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An Integrated Analysis of Pre-Hispanic Mortuary Practices

A Middle Sicán Case Study[1]

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Recent debate has raised serious questions about the viability of the social and ideological reconstruction of prehistoric culture on the basis of mortuary analysis. In recent years bioarchaeology has gained considerable prominence, underscoring the fact that death, burials, and associated mortuary practices are multifaceted phenomena shaped by biological, social, ideological, and taphonomic factors. Few studies attempting social reconstruction through mortuary analysis, including those of a bioarchaeological character, have adequately addressed this multidimensionality. This study shows that social, ideological, and bioarchaeological reconstruction can be productively pursued through tight integration of a multitude of approaches and perspectives set within a long-term regional study. Focusing on two large 1,000-year-old Middle Sicán shaft tombs on the north coast of Peru, it integrates analyses of mitochondrial DNA, inherited dental traits, developmental health, diet, placement of interred individuals and associated grave goods, and data from ground-penetrating radar surveys. Overall it shows that these tombs reflected the broader social organization and were part of a planned elite cemetery and that the overlying monumental adobe mound served as the physical focus of ancestor worship.

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Human burials, with their tangible and intangible components, are shaped by the interplay of numerous factors, and therefore they provide a wide range of information and insight about cultures, populations, and their environments, depending on the analytical perspective one adopts. Indeed, recognition of the multivariate and informative character of the conception and treatment of death has led to many anthropological studies. Hertz (1960[1909]) offered a sophisticated theory on the collective representation of death that focused on the triadic interplay among the dead/soul, the corpse/burial, and the living/mourners (Metcalf and Huntington 1991). For much of the twentieth century, however, archaeologists focused on the material aspects of death—burials and, in particular, their associated furnishings. Burial excavations were commonly motivated by the search for well-preserved decorated artifacts in presumed sealed, synchronous context. They served primarily as the basis for stylistic dating and determination of cultural affiliation. This vision of burials was basically static, compartmentalized, and object-centered. Osteological remains, rituals and symbolism, and the living remained largely unexplored.

In an effort to redress the atheoretical and underdeveloped character of mortuary archaeology, Binford (1971) offered the general proposition that treatment in death was primarily determined by one's social position in life and that sociopolitical complexity and mortuary elaboration were positively correlated. Much of his argument rested on findings from his cross-cultural study of 40 historical and modern societies. Concurrently, Saxe (1970) proposed a body of testable theory (i.e., eight hypotheses) regarding the degrees of concordance between mortuary practice and social structure in three ethnographic settings. These two complemented each other and have since come to be called the Saxe-Binford hypothesis or the "representationist" position (Brown 1971; 1995*a*:393; 1995*b*:10).

This position provided the theoretical underpinning for a generation of mortuary studies that directly or indirectly promoted a positivist vision of social evolution and presumably the predictable correlation between ma-

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terial remains and social structure. Determination of the social correlates of mortuary treatment through measurement of energy expenditure (e.g., Tainter 1978), for example, seemed to offer a clear conception of the pertinent cause-effect relationship and operational ease but left one wondering how energy expenditure could be fully measured, what was really being measured, and whether nonmaterial factors had any significance at all (cf. Braun 1981, Cannon 1989). This and other mortuary studies of the same era focused on deceased individuals, material attributes, and the evolutionary complexity of their societies.

The underlying premise of a correlation between funerary treatment and social complexity was soon challenged (e.g., Hodder 1980, 1982). O'Shea (1984) pointed to the muddying effects of factors such as formation processes and sampling. Even the reliability and comparability of the ethnographic data that underlay the Saxe-Binford hypothesis came to be questioned (e.g., McHugh 1999, Morris 1987). In response to criticism from both within and outside the representationist camp, important tests and refinements of the hypothesis were made, for example, in the case of Goldstein's (1980) elaboration of Saxe's (1970:119) hypothesis 8 regarding the maintenance of formal cemeteries by corporate groups.

More recent efforts by postprocessualists to broaden our perspective on mortuary practices to encompass rituals and symbolism are largely a reaction to the perceived failure of the representationists to acknowledge their primary role. Postprocessualists have forcefully argued that burial practices are contingent upon many nonmaterial factors and that a strong and lasting tie between the living and the dead may express itself in diverse ways; social status is seen as the variable and negotiable dimensions of an individual's kinship and political background, as well as lifestyle and economic basis (Parker Pearson 2000:33, 83). They maintain that burials do not simply or necessarily reflect sociopolitical structure but rather provide opportunities for the living to create and maintain that structure. Here, living survivors are seen not as passive conformists to traditional funerary customs but as knowledgeable social actors capable of pursuing an agenda that may diverge from those customs; in other words, mortuary practices are seen as malleable and dynamic social constructs that may disguise the social position and relations of the dead and be more informative about the living (e.g., Parker Pearson 1982, Shanks and Tilley 1982). In fact, burials should not be assumed to have been the exclusive loci of social representations. Ceremonies that were physically detached from and performed before or after the interment (e.g., feasting) may well have been the primary focus of social and symbolic display, if not material investment (e.g., Goldstein 1980, Trinkaus 1984). Concurrently, grave goods have come to be seen as tokens of respect or affection or even reflections of the political motives of the living rather than or in addition to social status markers and possessions of the dead. Thus, there has been a tendency in recent decades to see mortuary analysis as a means of identifying social or ethnic memories, identities and boundaries, symbolism and cosmology (e.g., Cannon 1989; Dillehay 1995; Pader 1982; Parker Pearson 1982, 1993; Shanks and Tilley 1982, Tarlow 1999).

At the same time, this genre of mortuary analysis, though often thoughtful and inspiring, has its own methodological and theoretical weaknesses and challenges. McHugh (1999:16) considers the main difficulty to be that of distinguishing purposeful ideological manipulations from other cultural behavior or natural processes that would produce the same kind of material remains. In this sense, it is understandable that insightful mortuary studies of this genre have often been focused on well-documented social contexts in historical Britain (e.g., Cannon 1989, Parker Pearson 1982, Tarlow 1999) or built on the application of presumed universal dualistic oppositions such as sacred/profane and female/male (e.g., Hodder 1984, Shanks and Tilley 1982). Other than the importance of contextual analysis, these highly varied case studies do not offer general methodological guidelines for, for example, investigating the symbolic dimension of nonliterate, pre-Hispanic mortuary practices. Recognition of the lasting bonds between the dead and the living and of the wide range of settings in which mortuary rituals and related social displays may take place implies that the boundaries for such contextual analysis should be expanded. How one draws appropriate boundaries for such contextual analysis remains vague.

Advocates of these two positions remain quite far apart, although they have arrived at similar conclusions and efforts at rapprochement (e.g., Morris 1991, Trinkaus 1995) have narrowed the gulf. In addition, a series of critical assessments of the representationist position actually have had the effect of highlighting its merits. Though the degree and nature of the correspondence among ideal and practiced social structure and mortuary treatments can be quite variable (e.g., Bloch 1971, Ucko 1969), it has been shown to be applicable to complex societies with institutionalized social and economic inequalities such as the Moche, Middle Sicán, and Chimú on the north coast of Peru. In these societies, upper-class "groups . . . attempt to preserve the *status quo* of inherited rights," for example, by constructing monumental tombs that may serve as reminders of their power and endurance (Brown 1995*b*:393–95; see also Ucko 1969:270).

The processualist-postprocessualist debate has also had the long-term beneficial effect of dispelling naive expectations of facile social reconstruction through mortuary analysis and instilling a more sophisticated understanding of the multiple factors (particularly rituals, symbolism, and the living as an active agency) and processes that structure mortuary patterns. It has also reminded us that burials are not the exclusive focus or locus of social representation and display—that mortuary rituals may take place prior to and after interment of the deceased near and/or away from the burial site. Further, the debate has driven home the point that burials and associated mortuary practices embody a variety of coded messages left by the living regarding the deceased and their society and culture and that interrela-

tions between the living and the dead in specific historical and social contexts are largely responsible for the observed variation in mortuary practices. Finally, though neither of these competing schools has adequately addressed analysis of the physical remains of the dead, encoded within these remains is valuable information concerning the life history and lifestyle of the individual that must be considered together with the other lines of evidence considered above.

Methodologically speaking, decoding these messages requires, first, an understanding of regional social and historical contexts and patterning. This understanding is critical for countering problems stemming from the relatively small and/or skewed samples of excavated burials that the archaeologist commonly confronts. In essence, a productive mortuary study should be set within sustained, broadly conceived regional research. Such research organization has been advocated (e.g., Beck 1995, Brown 1995*b*, Buikstra 1977, Milner 1984) but rarely implemented. Second, the importance of studying both actual burials and associated mortuary rituals, both pre- and postinterment, necessitates examination not only of graves but also of their broader contexts, including associated cemeteries, altars, and settlements. Third, burial samples should be large and diverse enough to approximate the biological and social variability within the synchronous regional population. Lastly, a balanced examination of the biological and nonbiological aspects of the deceased (i.e., a multivariate approach) is needed (e.g., Buikstra 1977, McHugh 1999, Parker Pearson 2000, Robb et al. 2001), including a determination of how diagenesis or postmortem alteration and biological and/or cultural practices account for the observed variation in the sampled burials.

Recognition that human remains are a veritable mine of information concerning the biological and social factors and processes of the deceased and the living underwrites the last point and the surging interest in bioarchaeology. This field has become a major alternative research path to social reconstruction based on excavated burials. Bioarchaeology is typically concerned with relationships between skeletal biology and behavior and lifetime events at the individual level and between biological patterns and the influence of cultural institutions and lifestyles at the population level (e.g., Boyd 1996, Larsen 1999).[2] Relevant institutions and lifestyle choices include religious customs and various forms of social inequality. In other words, a broadly conceived bioarchaeological study can effectively contribute to the reconstruction of social, religious, and other dimensions of a given culture. In fact, a generation ago Buikstra (1977) offered a model of bioarchaeological research organization that pointed to this potential, which has remained largely unrealized.

2. The current use of the term "bioarchaeological" diverges from that of an earlier era, when it denoted the study of preserved animal and plant remains from archaeological deposits for information on past human diet and subsistence, both the natural and the anthropogenic environment, and other related topics (Clarke 1972).

Aims and Hypotheses

Using our case study of pre-Hispanic mortuary practices, this paper demonstrates how a comprehensive social and religious reconstruction may be achieved through a broadly conceived bioarchaeological study nested within a broader, long-term regional project. Our study is built on a relatively large, synchronous burial sample that represents much of the regional social spectrum, in-depth understanding of relevant regional historical and social contexts, elucidation of pre- and postinterment ritual settings, and close integration of a multitude of analytical perspectives and specialists in all phases of field and laboratory work.

The present study aimed to elucidate (1) the biological, social, and cultural relationships among the 34 inferred commoners and elite individuals excavated from two large 1,000-year-old shaft tombs and five small pit graves from the monumental temple of Huaca Loro at the Middle Sicán capital of Sicán, situated within the Poma National Historical Sanctuary in the mid–La Leche Valley on the north coast of Peru; (2) the factors and processes that affected the life histories of these individuals; and (3) the religious and symbolic significance of these tombs, both individually and collectively.

A primary hypothesis guiding our research was that there was, in general, except for sacrificial burials, an inverse relationship between the distance of a given tomb from a sacred locus (i.e., a temple) and the social importance of the interred individual in life: the higher the status, the closer the tomb to the temple (Shimada 1995, Vreeland and Shimada 1981). Related to this hypothesis was our expectation that there was a general positive correlation between the inferred social status and the quality of life of the individual as measured by osteological indicators of diet and health. Another working hypothesis was that there was a planned Middle Sicán elite cemetery under and around the Huaca Loro and that its north-south axis played the symbolic role of separating deceased members of complementary moieties. In other words, we inferred that elite individuals interred in the cemetery were socially cohesive and genetically related. The last hypothesis is, in essence, a variant of Saxe's hypothesis 8. These hypotheses were formulated largely on the basis of our earlier study of looted tombs (Carcedo and Shimada 1985, Vreeland and Shimada 1981).

In addition to excavation of the aforementioned shaft tombs and the inferred "ritual space" around the temple and ground-penetrating radar (hereafter GPR) surveys of the same area, our approach integrated independent analyses of (1) the distribution, composition, materials, techniques, and styles of the associated grave goods, (2) mtDNA, (3) inherited dental traits, (4) developmental health and dietary indicators, and (5) postinterment taphonomic processes.

This paper first explains the context of our study and the sample and goes on to examine multiple lines of evidence. The final portions of the paper discuss major

findings emerging out of systematic comparisons of these lines of evidence and their methodological and theoretical implications. We will show that, while our burial sample illustrates the general applicability of the Saxe-Binford hypothesis, a series of ritual and symbolic considerations before, during, and after the interment was integral to the complex internal and external organization of the shaft tombs. A comparison of archaeological and biological lines of evidence suggests that the layout and contents of one tomb in fact reflected Middle Sicán social reality in having members of two distinct ethnic groups buried in symmetrical opposition. Further, the same comparison effectively underscores the variable, context-specific expressions of status and role and the related difficulty of defining social status on the basis of the limited material attributes of funerary contexts.

Archaeological and Cultural Contexts

The Sicán (a.k.a. Lambayeque) is an archaeological culture centered in the extensive Lambayeque region of the northern north coast of Peru (fig. 1) that emerged around 750–800 C.E. after the political demise of the northern Moche (a.k.a. Mochica). It remained viable until ca. 1375 C.E., when the Chimú intruded from the south and conquered it. Its roughly 600-year span is divided into three periods based on major cultural changes documented through excavations of stratified sites and over 100 associated radiocarbon dates. The Early, Middle, and Late Sicán periods are dated 750/800–900, 900–1100, and 1100–1375 C.E., respectively. The Middle Sicán represents the florescence of the culture, when its state-level polity established dominance over a 400-km stretch of the coast from the Chira Valley (and perhaps the Tumbez) in the north to the Chicama in the south. Its interaction sphere extended to the central coast of Ecuador to the north, the Marañon River drainage to the east, and Pachacamac on the central coast of Peru to the south.

