources and shell beads presented above suggests that this new focus on the household may have translated to other social institutions, such as access to exotic resource acquisition networks. Before the Marana period, households had equal access. After this time, some social units had greater and others only limited access to such distribution networks, and presumably to the material wealth that moved through them. In the case of obsidian, such access appears to have been correlated to house size, though this pattern is less evident for beads. On the other hand, there is currently no evidence to suggest that these changes were carried over in the treatment of dead, though the sample size of Marana-period burials is so small ( $n = 3$ ) that I would not yet lend great weight to this finding.

#### **Erosion of Egalitarian Norms**

Moving back to the main question and purpose of the paper, do economic nonredundancy and greater wealth inequality represent the evolu-



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tion of leaders—that is, individuals with decision-making power over others? It is difficult to make this argument strongly. While most individuals we recognize as leaders ethnographically have access to wide-ranging exchange networks, the reverse is not necessarily true. Economically independent households might display just as much disparity in access to exchange networks as leaders versus nonleaders, especially if family size plays an important role in dictating the number of exchange nodes a household has. Thus it is quite possible that Marana-period households behaved independently of one another without any centralized decision-making power between them.

Indeed, this is the situation that Steward (1938) described for much of the rest of the Great Basin, outside of Owens Valley and a small number of other regions. In those areas ethnographically, Paiute and Shoshone were known for their emphasis on independent and highly mobile nuclear families that made decisions without consulting other social units (Bettinger 1983). Thus, unlike in Owens Valley, families did not have to pay any heed to any type of leader. Steward did not indicate that there would have been any disparity in exchange relations between such independent families. But without data to evaluate this possibility, it would be difficult to make the simple argument that disparity in exchange relations equals leaders in prehistoric Owens Valley.

What I would argue strongly is that by six hundred years ago, Owens Valley societies had removed one, if not *the major*, impediment to the development of leaders—that being the notion of equal access to exotic goods. Without being able to claim ownership over various resources, potential leaders have little incentive to overproduce and create a disposable surplus (Bettinger 1999). Such resources would be quickly absorbed by opportunistic freeloaders. Nor can leaders give away such surplus to accrue social debt, gain status, or enforce their decision-making will on others. In short, I would argue that without some notion of privatized goods, true leaders cannot evolve. Furthermore, I argue that the installation of an ideology of privatization is often driven by increases in population size and numbers of non-kin freeloaders. It is unlikely that aspiring leaders can get the majority of others to agree to such an ideology when applied to goods for which rules of sharing and public ownership are already well established. Instead, they are more likely to have them applied to new kinds of resources and technologies (material or immaterial).

In Owens Valley, the data suggest two possible interpretations of social conditions and evolution of leaders. First, following the establishment of a privatized goods system, small-scale leaders could have been asserting

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themselves six hundred years ago, and the disparity we see in exchange represents the material remains of such leaders. Alternatively, a privatized goods system could have been implemented around six hundred years ago to combat freeloaders. Leaders could have evolved out of this social milieu four hundred years later, during the protohistoric or early Historic period (circa two hundred years ago), when Steward recorded their presence.

I strongly suspect the former because I think individuals are generally self-interested, prestige-seeking, and quick to take advantage of changing social situations to benefit themselves and their families, but this is largely my theoretical bias. In any case, addressing this issue will require the collection of additional fine-grained data from the archaeological record. In particular, we need to undertake a careful and spatially extensive excavation of a single-component protohistoric village to establish the archaeological signature of interhousehold difference during a period when we know leaders existed. Some protohistoric houses were excavated at CA-INY-30, as evidenced by the presence of glass beads, but it is difficult to segregate the prehistoric from the protohistoric materials at this site. As well, we will need to know more about sharing practices between households and changes therein over time. Such data would provide a more direct measure of interaction than simply the redundancy of material culture. I am currently involved in research using ancient DNA to track the spatial distribution of carcass elements (for example, skulls, forelimbs, and hind limbs) from individual kills across these same archaeological sites. Such information should allow us to evaluate the degree of meat sharing between houses during different time periods, but it requires excellent site preservation and a large amount of work extracting DNA from a range of animal remains.