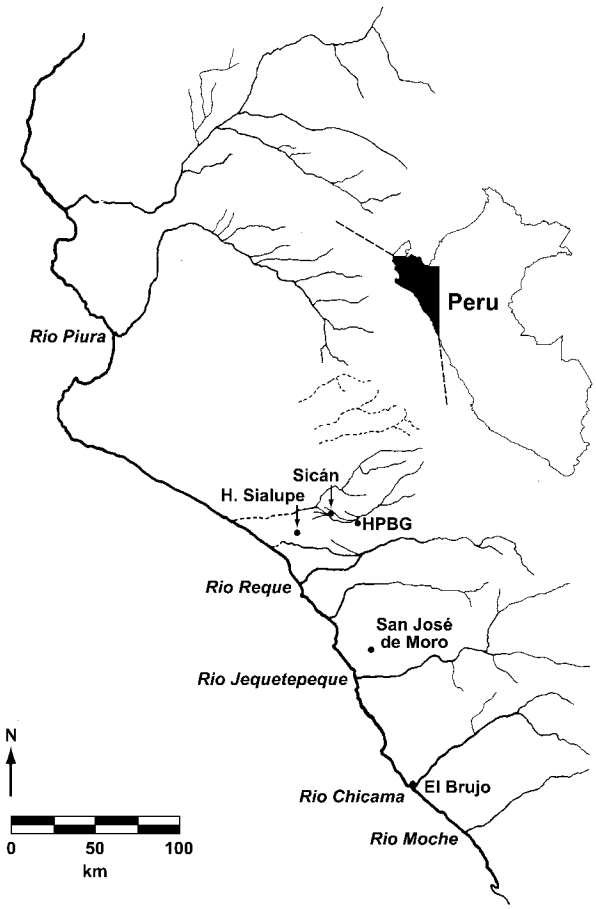

FIG. 1. *The northern north coast of Peru, showing sites mentioned in the text.*

The capital site of Sicán in the mid–La Leche Valley, shaped like a T, contained a dozen monumental mounds either covered or surrounded by tombs. Huaca Loro, a truncated pyramidal mound (ca. 80 × 80 m and 35 m high) with a 150-m-long multilevel North Platform extending due north from the mound body, formed the western edge of the Great Plaza (ca. 500 × 250 m) (fig. 2). Most of these mounds were built between 950 and 1050 C.E. Atop them were temples with impressive colonnades and offerings (*Spondylus princeps* shells, bundles of arsenical-copper sheaths, and/or human sacrifices) in enclosed ceremonial precincts decorated with polychrome murals of religious iconography (Shimada 1981, 1990, 1995). Inferred craft workshops, storage facilities, and elite residences surrounded these mounds, and extensive commoners' residential settlements encircled the perimeter of the capital.

Only the characteristics of the culture that are directly pertinent to this paper are described here (for a fuller characterization, see Shimada 1990, 1995, 2000). Among its distinguishing features was the production of arsenical-copper and gold alloys on a scale heretofore unseen in Peru (e.g., Cleland and Shimada 1992, Shimada 1994*a*). Metals permeated all facets of the culture, and differentiated access to different metals apparently served as a marker of social status, with arsenical copper being available to commoners and elite alike, ≥10-karat copper-silver-gold alloys (*tumbaga*) and gilt copper to the low-echelon elite (Shimada 1994*a*, 1995; Shimada, Gordus, and Griffin, 2000), and high-karat gold alloys to the high-echelon elite only. The marked social differentiation in Middle Sicán culture is clearly represented in ceramic and metal models of an elaborately dressed personage carried on a litter by four bearers in simple clothing (e.g., Sawyer 1975:46, fig. 55; Shimada, Gordus, and Griffin 2000:30, fig. 2.1). The bearers are shown with ear spools and simple headgear. Other artistic representations depict men without these ornaments. The polychrome murals that decorated formal adobe structures (e.g., Alva and Alva 1983) and other artistic expressions (e.g., Carcedo 1989, Carrión 1940) show the most elaborately attired individuals largest and in the highest and

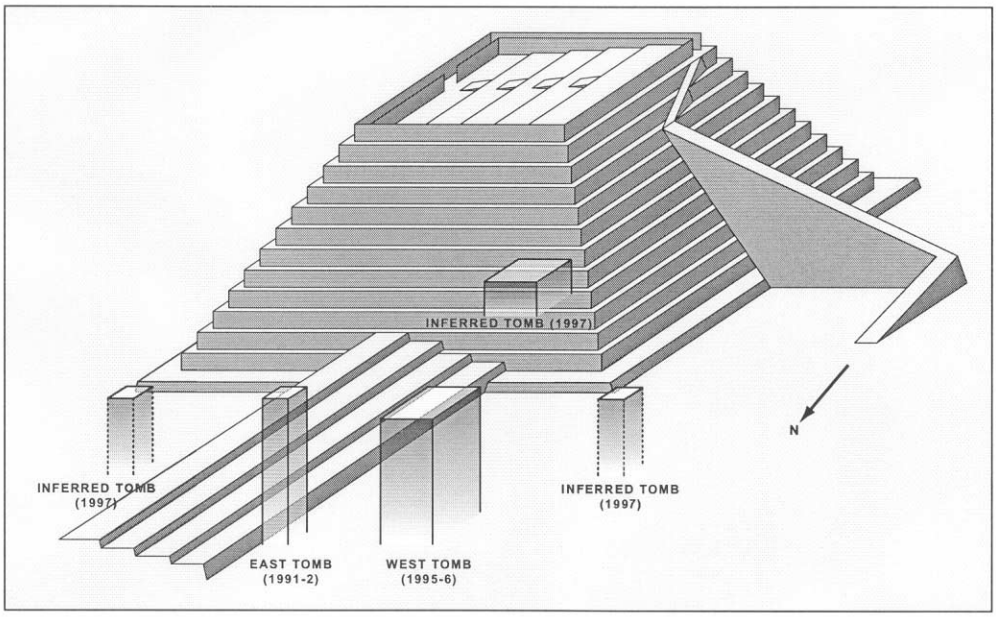

FIG. 2. *Isometric reconstruction of Huaca Loro with the locations of excavated and inferred shaft tombs.*

most central locations. These lines of evidence indicate that the Middle Sicán culture had a marked social hierarchy consisting of at least three levels and that observed material variation reflects these social differences.

Prior to the initiation of the Sicán Archaeological Project in 1978, understanding of the Sicán culture had been largely limited to the style and iconography of looted funerary objects (e.g., Larco 1948, Zevallos 1971) and untested inferences based on oral dynastic histories recorded in the sixteenth century C.E. (e.g., Kosok 1965, Trimborn 1979). The first seven seasons (1978–84) of the project were directed toward elucidation of the regional paleoenvironment, natural resources, chronology, and settlement pattern and Sicán economy and technology (e.g., Cleland and Shimada 1992, Craig and Shimada 1986, Shimada, Epstein, and Craig 1983). Various Sicán residential and craft production sites were excavated, yielding some two dozen Sicán commoner burials. The following three seasons (1985–89) focused largely on the organization and workings of the site of Sicán (e.g., Cavallaro and Shimada 1988, Shimada 1990). Excavations atop and around monumental adobe platform mounds at Sicán revealed their ceremonial and elite character. This early work provided us a firm grasp of the regional historical and social contexts for the present study. Building on this comprehensive background knowledge, in 1990 we began the systematic excavation of burials and associated ritual settings for an investigation of Sicán social organization and religion (e.g., Shimada 1995).

The Burial Sample

Many earlier studies of pre-Hispanic mortuary practices have been limited by skewed samples that failed to represent all segments of society. Brown (1995*a*:403; also McHugh 1999:16) points out that "a major problem in the Andes is how to recover representative burial samples for social analysis. False pictures of vertical status differentiation can be created by integrating parts of cemeteries that happen to have survived." Realistically speaking, however, a representative sample of any archaeological population is nearly impossible to obtain without knowledge of or access to the entire population (Drennan 1996:86). The Poma Sanctuary and the site of Sicán in particular have been badly affected by a long history (1930s to 1970s) of intensive grave looting with heavy earthmoving machines and organized labor gangs (e.g., Pedersen 1976, Valcárcel 1937). Middle Sicán shaft tombs, with their quantities of gold and other commercially valuable grave goods, were systematically targeted and looted, and locating intact tombs, particularly those of the elite, posed a serious challenge. However, the knowledge gained from our prior systematic study of grave looting in Poma (Vreeland and Shimada 1981, Carcedo and Shimada 1985) and occasional excavations of burials at various Sicán sites in the region (e.g., Farnum 2002, Shimada 1990) effectively guided our burial excavations at Sicán between 1990 and 1997.

Our aim was to collect a large, synchronous burial sample representing as much of the regional social spec-

trum as possible. We collected a securely dated sample of some 50 Middle Sicán burials at Sicán ranging from commoners to the highest-echelon elite (table 1; Farnum 2002:74–75, table 4). Most of these burials were excavated around and under the monumental temple of Huaca Loro, which had escaped the full brunt of the large-scale looting mentioned above. These burials, together with those documented at Sicán and at nearby sites by our project (e.g., Shimada 1990, 1995) and others (e.g., Alva 1986, Bennett 1939, Klaus 2003; Narváez 1995*a*, *b*; Pedersen 1976), allow a tentative characterization of Middle Sicán funerary treatment in Poma and the surrounding Lambayeque region. Three basic burial positions coexisted: flexed and laid on a side, seated with legs crossed, and extended with the head to the east or south. The first two positions may face any of the cardinal directions except north. The seated position seems to have been the norm for the elite, though our sample is very small (four). At Sicán, Middle Sicán burials are found atop, under, around, and between the major platform mounds. Outside of the capital, burials are typically found in simple shallow pits in stabilized dunes and in subfloor pits in residences or workshops. The shape and size of pits vary, but they are usually rectangular or square and rarely exceed 2 m in any one dimension. With the exception of the large, deep shaft tombs at Sicán, graves were simply dug in the ground with little or no modification. The presence of an in situ ash-charcoal deposit atop or just next to some burial pits suggests that a small fire was lighted at the end of or after the interment.

A shaft tomb, as defined here, has a square or rectangular vertical shaft extending at least 5 m below the present surface. Shallow, narrow troughlike marks preserved on the walls of shaft tombs indicate that varied numbers of workers using arsenical-copper tools were involved in the digging. A roofed burial chamber, sometimes with wall niches or lateral chambers, is situated at the bottom of the shaft. Shaft tombs vary from about 1 m to as much as 14 m on a side, and their maximum depth may exceed 15 m.

HUACA LORO EAST TOMB

The two Middle Sicán elite shaft tombs that are the focus of this study, the East and West Tombs at Huaca Loro (fig. 2), were excavated in 1991–92 and 1995–96 respectively. The contents and their organization are briefly summarized here (for additional details, see Shimada

TABLE 1
Archaeological Contexts of the Sampled Individuals

Archaeological Site	Number of Burials	Cultural Affiliation	Location (Valley)	Approximate Date (C.E.)
Elite shaft tomb (East Tomb), Huaca Loro, Sicán	5	Middle Sicán	Mid–La Leche	1000
Elite shaft tomb (West Tomb), Huaca Loro, Sicán	24	Middle Sicán	Mid–La Leche	1000
Commoner burials, North Trench, Huaca Loro, Sicán	5	Middle Sicán	Mid–La Leche	1000
Commoner burials, East Sector, Huaca Las Ventanas, Sicán	4	Middle Sicán	Mid–La Leche	1000
Elite tomb, South Sector, Huaca Las Ventanas, Sicán	7	Middle Sicán	Mid–La Leche	1000
Dedicatory burials atop Huaca Las Ventanas, Sicán	2	Middle Sicán	Mid–La Leche	1000
Dedicatory burials atop Huaca Rodillona, Sicán	3	Middle Sicán	Mid–La Leche	1050
Commoner burials, multicraft workshop, Huaca Sialupe	9	Middle Sicán	Lower La Leche	1000
Commoner burials, habitational-craft workshop site, Huaca del Pueblo Batán Grande	9	Middle Sicán	Upper La Leche	950–1100
Commoner and elite burials, Huaca Cao Viejo east face (El Brujo complex)	50	Provincial Sicán	Lower Chicama	900–1200

1995, Shimada, Gordus, and Griffin 2000, Shimada and Griffin 1994).

The East Tomb was placed at the corner formed by the north base of the Huaca Loro and the east base of the North Platform. The tomb mouth was originally covered by the basal terrace (ca. 2 m thick) of the mound. Below the caved-in roof, the 3 × 3-m burial chamber at the bottom of the 11-m-deep shaft contained five individuals and ca. 1.2 tons of diverse grave goods. There were seven niches of varying size in the four surrounding walls, with niche 1 on the east wall being the largest and serving as a major repository of semiprecious stone beads, *tumbaga*, and other grave goods. Within the chamber, grave goods were arranged concentrically and superimposed in layers on, around, and beneath the cinnabar-covered body of the principal personage, a robust male some 40–50 years of age.

At the top of this heap of grave contents was the semiflexed body of a 12-to-15-year-old youth (indeterminate sex) on a partially disassembled litter. Near the level of the litter base, at the mouth of a north wall niche, were a juvenile ca. 5 years of age (indeterminate sex) and a rectangular box containing more than 60 major ornaments and ritual paraphernalia, mostly of high-karat gold. The level below contained 14 bundles of cast arsenical-copper implements placed along the edges of the burial chamber, three large piles of *tumbaga* sheet scraps, and two large piles each of whole *Spondylus princeps* and *Conus fergusoni* shells. Objects were grouped together by category and wrapped with or separated by organic mats covered with *tumbaga* sheets.

Below these objects was the body of the principal personage, which was placed near the center of the floor. The body was flanked on the north and south sides by a pair of gloves over a meter long covered with gold foil. The right glove held a gold cup. The principal personage was dressed in full regalia and painted with cinnabar from head to toe. Though the body had been compressed by the weight of fill, it was evident that it had been carefully arranged in a seated and inverted position. The head, however, was detached from the body and rotated 180° so that it was right side up and facing west. A large gold mask covered the face, which also had a gold nose clip and a pair of gold ear spools.

Accompanying him were two women placed on the northwest corner of the floor. They were both gracile and about 30–35 years of age and showed fronto-occipital skull deformation[3] similar to that of the principal personage. Their high social status is suggested by gold ornaments on clothing that has long since perished.

HUACA LORO WEST TOMB

The West Tomb was situated opposite the East Tomb across the north-south longitudinal axis of the mound (fig. 2). Predicted by our guiding hypothesis regarding a planned elite cemetery under and around the mound, its presence was detected by GPR surveys in 1994 and 1995. The tomb was a complex, two-tiered, nested construction—a tomb within a tomb—that contained 24 individuals (fig. 3).

The 10 × 6-m antechamber lay 12 m below the surface and had 10 wall niches and 12 small, rectangular subfloor pits. Two of the niches near the northeast corner contained young adult females with accompanying grave goods, as did the nearby pit burials. One central niche (niche 6) contained a 12–13-year-old boy with annular cranial deformation.[4] The remaining 7 niches were largely empty. The subfloor square and rectangular pits were laid out in two symmetrically opposing groups of six each on the north and south sides of the central chamber. Each pit contained one or two skeletons—in some cases, literally crammed in—of young adult women (mostly 18–22 years), a total of nine for each group. The two resultant groups of nine women each are hereafter referred to as the North and South Women. Each woman was accompanied by a handful of ceramic vessels, textiles, arsenical-copper objects, and/or other grave goods. Some of these women were found to be missing one or more terminal phalanges and accompanied by broken and incomplete ceramic vessels. In some burials, bones were disarticulated to a degree difficult to account for by postdepositional shifting. For example, the entire right arm of burial 7 was found under the left side of the vertebrae. In addition, small, ovoid empty puparia, presumably of muscoid flies (see Faulkner 1986), were found in direct association with burials 9 and 14. Much of the floor, including most of the pits, was covered with large painted cotton cloths and gilded *tumbaga* sheet metal. Near the northeast corner, two adult camelid skeletons were found.

The 3 × 3-m central chamber descended 3 m to a depth of 15 m and had symmetrically opposing niches on the north and south walls. Its roof was composed of at least three layers of woven mats supported by wooden beams and east and west walls covered with painted cotton cloth. This chamber was reserved primarily for the principal personage and his grave goods. The personage (burial 1), a robust man ca. 30–40 years of age with a serious puncture wound on his pelvis, was placed at the center of the mat-lined floor in a cross-legged, seated position. He wore full regalia that included a large *tumbaga* mask, an elaborate head ornament, and a pectoral of a silver alloy plate with semiprecious stone inlays. His head was thoroughly covered with cinnabar paint and faced west.

A diverse range of grave goods surrounded this personage, including the remains of nine rolls of strip cloth, two wooden staffs, and four decorated ceramic vessels completely covered with *tumbaga* sheets (Shimada, Gordus, and Griffin 2000). There were also the heads and articulated feet of at least 25 camelids of various age-groups (Shimada and Shimada 1997). Another major component of the grave goods was at least 111 of the crude handmade miniature clay vessels known widely

3. This type of deformation is believed to have resulted from binding the infant's head to a flat cradleboard (Verano 1997*b*, Weiss 1962).

4. Annular deformation results from compression of the cranium when it is wrapped with cloth strips (e.g., Weiss 1962).

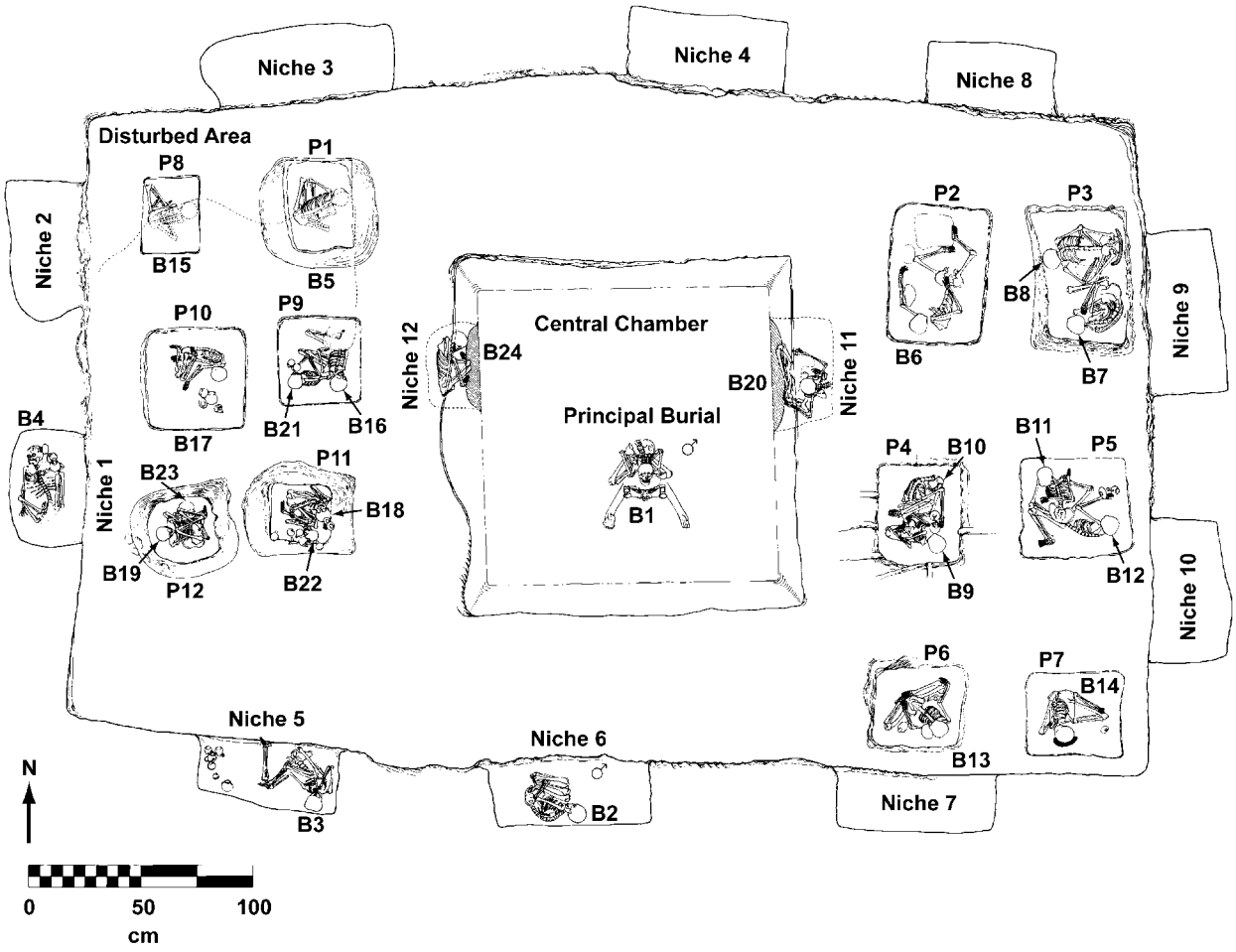

FIG. 3. *The symmetrical distribution of the 24 individuals in the niches, antechamber, and central chamber of the West Tomb.* B, *burial;* P, *pit.*

on the north coast as *crisoles*. Over 50 of them were clustered atop a bed of clay, while the rest were scattered on other parts of the floor.

Flanking the principal personage, an adult woman was placed in each of the two symmetrically opposing niches. The cross-legged and seated woman in the south niche (burial 20) had cinnabar paint on her face, wore a shell bead pectoral, and was accompanied by numerous ceramic vessels. In contrast, the north-niche woman (burial 24) was without grave goods, tightly flexed and buried beneath a large cluster of shell beads and a basket containing some two dozen *tumbaga* ornaments and ritual paraphernalia.

ADDITIONAL BURIALS

Five additional burials were excavated in 1995 in the North Trench, ca. 30 m north of the East Tomb. GPR survey in 1994 had suggested the presence of a large shaft tomb there. The area was excavated to test the hypothesized inverse relationship between the social status of the deceased and distance of the tomb from the Huaca Loro temple—that the burial(s) there would be lower in status. Our excavation revealed a cluster of five commoners' burials in either fully extended or semiflexed position associated with ceramics that were stylistically identical to those in the East and West Tombs (i.e., early Middle Sicán, ca. 1000 C.E.).

For our analysis of mtDNA and developmental health indicators, we included 16 additional Middle Sicán burials from the Sicán capital and 9 each from the outlying sites of Huaca del Pueblo Batán Grande and Huaca Sialupe, some 13 km east and 22 km southwest of the Huaca Loro, respectively. The former sample consists of 2 sacrificed individuals atop the Huaca Las Ventanas platform, 4 superimposed commoner burials below the principal ramp of the same mound (East Sector), 7 lower-nobility individuals from a large (15 × 15 m at the top and 12 m deep) half-looted tomb some 150 m south of the same mound (South Sector), and 3 sacrificed individuals inside the cubic-meter-sized "sockets" for the columns that supported the roof of the temple atop

the Huaca Rodillona (e.g., Farnum 2002, Shimada 1995). Additionally, 50 individuals from a provincial Sicán-affiliated population buried on the east slope of the Huaca Cao Viejo at the El Brujo site in the lower Chicama Valley, some 175 km southeast of Sicán, were examined by Farnum (2002).

Analyses and Their Results

BURIAL PLACEMENT AND ASSOCIATED GRAVE GOODS

In ferreting out the social and symbolic significance of the excavated burials, the symmetrical opposition of the North and South Women in the West Tomb especially calls for our attention. Who were these women, and why were they grouped in this manner? What was their relationship to others buried in the tomb?

Important social, biological, and/or symbolic relationships among the West Tomb individuals are alluded to by the arrangement of their bodies and associated artifacts, particularly textiles. For example, the juvenile (burial 2) in niche 6, the youngest individual and the only male in the antechamber, was carefully positioned so that his cinnabar-painted face looked directly toward the only other male in the tomb, the principal personage in the central chamber 3 m below (fig. 3). Placed at different elevations along an imaginary line of sight between them were a cluster of 11 whole *Spondylus princeps* shells, badly corroded *tumbaga* objects, and hematite lumps. Though the juvenile had no associated grave goods, this arrangement suggests that he had special importance to the principal personage. The same arrangement is seen in the East Tomb, where a youth of the same age, also with cinnabar-painted face, was carefully placed atop the litter to look straight at the principal personage about a meter below.

A special relationship between the South Women and the principal personage is strongly intimated by a cloth strip (ca. 30–35 cm wide) that descended from the southwest sector of the antechamber floor and along the southwest corner of the central chamber to wrap the principal personage's headdress and upper torso. No comparable connection by cloth strips or any other means was found in the northern half of the central chamber. This suggests that the separation of the North and South Women accurately reflects some significant differences between them. The style of the associated pottery is important in this regard. The North Women are predominantly associated with vessels that show a strong affinity to the earlier Moche style, such as bichrome stirrup-spout bottles and sculptural effigy jars (fig. 4). In contrast, the South Women are found with typical Middle Sicán vessels such as gray or black single-spout bottles and jars with press-molded decorations (fig. 4). The principal personage and the south-niche women were both accompanied by Sicán-style vessels. The north-niche women were found in fetal position with no grave goods. The spatial segregation of the Mochecoid and Sicán ceramics

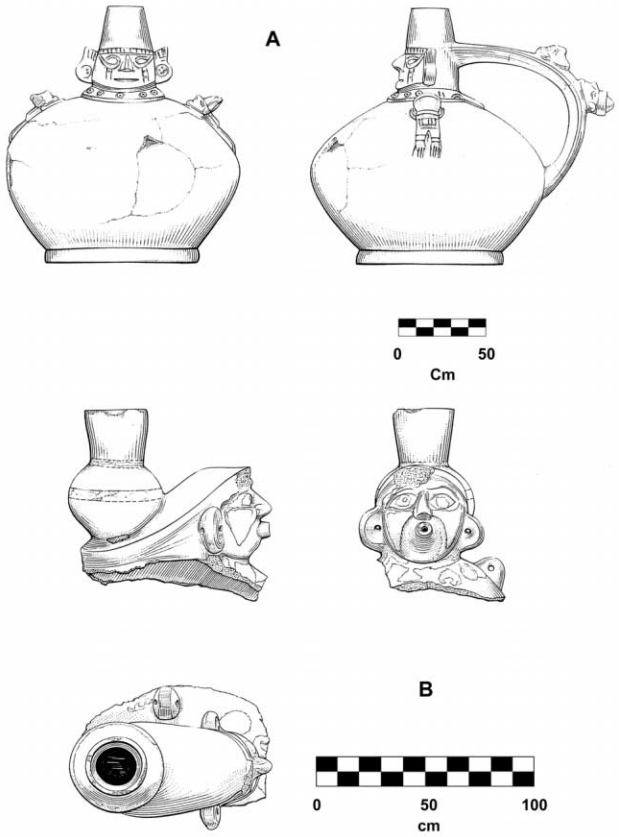

FIG. 4. *Pottery from the West Tomb.* A, *Middle Sicán reduced ware bottle associated with a South Woman;* B, *Mochecoid bichrome pottery associated with a North Woman.*

is further reinforced by the presence of a painted cloth on the north side of the antechamber floor. A procession of warriors carrying war clubs, shields, and trophy heads depicted in black lines in profile is highly reminiscent of the earlier Moche style. No such painted cloth occurs on the south side of the antechamber.

Technical analyses of ceramic vessels from the tombs also generated data relevant to our research interests. For example, Mössbauer spectroscopic analysis of samples of ceramics associated with the antechamber women indicates that many of these vessels had been scarcely fired (Shimada et al. 2003*a*). The black or gray finish resulted from smudging, not chemical reduction or penetration of carbon into the vessel walls. These vessels belie the technical capability of Middle Sicán potters and suggest that they were hastily or expediently made for interment in this tomb. Middle Sicán potters produced large quantities of glossy black vessels fired in a reducing atmosphere at temperatures of ca. 800–900°C (Shimada and Wagner 2001). Neutron-activation analysis and thin-section petrography of the same samples revealed that they were quite homogeneous and indistinguishable from the

paste used at the contemporaneous ceramic workshop at Huaca Sialupe (Shimada et al. 2003*a*, *b*). While the workshop concurrently produced diagnostic Middle Sicán vessels, the majority of its products were Mochecoid in style, including exactly the same kinds of vessels found in the West Tomb.

Other grave goods appear to have been prepared much closer to the West Tomb. *Crisoles* found on the central chamber floor were all crudely handmade and left undecorated and unfired. As a result, many of them had disintegrated. Further, the partially used clay mixture on the same floor had the same texture and composition as the *crisoles*, indicating that they had been made inside the chamber during the interment process.

MTDNA ANALYSIS

The question of possible biological relationships among the sampled individuals was addressed by mtDNA and inherited-dental-trait analyses. In particular, mtDNA analysis can be done rapidly through automated sequencing to provide reliable, specific data for making inferences and building models about past kinship structures, relationships among diverse social and cultural groups, and population movements that often elude traditional archaeological approaches (see, e.g., Renfrew 1998, 2000; Schurr 2000) and, for lucid explanations of its underlying principles and premises, as well as potential and limitations, Kaestle and Horsburgh 2002, Pääbo 1999, Stone 2000, and Sykes and Renfrew 2000).

The facts that mtDNA is abundant in cells and maternally inherited, does not undergo genetic recombination, and undergoes mutation at a relatively high frequency (perhaps 20 times faster than in nuclear DNA) all contribute to the relative ease with which genetic relationships and ancestry can be defined (Sykes and Renfrew 2000). However, problems caused by the degradation and contamination of the minute quantities of extracted mtDNA and the difficulty of assembling a large number of coherent, well-documented, and dated skeletal remains are pervasive and serious (e.g., Kaestle and Horsburgh 2002, Renfrew 1998, Stone and Stoneking 1999). These problems help to account for the scarcity of informative and reliable mtDNA studies to date in the Andes and elsewhere. Practitioners are making efforts to collaborate so that samples from the same individuals can be analyzed independently by more than one laboratory (e.g., Kaestle and Horsburgh 2002) to ensure the authenticity of analytical results. From an archaeological point of view, however, this is not always feasible, since well-preserved teeth or bones are often scarce and the excavators, for various reasons, tend to forbid the extraction of multiple samples from each burial.

For our study, mtDNA extracted from a single well-preserved tooth from each excavated Sicán burial was analyzed by Shinoda using a combination of restriction-fragment-length polymorphism (RFLP) haplotype and D-loop sequence methods. D-loop is the fastest-changing and thus most variable segment of mtDNA. Tooth enamel forms an effective natural barrier to exogenous DNA contamination, and DNA from teeth appears to lack most of the inhibitors of enzymatic amplification found in ancient DNA (Woodward et al. 1994). Extracted DNA was amplified by a process called the polymerase chain reaction. When the amount amplified was not sufficient, a second chain reaction was performed for the next direct sequencing step in D-loop amplification. Where several ambiguous positions were observed in the sequencing data, the next DNA cloning step was performed. Suspected false positive results stemming from contamination with contemporary DNA (Lawlor et al. 1991) and other questionable data (e.g., Kolman and Tuross 2000) were excluded (for additional details see Shimada et al. n.d.*a*).