Finally, I do not mean to imply that certain individuals in earlier time periods did not enjoy certain social benefits based on their actions. Indeed, the successful prestige-seeking hunters of the Newberry period may have had differential access to mates and/or mating opportunities (for example, Hildebrandt and McGuire 2002; McGuire and Hildebrandt 2005). However, such status positions do not appear to have accrued any long-lasting material or economic benefits, other than additional mates and perhaps children, likely because all the proceeds of their labor were given away (a public goods system). It is only during the Marana period that any such status positions appear to have been formalized and marked by material differences in the archaeological record. As I have argued, this difference relates largely to resource ownership practices that shifted to a more privatized one.

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### Possible Catalysts

What could have been behind the erosion of egalitarian notions in terms of access to nonlocal resources around six hundred years ago? To address this question, it would be nice to have a continuous distribution of sites spanning the shift. Unfortunately, the temporal range of sites investigated by archaeologists contains gaps, particularly between around ad 1000 and 1300, to which no houses have been dated. Thus we have no analogous contexts from the period immediately preceding the shift.

Paleoclimate is often cited as a catalyst to such changes. However, several issues complicate evaluating paleoclimate as a catalyst for social change. First, there are many ways to measure paleoclimate (tree rings, lake-level cores, glacial moraines, pollen, among others). Second, not only do these different signals measure different aspects of paleoclimate (maximum temperature, annual temperature variation, precipitation, frost-free days, and so on), they measure these things at different spatial scales (seasonal, annual, decadal, millennial) (see also Stine 2000). It is often unclear to which aspect and temporal scale humans adapt. More specifically, it is unclear how various facets of human culture respond differentially to these different components of paleoclimate.

In terms of paleoclimatic records, Owens Valley is an ideal place to work. A number of proxy paleoclimatic sequences have been built on a range of data types. Perhaps most relevant to the current study, a core from Owens Lake, just kilometers from the sites investigated here, has been extracted and its paleoclimate reconstructed. This core records detailed paleoclimatic changes in the lake over the last one thousand years (Li et al. 2000). In this paper, the authors attempted to reconstruct patterns in precipitation and temperature, and although paleoclimate seems to have been fluctuating throughout all of prehistory, they identify several “periods” of more sustained paleoclimatic patterns. In particular, they identify a period of relatively dry climate lasting from about ad 1000 to 1220, corresponding roughly to the Medieval Climatic Anomaly (MCA). Two shorter-duration wet events, around ad 1025 and 1125, fall within this earlier period. A second period lasting from approximately ad 1220 to 1480 is marked by overall wetter climatic patterns, though a brief dry spell around ad 1400 is evident. The third period, between ad 1480 and 1720, is characterized as dry and cool, though it too displays a number of shorter wetter events.

Within this core from the lake, it appears that, if anything, the transition between the relatively egalitarian Haiwee and nonegalitarian Marana patterns took place within the midst of the second period for which wetter

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conditions are implied. That the transition happened in the middle, rather than at the beginning or end of a climatic “era” is perhaps significant, suggesting that the changes are not necessarily knee-jerk reactions to climatic shifts. Instead, if paleoclimate was indeed a factor, this implies that longer-term social evolutionary processes (over at least two generations) were at work.

Would the wetter conditions during this interval (ad 1220 to 1480) have meant higher natural resource productivity in the region? As Kantner has proposed (this volume), the evolution of leadership positions may take place within the context of “good” climatic conditions where generation of surplus is possible. This may have happened in Owens Valley, but it is not clear that this need be the case. In particular, it is unclear exactly *how* overall increased rainfall would have affected natural resource productivity. The timing of rainfall (for example, winter versus summer) is very important in determining plant productivity. Furthermore, some plants important to human economies actually produce better during slightly drier conditions (Basgall 1999). Thus making this argument will require more than just matching social changes to gross climatic ones, necessitating more detailed predictions regarding the dynamics between human social systems and climatic patterns (see Bettinger 1999).