The nucleotide base sequences in the D-loop regions of 28 individuals were established. Not all sampled teeth yielded sufficient materials for reliable sequencing. The base sequences in 192 base pairs of DNA were determined, and mutations were observed in 24 portions (table 2). These individuals can be classified into 17 haplotypes. While haplotypes refer to distinct DNA sequences defined in the D-loop, haplogroups correspond to major lineage clusters of similar haplotypes. It is generally agreed that most of the mtDNA of native Americans can be traced to one of four maternal lineages (designated as A, B, C, and D) well established for the ancient founders of New World populations (Schurr 2000, Schurr et al. 1990) and that these lineages can be defined by three RFLPs and a 9-nucleotide-base-pair deletion.

Nine haplotypes were identified among 17 individuals from the Huaca Loro West Tomb. Three additional haplotypes occurred among individuals from the East Tomb and the North Trench. Those from Huaca Las Ventanas, Rodillona, and Sialupe were found to have five additional haplotypes. Fifteen of these haplotypes belonged to one of the four haplogroups (A–D) identified thus far among South American aboriginals, but the remaining two did not belong to any of these haplogroups. While we cannot assume that all of the sequences obtained are derived from ancient human remains or reliable, we cannot readily dismiss the two haplotypes in question as inauthentic.[5] Haplotypes in addition to the well-known ones have been identified among contemporary and pre-Columbian Amerindians (e.g., Easton et al. 1996, Ribeiro-

5. Haplotype 5 (burials 10, 13, and 14 in the Huaca Loro West Tomb) may have resulted from exogenous contamination. This haplotype occurs among modern Koreans and Ainus and matches that of Kazuharu Mine, the Japanese physical anthropologist who handled the West Tomb human remains in the course of his osteological examination in 1997. At the same time, various dental morphological studies (e.g., Scott and Turner 1997, Turner 1985, Sutter 2003) suggest that ancient migrants originating in northeastern Asia and characterized by sinodonty (complex root and crown forms and high frequencies of incisor shoveling and double shoveling) populated much of South America, particularly its northwestern portion, and other studies point to a shared genetic basis of Ainus and Amerindians (e.g., Miura et al. 1997). Given that our research into pre-Hispanic Andean population genetic variability and distribution is still in its infancy, it is prudent to remain open-minded on the subject.

TABLE 2
Segregating Sites in the Control Region of mtDNA

	Consensus Sequence																										
	16029	16122	16173	16232	16313	16333	16343	16356	16361	16363	16380	16384	16387	16390	16391	16395	16304	16311	16319	16324	16325	16326	16391	16399			
Archaeological Site and Haplotype	T	A	T	C	T	A	T	C	C	T	A	A	C	C	C	C	T	T	G	T	T	T	G	A	*n*	Haplogroup
Huaca Loro West																											
1	.	.	C	.	.	.	.	T	.	.	.	.	.	.	.	.	C	.	.	.	.	.	.	.	1	B
2	.	.	.	T	.	.	.	.	.	.	.	.	.	T	.	.	.	.	A	.	.	.	.	.	3	A
3	.	.	.	.	.	.	.	.	.	.	.	G	.	.	.	.	.	.	.	.	C	.	A	.	2	D
4	.	.	.	.	C	.	.	.	T	.	.	.	.	.	.	.	.	C	.	.	.	.	.	.	1	B
5	C	.	.	T	.	.	.	.	.	.	.	.	.	.	T	.	.	.	.	C	.	.	.	.	3	Other
6	.	.	.	T	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	C
7	.	G	.	.	.	G	.	.	T	.	G	.	.	.	.	.	.	.	.	A	.	.	.	G	4	Other
8	.	.	.	T	.	.	.	.	.	.	.	G	.	.	.	.	.	.	.	.	.	.	.	.	1	D
9	.	.	.	T	.	.	.	.	.	.	.	.	T	T	.	.	.	.	A	.	.	.	.	.	1	A
Huaca Loro East and North																											
10	.	.	C	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	B
11	.	.	C	.	.	.	.	T	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	B
12	.	.	.	.	.	.	.	T	.	.	.	.	.	.	.	.	C	.	.	.	.	C	.	.	3	D
Huaca Las Ventanas																											
1	.	.	C	.	.	.	C	.	.	C	.	.	.	.	.	T	.	.	A	.	.	.	.	.	2	B
2	.	.	.	.	.	.	.	.	.	.	.	.	.	T	.	.	.	.	A	.	.	.	.	.	1	A
3	.	.	.	T	.	.	.	.	.	.	.	.	.	T	.	.	.	.	.	.	.	.	.	.	1	A
Huaca Rodillona 1	.	.	.	T	.	.	.	.	.	.	.	G	.	.	.	.	.	C	.	.	.	.	.	.	1	D
Huaca Sialupe 1	.	.	C	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	.	.	.	.	.	1	B

NOTE: The 24 segregating sites observed are shown as differences from the human consensus sequence. The base number of each site in the control region is assigned by the reference sequence (Anderson et al. 1981). Dots indicate a match to the reference sequence. The number of individuals for each sequence type (*n*) and haplogroup are shown at the right of each sequence.

Dos-Santos et al. 1996). It is clear that founding haplogroups other than the four currently known were once present in the New World, and it is likely that the proportion of haplotypes not belonging to the four major haplogroups in ancient populations is much greater than in contemporary indigenous populations. Thus there remains the strong possibility that the majority, if not all, of the haplotypes obtained from the Sicán sample are authentic.

Perhaps the most significant result of the mtDNA analysis is the documentation of four distinct maternal kinship ties among 12 women and the bipartite spatial distribution of related individuals in the West Tomb (fig. 5). In addition, the North and South Women were characterized by two mutually exclusive sets of haplotypes. In other words, the north versus south groupings of women had a kinship basis that crosscut the antechamber/central-chamber distinction. Difficulties in reproducing the experimental results of the East and West Tomb principal personages precluded an anticipated mtDNA comparison between these two key figures. Two burials from Huaca Las Ventanas were shown to be maternally related. No other definite kinship ties were identified among the 28 individuals.

INHERITED-DENTAL-TRAIT ANALYSIS

Dental characteristics are an informative source of data for establishing differences between populations and genetic segregation within lineages (e.g., Alt and Vach 1995, Kelley and Larson 1991, Scott and Turner 1997). Studies of dental and other traits have also helped in the nonspatial assessment of possible biological kinship within cemeteries (Alt and Vach 1992, Alt et al. 1996). Accordingly, inherited dental traits of the Huaca Loro sample were analyzed by Corruccini for possible familial clusters that might correspond to the observed archaeological and mtDNA patterning. The Huaca Loro sample was well suited to this analysis in that many teeth were well preserved, largely because of the presence of many young adults with minimal wear. Additionally, given that dental traits are inherited from both maternal and paternal sides, we were interested in the degree and nature of the correspondence between the mtDNA results and those of this analysis (Corruccini, Shimada, and Shinoda 2002). We anticipated some discrepancies between them because of the different processes of inheritance involved but hoped that the dental-trait analysis would

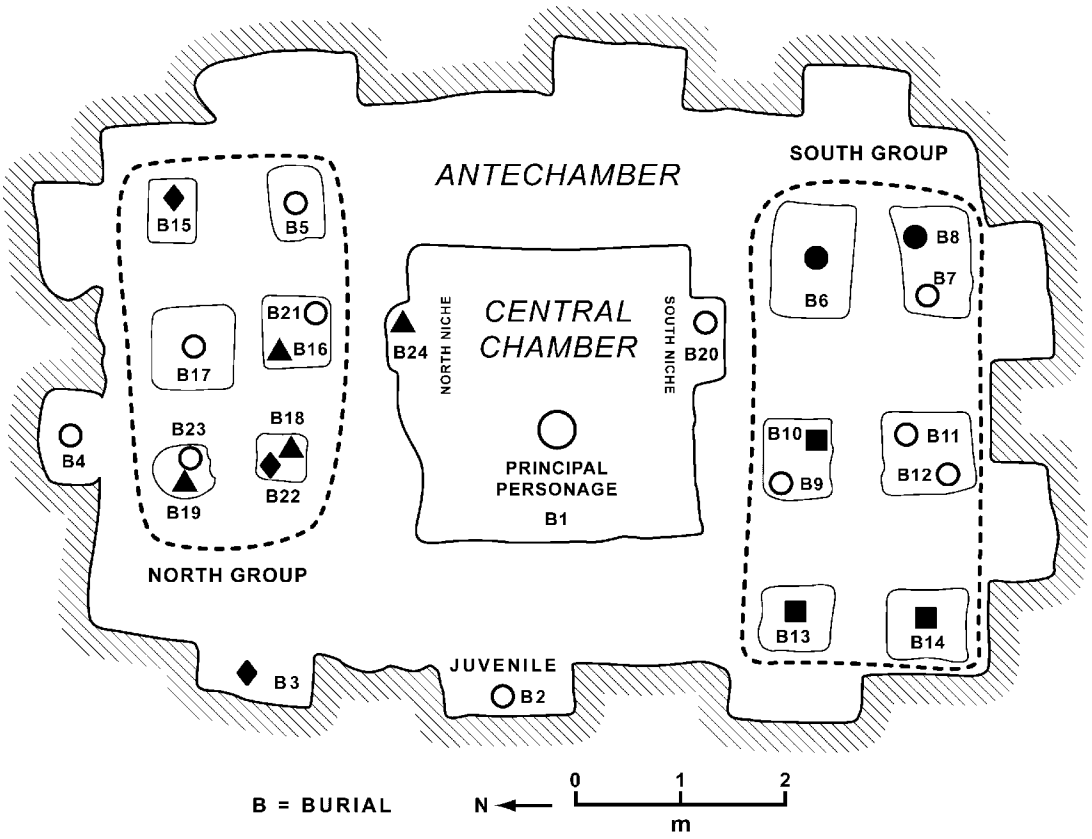

FIG. 5. *Distribution of maternally related individuals in the West Tomb as determined by mtDNA analysis. Burials represented by the same shape (solid black triangle, square, circle, and diamond) are related. Open circles are individuals who are unrelated to anyone in the tomb.*

add more depth and breadth to our understanding of the genetic relationships among the sampled individuals.

Dental stone casts were prepared from silicon molds of maxillary and mandibular arches taken in Peru. The 23 dental traits (see Corruccini and Shimada 2002:116) were taken largely from published studies (e.g., Turner, Nichol, and Scott 1991) and scored using the best-preserved side. On the basis of archaeological data, the sample was partitioned into nine groups: (1) West Tomb principal personage, (2) niche 6 juvenile male, (3) south-niche woman, (4) north-niche woman, (5) eight South Women, (6) eight North Women, (7) five North Trench individuals, (8) East Tomb principal personage, and (9) East Tomb juvenile and two women.

Statistically significant variation emerged in the sample (fig. 6) that corresponded to the spatial groupings and cohesiveness defined independently by mtDNA, burial placement, and artifact analyses. A notable finding was the relatively small intrasample variance among the South Women and among the five North Trench individuals. The biological proximity within each of these two groups is derived from the shared strong development of various traits, including maxillary incisor shoveling and canine tubercles.

Another major finding was that the North Women were, biologically speaking, quite distinct from all other groups in the sample. At the same time, these women were relatively and consistently quite heterogeneous among themselves, in notable contrast to the South Women, who were internally closely related. As anticipated, the results for the women in the central-chamber niches were consistent with the pattern found in the adjacent groups of women; the south-niche woman was biologically close to the South Women, while the north-niche woman was distant from all other individuals in the sample.

Particularly important to the testing of the hypothesis of an elite cemetery was the nature of the relationship between the East and West Tomb principal personages. The analysis showed that they were more closely related to each other than to any of the other individuals and groups in the sample. Greater genetic closeness between these two principal personages is therefore suspected but is of reduced statistical certainty because of antemortem tooth loss.

Yet another pairing that is worth noting is the relationship between the niche 6 male juvenile and the West Tomb principal personage. Though the relatively small raw (size) distance between them suggests some special relationship, other calculated coefficients (e.g., shape-vector distances) do not decisively demonstrate any special affinity.

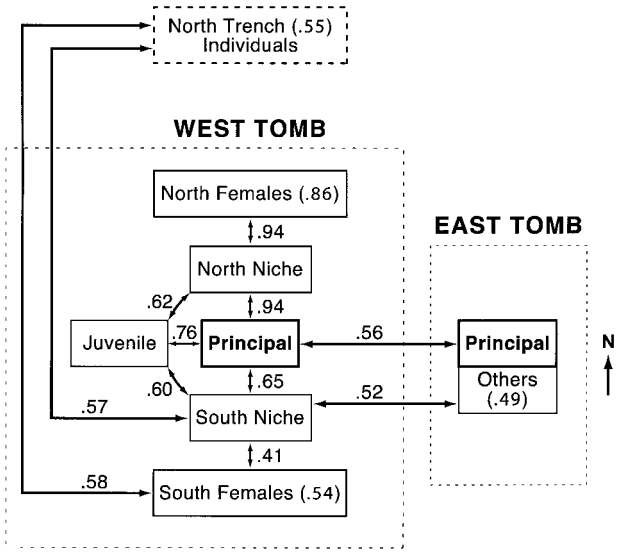

FIG. 6. *Odontological Euclidean distances between nine recognized groupings or individuals in the East and West Tombs. The minimum distance of 0.71 was taken out as "background noise." Only relatively small distances (0.60 or less) indicate major linkages according to similarity.*

DIETARY AND HEALTH INDICATORS

A major concern of our integrated study was the developmental correlates of social differentiation. Well-preserved individuals, particularly those grouped by inferred social status in the East and West Tombs, were examined to evaluate the role of social status and environmental influences on developmental health. Nonspecific indicators of stress were used as criteria for evaluating the relationship between physical observations and the health of the individual.

The patterns observed in the stress indicators were used to determine whether there was a relationship between developmental health and the social status inferred from access to metals. Our expectation was that preferential developmental health would have been enjoyed by the Sicán elite, whereas those of lower social status would have manifested more pathologies related to malnutrition and disease caused by poor sanitation, crowded living conditions, inadequate access to resources, and other social factors. Sicán developmental health was compared with that of individuals at other pre-Hispanic Peruvian sites studied using the same methodology (table 3; see Farnum 2002 for the complete data sets).

One indicator, cribra orbitalia, is identified by porosity of the orbitals of the frontal bone. It is associated with an iron metabolic imbalance, which may be caused by low dietary iron intake and/or parasitic or other infection (Ryan 1997). The severity of cribra orbitalia, scored by osteological standards (Buikstra and Ubelaker 1994), indicates that the North Trench individuals had the more severe cases. The percentage of individuals affected varied considerably by social group. Twice as many of the North Women than of the South Women were affected. Cribra orbitalia was absent in both principal personages and in the remaining East Tomb individuals. Apparently

TABLE 3
Stress Indicators by Social Group

Context	Age (years)	# Enamel Hypoplasias/ Anterior Teeth Present	% Carious Teeth/ # of Teeth Present	Distal Harris Lines Left Tibia	Distal Harris Lines Right Tibia	% Cribra Orbitalia	Cribra Orbitalia Severity	%Porotic Hyperostosis	Porotic Hyperostosis Severity
Rodillona	21 ± 3	0.2 ± 0.2	14 ± 10	6 ± 0	3 ± 0	0[a]	0[a]	33	1.0 ± 0.0
Batán Grande[b]	25 ± 2	0.3 ± 0.2	11 ± 5	–	–	abs	abs	100[c]	1.0 ± 0.0[c]
Loro principals	44 ± 2	0.3 ± 0.3	3 ± 3	–	–	0	0	100	0
Loro East (adults)	26 ± 3	0.3 ± 0.3	2 ± 2	–	–	0	0	0	1 ± 0
Loro East (total)	20 ± 4	0.4 ± 0.2	5 ± 4	–	–	0	0	40	2 ± 1
El Brujo (adults)	30 ± 17	0.3 ± 0.4	13 ± 13	–	–	23	1.0 ± 0.5	87	0.9 ± 0.3
El Brujo (total)	22 ± 18	0.4 ± 0.5	14 ± 18	–	–	30	0.9 ± 0.4	44	0.9 ± 0.4
El Brujo (juveniles)	1.5 ± 1	0.4 ± 0.8	abs	1.1 ± 0.5	0.7 ± 0.7	46	0.8 ± 0.3	57	0.9 ± 0.7
Loro South Women	24 ± 2	0.6 ± 0.2	11 ± 4	1.4 ± 0.7	0.6 ± 0.4	22	1.8 ± 0.3	80	1.4 ± 0.2
Ventanas South	22 ± 2	0.7 ± 0.3	11 ± 4	–	–	0[a]	0[a]	100	2.0 ± 0.6
All Sicán capital	23 ± 1	0.7 ± 0.1	9 ± 1	–	–	27	1.8 ± 0.8	68	1.4 ± 0.6
Loro North Trench	22 ± 2	0.8 ± 0.2	14 ± 3	–	–	0[c]	0[c]	67	1.0 ± 0.0
Batán Grande	24 ± 1	0.8 ± 0.5	10 ± 4	–	–	abs	abs	100[c]	1.0 ± 0.0[d]
Loro North Women	21 ± 1	0.9 ± 0.2	4 ± 2	3 ± 1.2	1.2 ± 0.6	40	2.3 ± 0.3	60	1.2 ± 0.2
Ventanas East	25 ± 2	1.4	0[d]	–	–	abs	abs	abs	abs

[a]Only two individuals scorable.
[b]Without burial 27.
[c]Only one individual scorable.
[d]Only one individual.

anemia was not a chronic problem for the entire Sicán population and was most likely overcome by social buffering or variation in childhood diet. Comparisons between Sicán and other pre-Hispanic Peruvian sites indicate the ubiquity of cribra orbitalia throughout prehistory. The frequencies of individuals affected in Sicán are about the same (28% for the individuals from East and West Tomb and 23% for the site of Sicán) as those in Preceramic and Initial Period sites on the central coast (Farnum 2002).

Another indicator, porotic hyperostosis, is similar to cribra orbitalia and appears to manifest itself at age 2–3 years or older. High percentages of porotic hyperostosis around the suture lines were seen in the majority of individuals in our sample, including both principal personages, and may be associated with the fronto-occipital cranial deformation that was common in the sample.

Harris lines in bone form when there is a disruption and subsequent resumption of cartilage growth and osteoblastic activity in bone growth. Harris lines were more common in the North Women than in the South Women; the data did not permit comparisons of Harris lines among the remaining groups. There is little comparative information available on Harris lines in pre-Hispanic Peru (e.g., Williams 1987).

Curiously, there was no difference in adult stature between the North and the South Women (table 4). Drawing on the findings of Leatherman, Carey, and Thomas (1995) on stature and modernization in Peru, we infer that the more stressed North Women attained comparable adult stature through an extended growth period and/or increased velocity of the adolescent growth spurt.

Growth-arrest defects in enamel apposition, enamel hypoplasias, can be linked clinically to over 100 possible disease conditions and/or dietary deficiencies (e.g., Hillson 1996). Almost all of the sampled individuals exhibited enamel hypoplasias, which suggests a great deal of childhood stress due to either diet or infections. The overall frequencies for the Sicán were, however, lower than those observed for other pre-Hispanic Peruvian populations (Farnum 2002). The frequencies per anterior tooth were plotted from lowest to highest by social group. The North Women and the North Trench individuals both had high frequencies of enamel hypoplasias and more chronicity (repeat events indicating seasonal stress) than the other groups.

Dental caries were also fairly common. Nine percent of all teeth at Sicán were affected by carious lesions. This finding is consistent with expectations of caries rates in pre-Hispanic agricultural populations (Turner 1979). The highest-status individuals (the two principal personages and the rest of the East Tomb individuals) and the North Women had the lowest number of dental caries. Caries frequencies were also lower in the North Women than in the South Women. This difference was unexpected; the North Women were expected to have higher caries frequencies because they had more of the enamel hypoplasias and anemia that are usually associated with high maize consumption and malnutrition (Goodman 1994).

Differential tooth wear patterns along gender lines have been noted elsewhere (Peterson 2002) but are difficult to assess in our burial sample because it is predominantly young women who showed minimal dental wear.

All of the individual remains were examined for traumas related to combat or warfare. Possible cases of such traumas were seen only in the high- and low-level elite at Huaca Loro and Huaca Las Ventanas South.

In summary, the main trends presented here indicate that social status did play a large role in exposure or response to developmental stress. The basic trend of su-

TABLE 4
Average Stature of Moche and Sicán Individuals by Sex (cm)

	Height[a]		
Group	Males	Females	Source
Moche			
Pacatnamu	158	147	Verano (1997*a*)
El Brujo	160	147	Verano (1997*a*)
Sipán	162	157	Verano (1997*b*)
Sicán			
El Brujo	159	155	This work
Huaca Loro	162	156/157[b]	This work

[a]Calculated according to Trotter and Gleseri (1958).
[b]North and South Women, respectively.

perior developmental health for the higher-status individuals appears to be confirmed for individuals from the East Tomb and various high-status individuals from the West Tomb. A more complete understanding of Sicán developmental health in regional/synchronic context was achieved by comparing the data from the Sicán capital with those from the 50 individuals excavated at Huaca Cao Viejo. The Huaca Cao Viejo nonspecific stress indicators and adult stature (159.0 cm males, 155.0 cm females) match those of the elite at Huaca Loro (161.9 cm males, 156.7 cm females). They do not seem to have been burdened nutritionally by their association with the Middle Sicán culture. Overall, the Sicán individuals showed more variation in developmental health by social group than by location (center versus periphery).

EXCAVATIONS AT THE GREAT PLAZA AND GPR SURVEY

Examination of tomb distribution and its broader contexts was critical to testing the hypothesis that the East Tomb was part of a planned elite cemetery and elucidating the associated mortuary rituals and processes. Accordingly, paralleling our burial excavations, we conducted test excavations and GPR survey of Huaca Loro and its surrounding area, including the Great Plaza and the adjacent Huaca Las Ventanas and Huaca El Moscón.

The 1990 excavation of the Plaza close to the east base of the Huaca Loro revealed the presence of a small rectangular altar with in situ burnt juvenile human bones and associated sherd-lined and covered "canals" (ca. 20 × 12 cm wide and deep). These canals, which closely resemble the one documented atop the Huaca El Corte ca. 1 km to the east, are suspected of having being used for ritual libations (Shimada 1986). In another area of the Plaza some 100 m to the north were large adobe-lined hearths with camelid and other food remains, numerous fragments of Middle Sicán serving dishes, and some fine black bottles (Montenegro and Shimada 1998, Shimada and Shimada 1997), suggesting public feasting. Nearby were neatly ordered rows of whole adobe bricks that were being dried or stockpiled for future use.

The 1997 excavations revealed the presence of other small adobe platforms in the Plaza and an inferred metal workshop near the east base of the Huaca Loro North Platform. A stone hammer and crucible fragments, tiny gold flakes, and extensive heat-discolored areas attest to precious-metalworking.

GPR survey of the Great Plaza, including the area surrounding and atop the Huaca Loro, was conducted in 1994, 1995, and 1997. GPR allows the detection of diverse features, speedy, nondestructive prospecting of large areas, and the pinpointing of possible excavation loci without extensive exploratory excavation. The dry, flat, relatively homogeneous eolian and/or flood deposits at the site were ideally suited to large-scale GPR application and the detection of deeply buried archaeological remains (for details see Shimada and Watanabe 1995, Clark 1996, Conyers and Goodman 1997).

The 1994 and 1995 GPR surveys located the West Tomb and other inferred shaft tombs. The 1997 survey and accompanying test excavations provided the best evidence to date of the presence of at least three intact shaft tombs beneath the Huaca Loro (fig. 2). In 1995 and 1997, radar detected the same subsurface structure, ca. 3–4 m on a side and over 10 m in depth, beneath a thick, homogeneous layer at the northwest corner of the mound. Our test trench revealed that the homogeneous layer corresponded to the mound's solid basal platform ca. 4 m below the modern surface. This platform was underlain by 1-m-thick compacted artificial fill. At the bottom of the fill we encountered two burials of young adults (not excavated) accompanied by fine early Middle Sicán pottery. These burials rested atop a thick intrusive soil that extended well under and below the basal platform. GPR inspection at the bottom of the trench (ca. 5 m below surface) indicated that the inferred shaft descended 8–10 m.

The 1997 survey also took advantage of a deep gully cut by the historic 1983 El Niño rains from the center top of the Huaca Loro to the east base. The gully had deepened and expanded rapidly when adobe chambers with the sand and other loose fill that made up much of the volume of the mound were breached. The survey results corroborated our test excavation findings, including the presence of thick fill over the natural substratum and a basal platform. More significant, they revealed what appeared to be a large square adobe chamber, ca. 11 m on a side and 18 m high, with relatively loose fill at the center bottom of the mound and a deep shaft reaching perhaps some 10 m below its base, well into the natural substratum (fig. 7). The shaft preceded all of the mound construction. In other words, the Huaca Loro overlay and sealed an inferred central shaft tomb.

Discussion

The multitude of analytical perspectives brought to bear in our study effectively corroborated each other to yield

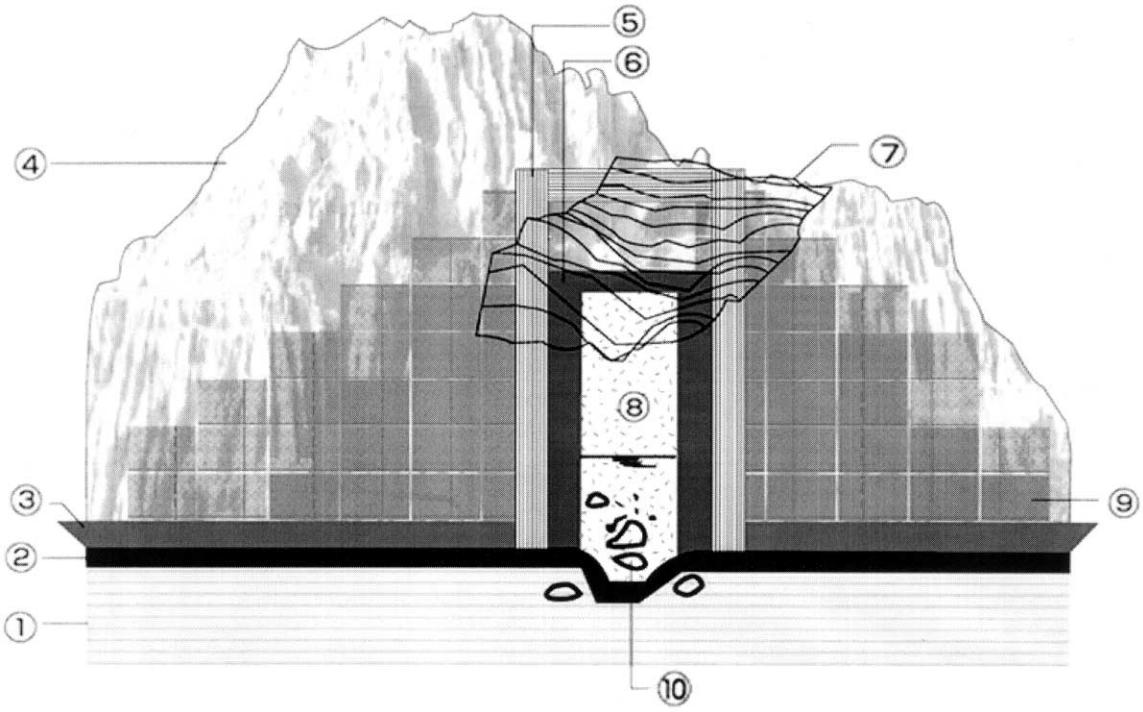

FIG. 7. *GPR image of the core of the Huaca Loro, revealing a deep subsurface structure beneath it. 1, natural matrix; 2, compacted foundation fill; 3, top of foundation fill; 4, outline of mound; 5, outer adobe structure; 6, inner adobe structure; 7, contour of area eroded by El Niño rains; 8, sandy fill; 9, adobe chambers with loose fills; 10, inferred central tomb.*

a coherent and comprehensive understanding of Middle Sicán mortuary practices and associated rituals, symbolism, and architecture. They also allowed us to test our inferences regarding status differentiation and skeletal biology as well as to refine our thinking regarding the nature, strength, and complexity of the bond between the deceased and the living. Finally, they pointed to the multiethnic composition of Middle Sicán society.

BIOLOGICAL, SOCIAL, AND ETHNIC IDENTITIES AND RELATIONS

Given the large number of women interred in the West Tomb, it is tempting to describe them as having been sacrificed en masse to accompany the male elite personage. However, definitive physical evidence for their sacrifice is scant (e.g., Verano 2001). In fact, missing phalanges, insect pupae, notable disarticulation, and incomplete ceramic vessels that cannot be explained by postinterment taphonomy indicate that at least some women in the antechamber were either secondary burials or mummified and curated prior to interment in this tomb, a process that Millaire (2002:172) calls "delayed burial." Faulkner (1986:146) notes that "sarcosaprophagous flies are among the first insects to arrive" at an available body during the initial stages of decay and putrefaction and that maggots will feed on moist parts for about two to three weeks. Preinterment mummification and curation have been suggested for Moche burials at Moche (Millaire 2002:172) and Sipán (Donnan 1995:172; Verano 1997*a*), Early Sicán and Middle Sicán burials at San José de Moro (Nelson 1998), and burials in shaft tombs of the last 1,500 years of prehistory of the Colombia-Ecuador border region (Doyón 2002).

In spite of the above insights, we are still left with the basic questions who these women were and why they would have been curated or reburied. Spanish colonial documents, particularly wills, offer an interesting perspective on these questions. They attest to the rights and privileges as well as obligations of the indigenous leaders (*kurakas*) of the immediately preconquest north coast. Ramírez (1996:15) points out that *kurakas'* rank and status was directly correlated with the numbers of their subjects and their skill in managing human resources. Though they had power over the life and death of their subjects, "the obligations between ruler and ruled were mutually reinforcing and interdependent" (Ramírez 1996:21). The *kuraka* had the responsibility of taking care of widows among the people whom he governed, for example, by having them serve him in his court as cooks or weavers, but they were expected to accompany him to his grave (Ramírez 1998:224; personal communication, 1998). This reciprocal relationship raises the possibility that some if not many of the women in the

antechamber were widows who had been cared for by the principal personage of the West Tomb in life and thus were buried to serve him in death, perhaps after mummification and curation of their bodies if they predeceased him.