A second major factor, often cited by archaeologists as a catalyst in fostering social change, is population pressure (for example, Carneiro 1970; Wright and Johnson 1975). Population levels are difficult to estimate, let alone the pressures such populations may have placed on local environments. The archaeological record of Owens Valley suggests increasing numbers of artifacts and sites in the Marana period (Bettinger 1999), and this certainly suggests increased numbers of people, but exactly how those artifacts and sites translate into population levels is difficult to evaluate. Moreover, we do not yet have the chronological control to examine changing population levels within the Marana period, though work in this area is taking place (for example, Eerkens 2003a).

It is tempting to argue that slightly wetter conditions between ad 1220 and 1480 may have increased the abundance of the ever-important (to local diets) seed resources, perhaps allowing populations to grow. Then, during the slightly drier and cooler conditions beginning around ad 1480, seed production decreased, putting increased pressures on family units to work harder to make ends meet. Such conditions may have fostered an emphasis on privatizing food resources and/or heightened the importance of trade relations, especially for larger families. Such conditions may have allowed certain economic units to override traditional egalitarian norms, fostering a new era in which certain resources, especially seeds and

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exchange networks, became the property of smaller social units. Out of this milieu, certain aspiring men may have been able to assert greater influence over decision-making process at family and/or village levels. The extent of such decision-making power was undoubtedly limited, likely to economic transactions as the ethnographic record suggests, but appears to have been at a level greater than at previous time periods. However, this scenario must remain a hypothesis at present, until additional archaeological and paleoclimatic data are collected.

## CONCLUSIONS

Based on theoretical arguments and ethnographic observations, we know that small-scale leaders hold certain decision-making powers over others within a local community, which they frequently use to gain access to surplus. Such surplus can be used in local redistribution or trade to create social debt and/or to gain access to exotic goods, making leaders well connected both within and outside the local village. However, none of this works if leaders cannot own and freely use such surplus on their own terms. Thus a notion of privatized goods is a prerequisite for the evolution of leaders (see also Shennan 2002).

Ethnographic accounts from Owens Valley clearly show the existence of local leaders (Steward 1933, 1938) who organized and controlled various economic activities and had the “power and prerogative to make and enforce unpopular decisions” (Bettinger 1983:49). The archaeological record in this region demonstrates a clear shift in the distribution of wealth (for example, beads) and access to exchange networks around six hundred years ago. Prior to this time, households appear to have been fairly redundant units, while after this time there is much greater variation between them. I argue that this shift marks the evolution of a privatized goods system (Eerkens 2004). I believe these differences also mark the evolution of small-scale leaders, or at a minimum created the social conditions that later led to their emergence.

At the same time, I would not push the influence of such local leaders too far. It is clear from the ethnography that family units were still fairly independent of one another (Steward 1933, 1938) and that they served important functions for larger social units such as villages. Leaders who overextended their decision-making powers or placed unreasonable demands on others would have quickly found themselves without a supporting cast. Offended families could have moved out of communities to new areas or could have banded together to remove the decision-making power of a leader. Thus leaders must have provided some benefits to other

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families (for example, organizing various events or taking the heat for unpopular but necessary decisions) or at least not demanded too much such that they were generally tolerated.

In any case, the Owens Valley study is an interesting one because it examines the evolution of leaders at the very incipient stages of their development. Many archaeological studies of leadership begin only with the analysis of social situations in which leaders are already well established and highly visible. In the Owens Valley case, it is clear both ethnographically and archaeologically that leaders were present but not dominant in local societies. Analysis of such incipient conditions allows us to better understand the more basic processes behind their ultimate evolution.