This inference, though quite reasonable, is difficult to test and remains speculative. It also does not account well for their youth or for the multiple sets of female relatives in the West Tomb, even with the possibility of delayed burials. The inference also raises the troubling and as yet unresolved question of accounting for the presence of only two women in the East Tomb, which clearly had many more exotic items (e.g., marine shells and semiprecious stone beads) and technically superior and iconographically richer gold objects than the West Tomb (Shimada, Gordus, and Griffin 2000). If the conspicuous consumption of luxury and exotic goods is symbolic of power (e.g., Trigger 1990), the East Tomb, with its 1.2 tons of such goods, represents an impressive demonstration of power.

It is evident that the north–south division in the West Tomb reflects significant biological, ethnic, lifestyle, and perhaps even status differences. The relative biological proximity and homogeneity of the South Women revealed by dental-trait and mtDNA analyses suggest that they practiced endogamy or at the least represent some sort of kin group. The cloth strip that connected the South Women and the principal personage may be seen as symbolic of their membership of the same lineage. It is also worth noting that the basic social organization of the late pre-Hispanic north-coastal population, according to ethnohistorical accounts, was *parcialidades*, indigenous endogamous social groups organized by occupational specialty and asymmetrical moieties (e.g., Netherly 1990, Ramírez 1981). On the basis of the symbolic linkage and the style of the associated ceramics, we identify both the principal personage and the South Women as Sicán in ethnic affiliation.

The South Women, along with the two principal personages and the rest of the occupants of the East Tomb, had enjoyed a healthier life than the North Trench individuals and the North Women. They appear to have been buffered from the majority of childhood stresses by either superior diet or some cultural factor. One relevant consideration in this regard is the relative dietary importance of maize for different groups in our sample. Though macrobotanical remains show the significance of maize in the Middle Sicán diet (Shimada 1981), stable-isotope analysis of teeth would be required to resolve this question.

There were some unexpected differences in observed nonspecific stress indicators between the North and the South Women. Social status as defined by access to metal predicted that the two groups should show similar responses to childhood and other stresses, since they were of the same inferred status. To the contrary, the available data raised the possibility that the South Women had higher social status than the North Women. The symbolic linkage between the South Women and the principal personage implied by the cloth strip connecting them tends to support this possibility.

This discrepancy in the status attributed to the two groups of women highlights the limitations of our social-differentiation model, which fails to account for factors such as the women's origin (local versus nonlocal),[6] the accompanying developmental environment, and the possibility that one group achieved elevated social status only in death. The North Women's developmental health was lower than that of the South Women, yet they were interred in an important location in the West Tomb. Our case study clearly underscores the variable, context-specific expressions of status and role and the related difficulty of inferring social status from the limited material attributes of funerary contexts. The integrated approach offers more substantive indications of quality of life.

The mtDNA analysis revealed the presence of two sets of maternal relatives within each of the two groups of women. The related women were buried close to each other. The dental analysis, however, presented a seemingly contradictory picture of biological relationships among the North Women, who were quite heterogeneous. The divergence between the mtDNA and the dental-trait data is not surprising given that two distinct processes of inheritance are involved. That the mtDNA analysis reveals only maternal kinship should always be kept in mind. A systematic comparison of these data sets did, however, show some concordances (Corruccini et al. 2002). Individuals sharing a haplotype, hence a matrilineage, were slightly but quite consistently more similar dentally than "unrelated" individuals.

In understanding the nature of the North Women, it is more significant that biologically they are quite distinct from all other groups in our sample. Together with the fact that they were consistently associated with Mochecoid artifacts, we suggest that they represent Moche descendants who had been integrated into a multiethnic society under Sicán political domination and perhaps patrilocal residence. The latter would explain the sharing by physically dissimilar women of some sort of maternal relatedness from prior maternal habits, diluted by generations of unrelated male genetic recombination. This inference regarding postmarital residence remains to be tested, for example, through mtDNA and Y-chromosome analysis of subfloor burials in residences.

The emerging picture of the multiethnic constitution of Middle Sicán society found independent support from materials analyses of ceramics from the West Tomb. It is noteworthy that an inferred purveyor of funerary vessels, the ceramic workshop at Huaca Sialupe, was situated in an area of earlier Moche (final Phase V) occupation into which Middle Sicán occupation intruded. While the artisans there produced some fine, diagnostic Middle Sicán–style vessels, their efforts were predomi-

6. To shed some light on the issue of the geographical origins of excavated individuals, the strontium isotope analysis of bone samples of the West Tomb women and other burials is in progress at the University of Missouri Research Reactor.

nantly directed toward the manufacture of Mochecoid ceramics, suggesting that the potters were Moche descendants co-opted into the intrusive Middle Sicán economy (Shimada and Wagner n.d.). The burials excavated at the site also suggest the persistence of traditional Moche funerary customs, which included placement of a small copper piece inside the mouth (Donnan 1995) and selective removal of skeletal parts (particularly heads, hands, and feet) from primary burials for use as offerings in other graves (e.g., Hecker and Hecker 1992, Klaus 2003).

The ethnic composition of the Middle Sicán territory was likely to have been even more complex (see Cleland and Shimada 1998, Shimada and Maguiña 1994). For example, Middle Sicán ceramic representations of women wearing labrets or lip plugs and distinctive coiffures and/or headgear are believed to illustrate elite members of a population that spoke Tallán and occupied the far north coast at the time of the Spanish conquest (e.g., Cordy-Collins 2001, Petersen 1955). This area was integrated into the Middle Sicán dominion around 1000 C.E. Iconographic, technical, chemical compositional, and other lines of evidence attest to the importance and intensity of contacts with the far north coast and coastal Ecuador for the Middle Sicán economy and religion (e.g., Cordy-Collins 1990; Shimada 1990, 1995; Shimada, Gordus, and Griffin 2000). In fact, mtDNA data raise the possibility that members of the Sicán elite immigrated to the Lambayeque region from the northern Andes (Shimada et al. n.d.).

FUNERARY PREPARATIONS AND RITUAL

Preparation of the East and West Tombs and performance of the associated funerary rituals required careful and complex planning, considerable material and labor resources, and time, perhaps extending to months if not years. Various lines of evidence suggest that the body of the East Tomb principal personage was either naturally or intentionally mummified and bundled (Shimada 1995:70). For example, the atlas was not found with his skeleton (B. Yamaguchi, personal communication 1994), suggesting that his head had been detached prior to placing his body upside down, perhaps after his mummification. Further, various heavy ornaments that he wore or held, such as necklaces and pectorals of semiprecious minerals, a hip cover, and a ceremonial *tumi* knife, showed hardly any signs of the postinterment movement that would be expected from the compaction of tons of overlying earthen fill. In addition, digging the tomb out of the consolidated silt and clay layers and assembling and placing grave contents are estimated to have taken at least two weeks (assuming 20 full-time workers), provided that the water table remained sufficiently low for long enough. Finally, we must consider the time and effort involved in gathering a half-ton of *tumbaga* sheet scraps, nearly 500 unused cast arsenical-copper implements (ca. 200 kg), and some 80 kg (i.e., hundreds of thousands) of shells and semiprecious stone beads from different workshops, among other items (Shimada 1995, Shimada, Gordus, and Griffin 2000).

The process of preparing the West Tomb was probably even longer and more complex because of the greater number of individuals interred (24 versus 5) and the volume of soil excavated (ca. 720 versus 105 m^3). Tool marks found on the shaft walls indicate that at least five or six individuals were working at one time on one side of the shaft. We estimate that the digging of this tomb alone would have taken 20 workers over two months. Once the central chamber and antechamber and their niches had been dug, three individuals and their grave goods were placed in the central chamber. The principal personage was carefully positioned near the center of the mat-lined central-chamber floor, and his mask, headdress, and gloves were placed on and around him. Other grave goods were positioned on the mat, while painted cloths were draped on walls.

Before the central chamber was roofed, the antechamber was prepared. As noted earlier, some women appear to have been bundled, mummified, and curated or exhumed for reburial. Other women may have been sacrificed at this stage but not immediately buried.[7] Once their bodies were placed in appropriate pits and buried, painted cloths and narrow cloth strips were placed on the floor. As we have seen, one cloth strip was draped down into the central chamber to wrap the headdress and upper torso of the principal personage.

Shortly (perhaps a day or two) before the central chamber was roofed, over 111 *crisoles* were hastily made in situ inside it and left there, perhaps as a parting gesture on the part of funerary participants. Discussing similar *crisoles* found in a terminal Moche/Early Sicán tomb at San José de Moro in the lower Jequetepeque Valley, some 85 km southeast of Sicán, Costin (1999:99) argues that they were "made specifically near and for the burial ritual" by a large number of funerary participants (nonpotters) for a ritual of drinking *chicha* or maize beer that concluded the funerary rites. In essence, Costin suggests that *crisoles* represent voluntary material expressions of the community in which the deceased had played certain roles and established social and economic networks. Her view is based on their high degree of formal variability and contrasting technological similarity, their fragility, and ethnographic analogy. We concur with her assessment with regard to the timing and makers of the *crisoles*, although their use remains to be demonstrated, for example, through residue analysis.

The abundant camelid remains inside the central chamber should also be considered in relation to the extensive funerary preparations and rites involving many individuals. Together with the aforementioned evidence of food consumption in the Great Plaza, the placement

7. The late pre-Hispanic Chimú people of the north coast observed a five-day mourning period followed by washing and interment of the deceased (Rowe 1948:49). Salomon and Urioste (1991:129, 131), citing preconquest Quechua folklore recorded in Huarochirí, suggest that the extended waiting period prior to interment may relate to the belief that the soul of the deceased left the body in the form of sarcosaprophagous muscoid flies laid in it.

of camelid feet and heads in the central chamber may be seen as a symbolic gesture of sharing by the funerary participants while fully exploiting the meat of the camelid (Shimada and Shimada 1997).

Even the filling of the tomb appears to have been quite slow and deliberate. In the West Tomb, the painted cloth and *tumbaga* sheets did not show the damage that would be expected had the dirt been simply dumped in from the top. Further, all niches were carefully filled in and sealed with clay. In fact, given the possibility that a lapse of time was needed for the soul of the deceased to leave the body the tomb may not have been filled in immediately after the placement of all the bodies and goods. The hastily made ceramics associated with the antechamber women contrast sharply with the ceramics associated with the principal personage, which were not only well made but thoroughly wrapped with *tumbaga* sheet metal, reflecting the social difference and value of ceramics relative to metal (Cleland and Shimada 1998, Shimada 1994*a*). Though we cannot specify how long the preparation and interment of these individuals took, the associated ceramics all pertain to the early Middle Sicán, with an estimated time range of 950–1050 C.E.[8]

The preceding reconstruction of funerary preparations and rituals, though partial, suggests that there were well-established protocols and specialists in elite tomb preparation and accompanying funerary rites and that such preparations were complex and protracted. This sort of specialization would not be surprising given the long list of specialists mentioned in the pre-Hispanic legend of the Naymlap dynasty in Lambayeque recorded in 1586 (Cabello 1951 [1586]). Similarities in the composition and organization of personnel involved in funerary processions (e.g., an oval casket on a pole carried on the shoulders of two men) as represented in Moche and Chimú artifacts (e.g., Castillo 2000:124–25, figs. 38–41) further reinforce this notion.

In addition, the above reconstruction reminds us that the presence of multiple individuals in a single tomb does not imply the synchronicity of their death, their grave goods, or even their interment. Increasingly, evidence of postinterment visitation and alterations, such as removal or addition of some skeletal elements and/or artifacts, has been documented for elite and commoner burials of the last 2,000 years of north-coast prehistory (e.g., Franco, Gálvez, and Vásquez 1998, Hecker and Hecker 1992, Klaus 2003). Together with the aforementioned curation of the deceased and delayed burials, these activities attest not only to the complexity of mortuary behavior but also to lasting bonds between the dead and the living. As will be seen below, however, the preparation of the East and West Tombs was only part of an even more protracted and grander project involving a Sicán elite lineage and its ancestor cult.

8. This estimate is based on five radiocarbon assays for Huaca Loro (see Shimada 1995:191–92), including two for the West Tomb (Beta-179888, 1,010 ± 50 B.P., 2-sigma calibrated date of 960–1160 C.E., and Beta-179889, 1,080 ± 50 B.P., 2-sigma calibrated date of 880–1030 C.E.).

SYMBOLISM

It is evident that the internal organization of both East and West Tombs was carefully choreographed with specific symbolic messages as well as social and/or kinship relationships in mind. For example, the placement of a youth and women close to the principal personage is seen in both tombs, just as it was in the earlier Moche elite tombs (i.e., tombs 1 and 3) at Sipán (Alva 2001). It has been suggested that the principal personage and two accompanying women of the East Tomb together formed a symbolic representation of the reincarnation of the principal personage, that the inverted burial position symbolized the fetus in the womb about to be born, and that the prone position of one of the women (burial 5) represented the act of giving birth while the other (burial 4) represented a midwife (Shimada 1995:145). Intensely bright red cinnabar painted on the body of the principal personage is believed to have symbolized life-giving, well-oxygenated blood and the blood that often accompanies birth.

The inverted position of the principal personage taken by itself may conjure up other symbolic messages, for example, the deceased's transformation into a bat (inverted position) ready to embark on his flight to the world of the dead (see Shimada 1995:144–46 for other views). Such interpretations, however, ignore the holistic character of the tomb contents and organization. At the same time, the images on the associated grave goods give the impression of being intended to glorify the deceased personage, who was likely to have been perceived as an earthly alter ego of the omnipotent central deity of the Sicán religion. The repoussé views of an elaborately attired man on gold artifacts found in the tomb (e.g., the gold cup held in the golden glove) appear to represent the central personage of the tomb. The staffs and clothing shown in these representations match those found in the tomb.

The West Tomb appears to have encoded different symbolic messages. Its overall internal configuration, with the principal personage flanked by two distinct groups of women, may have symbolized his real or expected role in life of unifying and governing Sicán and Moche populations. Further, the placement of his body at the bottom of the central chamber may also express the significant social gulf between him and the women. In other words, the horizontal and vertical dimensions of this tomb and the myriad interrelationships among the interred individuals embodied not only the complex hierarchical and multiethnic character of Middle Sicán society (e.g., McHugh 1999) but also the social obligations and networks that bound it together.

Drawing on an analogy with northern Andean highland shaft tombs, we may suggest instead that the additional depth of the central chamber symbolized access to the watery underworld. This view invokes the concept of the cyclical circulation of water and soul from celestial to subterranean worlds (Doyón 2002, Zuidema 1977–78). Related to this inference is the idea that the vertical layout of elite shaft tombs and their contents embodied

a widespread cosmological model that consisted of superimposed celestial, earthly, and under-worlds (Doyón 2002). Horizontally, grave goods are said to have been concentrically organized according to their decreasing value to the earthly political economy, with the highest (gold, precious stones) at the center and the lowest (ceramics) at the peripheries (Doyón 2002; cf. Pader 1982). These symbolic interpretations are based heavily on northern Andean and Amazonian ethnographic and ethnohistorical data. Their applicability to the Sicán shaft tombs under consideration is questionable given, among other things, the notable differences in tomb construction and content organization and the lack of documented sharing of cosmology and political dogma by the two regions.

The iconography found in the West Tomb differs notably from that of the East Tomb. Objects that accompanied the principal personage in the central chamber not only lacked self-images (with the possible exception of the repoussé images on the gold cup mentioned earlier) but generally had little iconographic content. In addition, it is evident that the main theme of the preserved painted cloths that spanned the north and south sides of the antechamber was a cosmological vision involving the Sicán Deity in marine settings represented by fish, shell, and anthropomorphized waves. The cloth that showed a procession of warriors carrying trophy heads was restricted to the north side, as if to reinforce the sacrificial character of the North Women.

Did the marine scenes and the westward orientation of the personage indicate the symbolic significance of the Pacific? The ceremonial gloves of the principal personages of both tombs seem to salute some imaginary entity to the west. In the case of the central chamber, hardly any grave goods that would impede the westerly view were placed in front of the principal personage and his gloves. The symbolic importance of the Pacific for pre-Hispanic north-coast populations is well documented at least from Moche times (e.g., Carrión 1940; Shimada 1994*b*: 44–47). Not only was the Pacific seen as the source of all life-giving water but its offshore islands were regarded as resting places for the ancestors and settings for human sacrifices and other offerings for ancestors, the moon goddess, and other deities (Hocquenghem 1987, Kubler 1948, Netherly 1977). In this regard, the aforementioned westerly orientation of the principal personages, together with their gloves and cups, may represent their veneration of the deities and ancestors and/or their journey to join them. Considering that Naymlap is said to have arrived from across the sea to establish the Lambayeque dynasty (Cabello 1951 [1586]), we may suggest that the deceased leader returned to the primordial sea from whence he presumably came.

THE SHAFT-TOMB/TEMPLE-MOUND COMPLEX AND ANCESTOR WORSHIP

Various lines of evidence support the primary working hypothesis that the East Tomb was part of the planned cemetery of a Middle Sicán elite lineage placed under and around the Huaca Loro. Along with the stratigraphic superposition documented at the mouth of the East and West Tombs, our GPR surveys and attendant excavations showed that construction of the excavated and inferred shaft tombs preceded construction of the Huaca Loro and that the tombs were planned to encircle an inferred central one. Although two phases of remodeling have been documented for the temple atop the mound, systematic examination of constructions and fill exposed by deep erosional cuts shows that the bulk of this mound, including its basal platform, was built in a single episode around 1000 C.E. The mound sealed and protected the underlying shaft tombs. A long, steep zigzag ramp (ca. 2 m wide) gave access to a temple atop the mound (fig. 2). With a colonnade supporting its solid roof and enclosing walls decorated with polychrome religious murals featuring the front-facing, standing Sicán Deity (Florián 1951; Kosok 1965:165; Shimada 1995:48, fig. 27), the temple was clearly a formal setting for exclusive ceremonies. The dimensions of the mound, particularly its height (ca. 35 m), together with the enclosing wall at the top, would have made any ritual performance at the temple largely invisible and inaudible (Moore 1996:155–64).

Although mtDNA analysis did not shed any light on the relationship between the principal personages of the East and West Tombs, dental-trait analysis suggested a genetic relationship that was more likely second-order (e.g., uncle–nephew) than first-order (e.g., father–son). The symmetrical placement of the tombs and similarities in their facial morphology such as a high nasal arch and prominent orbits (K. Mine, personal communication, 1996) had already hinted at such a relationship.

We infer that the central shaft tomb below the Huaca Loro pertains to the ancestral figure of the endogamous kin group to which the principal personages of the East and West Tombs belonged. This hypothesis may never be tested, given the enormous excavation task it would involve. In fact, excavation of any hypothesized shaft tomb cannot be readily realized, if for no other reason than the height of the water table since the El Niño event of 1997–98.

The differences in developmental health, associated grave goods, and other features between the North Trench burials and the contemporaneous East and West Tomb individuals tend to support the hypothesized inverse relationship between social status and distance from the sacred locus. This hypothesis requires further testing, for example, through excavation of burials placed along different orientations. Likewise, in spite of East and West Tomb differences, it seems premature to pass judgment on the hypothesized separation of two complementary but asymmetrical moieties along the north–south axis of the mound.

We can state with confidence, however, that construction of the Huaca Loro was a corporate undertaking of historical proportions based on a master plan and involving ancestor worship and the permanence and power of an elite lineage. The ascent to the temple effectively impressed visitors with the grandeur and sanctity of the overall construction and, symbolically, the power of the

inferred elite lineage. The aforementioned murals helped to establish not only the sanctity of the ritual space but also the symbolic connection between the deity and the deceased personages interred underneath. That the principal personages of the East and West Tombs wore masks identical to the face of the Sicán Deity further reinforces our impression that a "divine" connection was invoked in legitimating and aggrandizing the elite that ruled Middle Sicán society. Interment of multiple elite individuals who had probably died at different times in a single collective cemetery was far more than mere body disposal; it presented a unique opportunity for the survivors to define, if not redefine, their social identity, position, and even history. Subsequent ritual performances at the temple by the living lineage members, then, served effectively to reaffirm and reinforce not only their lineage identity and unity but also three-way symbolic linkages among the Sicán Deity, the dead, and the living. It is likely that, through these rituals, the divine connection between the deity and the dead was extended and legitimated for the living.

The documented rituals and feasting at the mound base and in the Great Plaza may well have been directed toward securing or reinforcing the ideological and social integration of the Sicán public. Though the effectiveness of such efforts may be questioned, the pervasive distribution of well-defined and homogeneous Sicán Deity and Sicán Lord icons attests to some success in institutionalized ancestor veneration. In many ways, the shaft-tomb/temple-mound complex described here exemplifies what Blanton et al. (1996) have termed the "network strategy" for acquiring and maintaining political power.

In essence, the Huaca Loro was an awe-inspiring piece of political propaganda, a temple for worship, and a monument to the unity and continuity of the Sicán Deity, the deceased, and the living. It was also a key part of the unique sacred landscape that we call the religious city of Sicán. The presence of two other pyramidal constructions at Sicán with similar or identical architectural forms but slightly later dates (i.e., Huaca Sontillo and Huaca Rodillona) suggests that different elite lineages at different times within the Middle Sicán built their own cemeteries, each capped by a monumental mound.

Tombs and cemeteries containing multiple interments placed around central individual(s) that presumably mirror social inequality and integration through shared ancestry and hierarchy have been widely documented in the Andes from the Necropolis on the south coast of Peru (Tello and Mejía 1979) to shaft-tomb clusters in the Ecuadorian (e.g., at La Florida, Quito) and Colombian (e.g., at Miraflores, Nariño) highlands (e.g., Doyón 1989, 2002; Uribe and Lleras 1982–83).

On the north coast, several generations of local Moche lords and priests, each accompanied by an impressive array of luxury grave goods, some kin, and his retinue, were interred in spacious, roofed burial chambers placed deep within the solid adobe platform at Sipán in the mid-Lambayeque Valley (Alva 2001, Shimada et al. n.d.). An inferred series of superimposed temples dedicated to ancestor worship was built in six phases during the first several centuries C.E. The burial platforms found in the vast royal compounds (*ciudadelas*) at the Chimú capital of Chan Chan (e.g., Conrad 1982) appear to be a later, above-ground version of the Huaca Loro West Tomb. Each had a central burial chamber (presumably reserved for a deceased king or noble) surrounded by symmetrically placed smaller chambers in which multiple women were buried (Pozorski 1971). The placement above ground of the former appears to be a solution to the high water table caused by irrigation up-valley.

Such cases of multiple interments placed around a central individual or individuals are commonly described as embodying pervasive and persistent ancestor worship. This interpretation, however, is typically based on the spatial arrangement of differentiated burials and a projection of ethnohistorically documented Inka and early colonial ancestor cults (e.g., Doyle 1988, Kaulicke 2000, Salomon 1995). Ancestor cult seems too casually or too often invoked for the available data. This is not a rejection of the inference but rather a call for better substantiation of the claim. Many claims for ancestor cult would be better described as simply a cult of the dead. Whitley (2002:119) laments the overreliance on "omnipresent ancestors" to explain a whole range of archaeological phenomena. He warns of various misconceptions regarding the ancestors and their worship and argues that "rites of burial and rites of 'ancestor worship' are ritually and often spatially distinct" (pp. 122–23). What distinguishes our claim for a Middle Sicán ancestor cult is that it is built on various converging lines of evidence that have not been brought to bear on previous studies of pre-Hispanic cases.

Conclusions

Over the past two decades, there have been many small- and large-scale excavations of pre-Hispanic burials on coastal Peru, where the general aridity has favored preservation of both artifactual and osteological remains. However, the information potential of burials has not often been fully realized because many excavations have been focused on grave goods or conducted with inadequate logistical and technical preparation, field and laboratory methodologies, and conceptual models of death and mortuary practices. Too often burial excavations have been reactive and mechanical, treated as secondary to other research activities and undertaken without worthy research questions in mind or sufficient expertise to document, sample, and conserve a wide range of biological and cultural features. Given the widespread focus on grave goods and reactive excavations, critical information such as the historical and social contexts of the burials have not been clearly identified prior to or even after excavation. If we are to treat burials as a microcosm of a given culture, then it behooves us to elucidate as many of the factors and processes that shape them as possible. Even the horizontal and vertical stratigraphies of burial structures and postprimary-interment modifications have been poorly documented. It is still rare to

find physical anthropologists included as integral to archaeological fieldwork and subsequent analysis. Too often, human remains do not receive the care required to ensure their survival for analysis.

Using a unique research opportunity on the north coast of Peru as a case study, we have illustrated the productivity of and need for broadly conceived bioarchaeological research with a balanced examination of the biological and cultural dimensions of pre-Hispanic burials for insightful social reconstruction. Our background investigation has suggested that Middle Sicán mortuary practices generally reflected the social status of the deceased and/or the surviving individuals. The intent of our study was not, however, to test the applicability of the representationist view of mortuary practices but rather to document the complexity and persistence of the relationships between the funerary goods and rituals, on the one hand, and the social and biological dimensions of the dead and the survivors, on the other. Systematic examination of biological data revealed the inadequacies of models of social differentiation based strictly on material evidence; in fact, the findings may be seen as supporting both representationist and nonrepresentationist modes of treating the dead (e.g., Buikstra 1995). The study also found the conventional view of the dead-living articulation on the pre-Hispanic north coast simplistic and temporally and spatially restricted. It was in fact meant to steer our attention away from the processual-postprocessual debate toward a holistic vision of pre-Hispanic mortuary practices that has long been envisioned but rarely implemented.

What distinguishes the Middle Sicán shaft-tomb/temple-mound complex reported here is not so much its material wealth or its scale as the breadth and depth of the information we have secured from a focused, sustained investigation that integrates a multitude of analytical perspectives and methods. The Middle Sicán case is securely based on multiple lines of corroborative evidence. For productive social analysis of burials, we argue for the close integration of complementary analytical perspectives and techniques such as those of artifact style and distribution, mtDNA, inherited dental traits, and developmental health and taphonomy set within a long-term research framework. In addition, our multifaceted analysis of human remains was conducted within a comprehensive examination of mortuary process, rituals, and symbolism that entailed excavation of nested spatial loci, including the associated temple and plaza. Finally, our study was set within a regional project that provided us critical background historical and social contexts as well as information for locating burials.

A securely dated burial sample that included individuals from all points on the social spectrum was crucial to our study. However, our sample cannot be described as representative of the relevant regional population or sufficiently large to be informative about its demography. This is a rather common situation with archaeologically derived burial samples. Our success in elucidating some important biological and social relationships is due largely to the emphasis on burials from a coherent cemetery. It seems that the best chance for insightful research is based on large samples from cemeteries that are spatially and temporally coherent.

Comments

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Contrary to popular belief, archaeologists seldom encounter royal burials, ancient buried cities, temples and ceremonial centers decorated with mural art, or even objects made out of precious metals or decorated with complex iconographies. As a consequence, as Shimada and colleagues point out, those who are so fortunate as to do so are often ill prepared to deal with the complexities that such contexts pose in terms of logistics, budgets, analytic support, and even local politics. Shimada et al. bring to the analysis of mortuary settings a state-of-the-art approach that combines traditional archaeological analysis of the stratigraphic, contextual, and artifactual component of elite burials with data contributed by newly developed biological techniques. Their article calls attention to the vast array of possibilities for interpreting such settings and their costs and complications, and it serves for the general anthropological community as an introduction to the complex societies of the north coast of Peru, particularly the Lambayeque (a.k.a. Sicán) culture.[1]

Shimada et al. argue that most of their colleagues interested in funerary archaeology are "motivated by the search for well-preserved decorated artifacts in presumed sealed, synchronous context." It is true that Peruvian archaeology, particularly on the north coast, has a reputation for producing high-status burials, but behind this façade of exuberance is some very high-quality archaeology. The excavations of the royal burials of Sipán, for example, cannot be characterized as motivated by greed. Walter Alva (2001) and his team of Peruvian archaeologists not only conducted a very good excavation but also undertook the conservation and restoration of the artifacts associated with the burials that culminated in the construction of Peru's largest archaeological museum.

The other difficulty with funerary studies pointed out

1. "Lambayeque" is the name of the general region where this society originated, the valley, and the modern political jurisdiction, and it is the term used by the first studies of this society, those of Rafael Larco Hoyle (1948) and Jorge Zevallos Quiñones (1971), and by Peruvian researchers and residents of the region today. The introduction of the term "Sicán" by Shimada and his collaborators has brought confusion to the field, since it labels exactly the same artifacts and cultural phenomena as the traditional name. Although Shimada claimed early on that his label referred only to the phenomena associated with the core of the Lambayeque realm, Lambayeque and Sicán styles are indistinguishable.

by Shimada et al., the representativity of the sample, is in fact an obvious shortcoming of their own study. They claim that most such studies are centered on extraordinary burials, with little being known about the total population and thus about the way in which the extraordinary represents the ordinary. The study discussed here focuses on two singular burials, and I doubt that it illustrates the range of variability of elite Lambayeque burials and that these burials are truly representative of a particular cultural behavior. Excavation of Moche elite burials at San José de Moro (Castillo 2003, Castillo and Donnan 1994), Dos Cabezas (Donnan 2001), and Sipán (Alva 2001) have shown many more similarities between elite burials than the formal proximity discussed here. Is this because of the singular character of the deceased? As Shimada et al. point out, singular burials must be placed in the context of the known burials pertaining to a given culture. Regrettably, the list of excavated Lambayeque burials is not very long. However, since most of the Sicán archaeology has been done by Shimada and his collaborators, at least the comparative sample has been excavated under the same high standards.

Shimada et al. reject the "representationist approach" to funerary data and call upon new approaches developed by the postprocessualists. Burials are clearly not only constructions that illustrate social structures and relations; they encode messages in particular ways. Only a detailed understanding of the conditions of a given society permits a meaningful reconstruction of the messages encoded in the construction of the funerary contexts. Whether one pursues generalizations or adopts a more particularistic approach, it is best to employ as many approaches as possible, combining the power of comparative and generalizing assumptions about societies and, in this case, the construction of social meaning. At the same time, Shimada et al. remind us that a deep understanding of the social, cultural, and historic conditions of a society will allow one to read appropriately between the lines. *But isn't this what we all try to do?* Fortunately, Latin American archaeologists have generally remained uninterested in theoretical disputes, trying to take advantage of what is useful about each approach and recognizing that sometimes the quality of theory and the strength of schools of thought rest upon the intelligence and creativity of the individuals involved.

The most interesting aspect of this research is the use of biological information in conjunction with archaeological data to demonstrate the genetic makeup of populations. In the West Tomb, where two groups of women were found associated with two distinct ceramic assemblages, mitochondrial DNA confirmed a hypothesis based on artifactual differences. Several other research teams are attempting to address questions of this kind, for example, to determine whether sacrificial victims belonged to the same populations as the perpetrators (Verano's work in progress at Huaca de la Luna) or whether individuals with a particular pathology were related or simply affected by the same disease (Cordy-Collins et al.'s [2001] work at Dos Cabezas). As strong as these new techniques are, they depend upon asking the right questions. As north-coast archaeology progresses, the questions that we pose are becoming more specific, always one step ahead of the methods. MtDNA analysis is incapable of addressing all the issues at hand. We have reached a point at which our research questions are only broadly answered by determination of genetic proximity or relationship to a given population; we want to know whether two individuals found in royal burials were father and son or brothers or whether all the priestesses found at San José de Moro were related.

The Sicán Archaeological Project is in many ways an example to imitate, but it is by no means the only serious and systematic attempt at addressing the social reconstruction of past societies on the basis of funerary data. It is entirely inappropriate to characterize other researchers' work as "focused narrowly on grave goods" or "reactive and mechanical" or to claim that one's approach is the only route to understanding. Echoes of the peculiar self-confidence of early processual archeology can be heard in this otherwise remarkable study.

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Shimada and coworkers should be commended for having presented their long-term regional study of social reconstruction in a concise and well-organized fashion. However, in a manuscript involving so many perspectives, it is almost inevitable that some elements will be inadequately explored. Their kinship analysis involving ancient DNA (aDNA) is presented without adequate hypothesis testing. Further, while they promote their study as a model for integrating multiple data sources and argue that this approach (which the philosopher William Whewell [1840:230] called "consilience of induction") is "rarely implemented," such studies do exist.

Stone's (1996) doctoral study of aDNA at the Norris Farms site (Stone et al. 1996, Stone and Stoneking 1998) also involved a comprehensive mortuary and spatial analysis of genetic data with associated burial inclusions. Shared mtDNA lineages in some multiple interments suggested relationships between victims of violence, and one lineage cluster in the highest artifact-ranking group also implied kinship burial practice. However, Stone acknowledged that a forensic-style DNA-typing approach using short tandem repeat (STR) analysis would be required for confirmation. Her results broadly indicate that Oneota society was likely egalitarian, with prestige acquired and age and sex as primary indicators of status.

My research on mortuary customs among Upper Canadian pioneers (Dudar, Waye, and Saunders 2003, Dudar, McKillop, and Saunders n.d.) also involved multiple lines of evidence. Ancient DNA sex identification, STRs, and mtDNA clusters were submitted to statistical analyses to achieve significant probabilities of genetic relationships. Associated historical records supported the

conclusion of ancestor veneration through "virilocal" mortuary practice and revealed an aDNA bias created by the disproportionate contribution of locally persisting elite families to the aggregate skeletal collections. This bias could easily have been misinterpreted as a founder effect if chronological control of the aDNA analysis had not been established through burial phases (using time/style-sensitive material culture) and with only a cursory examination of regional settlement history.

These studies point to the importance of careful study of aDNA within a broader cultural context and the necessity of hypothesis testing to drive interpretation. Gould (1989:282) has cautioned that "the firm requirement for all science . . . lies in secure testability, not direct observation." In the case, for example, of the mtDNA sequence not belonging to a Native American haplogroup that was recovered from three female burials of Huaca Loro West and a male Japanese anthropologist who had previously handled the remains (n. 5), contamination could have been discounted if additional nuclear aDNA sex identification had been performed. Since nuclear aDNA amplification is considerably more difficult to achieve, a simple forensic-based statistic, the probability of maternal kinship by chance (PrMKBC), using mtDNA, could have been calculated in a mock scenario with the anthropologist as a suspect leaving DNA at a crime scene. The conservative probability (with 95% confidence interval) of a *chance match* between the anthropologist's and the putative aDNA sequence is very low, indicating contamination as the most likely source ($p = 0.0066 \pm 0.0058$ using the Asian forensic database [see http://www.fbi.gov/hq/lab/fsc/backissu/april2002/miller1.htm]). The majority of Shimada et al.'s other mtDNA sequences have never been observed. Seven of them appear in world databases ranging from Native America (including three matches to ancient Windover lineages!), Africa, Europe, and Asia, but since they belong to established Native American haplogroups, they are most likely endogenous aDNA.

When the probable contamination is removed from the West Tomb results, it is disputable whether "the North and South Women were characterized by mutually exclusive sets of haplotypes" because the majority of burials have unique mtDNA sequences. The individuals sharing sequences are not found in the same pits, and one cannot simply assume relationships between them; 20% to 33% of modern Britons possess the mtDNA Cambridge Reference Sequence (Piercy et al. 1993, Richards et al. 1996) but have no known common ancestry. Chance could account for whatever pattern is left, and since shared dental traits are an unknown blend of genetic and environmental factors they can only indicate differences or broad associations.

Multiple converging perspectives support conclusions with greater strength than conclusions derived from fewer sources; unfortunately, in this case the whole is not the sum of the parts. I believe that Shimada et al. have collected some authentic aDNA data, but they must use them to test relationships rather than simply assert them. I firmly agree with their progressive conclusions calling for greater cooperation between archaeologists and physical anthropologists in the field and the laboratory, for interpretation does begin "at the trowel's edge" (Hodder 1999). It is an exciting time for bioarchaeology research as more integrative bioculturally based studies such as Shimada and coworkers' begin to unfold.

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16 I 04

Up to the late eighties, scientifically controlled excavations of "rich" burials from ancient Peru were extremely scarce, though myriad objects from unknown looted cemeteries and sixteenth-century written sources had pointed to complex burials as a common practice. For this and other reasons (absence of legible writing, difficulties in assigning function to monumental architecture, etc.) archaeologists did not develop clear concepts about pre-European elites apart from analogies directly drawn from ethnohistorical sources. During the past 15 years, however, a steady flow of new findings has been changing this situation dramatically. This short time span and the resulting absence of precise presentations of the pertinent data for most of these contexts mean that their theoretical relevance remains largely unclear.

With his long-term project at La Poma Shimada has managed to find and excavate a series of burials, among these two intact complex contexts, beneath Huaca Loro. The latter is one of the huge mounds forming what Shimada calls the sacred city and capital of the Sicán state. His GPR results in and around this mound allow him to postulate the existence of a planned elite cemetery consisting of five contexts located beneath the platform mound. His interest is not, however, restricted to an extensive discussion of this site but aims at a theoretical approach to an integrated (or, in his terms, "holistic") view of Sicán society during Middle Sicán times (A.D. 900–1100). In order to achieve this aim, he and his colleagues use an impressive variety of different kinds of analyses, stressing the particular importance of bioarchaeology.

While it is certainly commendable to include all possible kinds of data in their analyses and subsequent interpretations, there is the danger that with more data more problems will arise. Analytical completeness is certainly not the same as complete understanding of complex and ritual networks. What Shimada and his colleagues have revealed about the composition of social networks in mortuary populations has produced some important insights, but their interpretation is often dependent on contextual correlations with material items, producing the danger of some circular reasoning.

Here I would like to concentrate on what is presented as a central hypothesis—that the mound is a physical fo-

cus of ancestor worship. Since Shimada et al.'s overall aim is the reconstruction of Sicán society, ritual is often reduced to functional interpretations as sequences of related activities with somewhat speculative reflections on their meanings. While the buried individual retains connections with the role assigned to him during his lifetime, his placement and ritual treatment are aimed at his future and can be seen as part of a process of transformation into a different identity. By this transformation he achieves superior power as an ancestor that is substantial for the living community. In order to achieve this transformation, often conceived as a dangerous voyage through the underworld, cycles of complicated rituals outside the tomb are needed and, as Shimada shows, are indicated at Huaca Loro. The outer or public and the inner (inside the burial chamber), more private formal aspects follow strict rules according to precise ritual, clear concepts, and logic. The best preservation is usually not found in the associated architecture and its surroundings but inside the burial chamber, where the evidence for transformation is pervasive. The West and East Tombs show that the logic may take different but not contradictory forms. In order to understand the logics of transformation, a close "reading" of the interrelated items (objects and human as well as animal bodies [real and figurative] or their parts) is of the utmost importance, as position, direction, number, color, kind of material, etc., may all have symbolic significance. The pertinent evidence in the West Tomb is to be seen in large painted textile panels and other kinds of textiles, while decorated metal and other materials predominate in the East Tomb. These topics are not fully explored to advantage in the present paper. Finally, the interpretation of these contexts should be compared with other related public and iconographic evidence (for instance, the murals on top of Huaca Loro) (for further discussion, see Kaulicke 2000).

The extremely rich evidence contained in complex burials and their connectedness with social and physical settings pose tremendous challenges for archaeological analyses. Shimada and his colleagues are certainly right in demanding a corresponding sophistication of analyses of mortuary contexts, and he is to be congratulated for significant advances. Similar analyses of complex contexts in other comparable sites (Sipán, Huaca de la Luna, etc.) should lead to a more definite understanding of ancient Peruvian elites in the near future.

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Shimada et al. have done an exemplary job of excavating and analyzing one of the most important sites in the Andes. In this paper they seek to integrate the contextual information from the Sicán burials with biological data derived from the analysis of the skeletal remains. This approach combines multiple lines of evidence and is crucial to a more complete understanding of the site and this cultural period.

The successful integration of multiple independent lines of evidence is a tall order, particularly with such a complex context. Shimada et al. demonstrate a sophisticated command of the literature surrounding the analysis of burial contexts and argue, successfully I feel, for an integration of many aspects of processual and postprocessual theory. I am, however, a little less enthusiastic about the presentation and integration of the biological data, for reasons I will explore below.

First, however, I must correct the citation of my 1998 work "Wandering Bones." In that article I described patterns of preinterment mummification and curation at San José de Moro (Jequetepeque Valley) for burials dating to Moche times and to a later period I called "immediately post-Moche" that is now referred to as the Transitional Period (Rucabado and Castillo 2003). Shimada et al. incorrectly cite this study as describing examples from Early and Middle Sicán times. While not mentioned in the 1998 paper, there is some evidence for preinterment mummification and/or curation at San José de Moro in Lambayeque (Middle Sicán) times (see Nelson et al. 2000 for a discussion of issues of Lambayeque/Sicán nomenclature), but the degree and pattern are very different from those of Moche times, and it is probable that this aspect of the funerary ritual was very different in the two cultures.

With respect to the overall integration of the biological data with this study, Shimada et al. would do well to reexamine their assumption that wealth = health, following Wood et al.'s (1992) discussion of the "osteological paradox." Wood et al. argue that we should consider the possibility that the individuals in which stress is most apparent may be the healthiest, as they recover and survive to show the effects. This framework might help resolve some of the apparently unexpected results, such as the pattern of differences between the North and South Women. It is certainly worthy of note that the wealth = health equation is not universally expressed in the Andes, particularly at the nearby site of Túcume. Toyne (2002) noted levels of cribra orbitalia and porotic hyperostosis in the 19 females buried in the Inca period at Huaca Larga that meet or exceed the levels cited for the North and the South Women at Sicán, and the 3 males from Huaca Larga all show Harris lines and hypoplastic defects. In addition, Cordy-Collins has reported widely on the pathological giants from the high-status Moche tombs at Dos Cabezas (e.g., Cordy-Collins et al. 2001).

The eternal banes of bioarchaeological research are sample size and representativeness. Shimada et al. aim to elucidate the "biological, social, and cultural relationships among the 34 inferred commoners and elite individuals excavated" at Sicán. However, they go on to claim that "a comparison of archaeological and biological lines of evidence suggests that the layout and contents of one tomb in fact reflected Middle Sicán social reality." Alas, a sample of 34 individuals from one site and 34 individuals from nearby sites (the El Brujo ma-

terial is not integrated throughout the analysis, and the two dozen Sicán commoner burials excavated between 1978 and 1984 do not appear to have been used in this study) simply cannot validly support the latter claim, especially when the samples are atomized into extremely small subsamples as is done in table 4 (incidentally, table 4 does not include an *N* column, which makes the assessment of the figures presented extremely difficult). That the Sicán sample may not be representative of the Sicán population at large is suggested by the fact that it has an average age in the early twenties and only two subadults. Clearly, cultural selection was at work in determining who was buried at Sicán. An understanding of the "background biological variability" expressed in the Sicán/Lambayeque population is crucial for the correct interpretation of all the biological data and particularly the dental morphology and mtDNA data sets. I well understand that the "background" is extremely difficult to come by, but interpretations must be attuned to their validating evidence.

While I have some concerns about interpretation and validation, Shimada et al. should be congratulated on bringing these data, ideas, and interpretations to the anthropological community at large. While there is much work yet to be done, Peruvian archaeology is making great strides in moving from a strict culture-historical paradigm to a more sophisticated theoretical and methodological (including bioarchaeological) framework.

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Descriptions of burial practices and related beliefs for the colonial period in the archives and the drawings of burials by the painter who accompanied Bishop Baltazar Jaime Martínez Compañon on his inspection tour of northern Peru in the 1780s show that members of lineages were interred together in cemeteries or burial complexes consisting of ceremonial spaces or patios, warehouses for storage of sacrificial goods, niched walls, and tombs. Burials were clustered or housed in caves or large chambers that might contain hundreds of the bundled and mummified remains of relatives, often arranged around the central figure of the founder. This personage usually sat atop a raised structure and wore a distinctive headdress and clothes. The living periodically visited these complexes to request health and fertility from the ancestors and conduct propitiating rituals, often burning food offerings (could this account for the ash-charcoal deposit atop or next to some burial pits?), singing, and dancing. The *callos* (feet, knuckles) of sacrificed camelids were burned at burial ceremonies as favorite foods of the dead. People believed that they depended on the dead for life, fertility, and prosperity while the dead depended on them for sustenance, the next life being so crowded that there was not enough space for all to plant.

The feasting and drinking that accompanied ancestral burial and subsequent propitiation certainly reflected the social status and importance of the remembered individual and his lineage and served to cement loyalties and reinforce obligations to the line and its power to attract followers. Important indices of the status and power of a curaca were the number of his followers and his ability to offer hospitality to anyone who appeared at his court. Colonial documents often refer to a chief's female attendants as "widows," and they may have included gift brides (cementing political alliances), orphans, captive females, or persons entering service in their flight from harsh economic realities or recurring ecological disasters. A litter, ritual paraphernalia, and a good number of retainers were customarily buried with lords to be used in the next life. Might not the wives and daughters of the defeated have served as household labor while alive and been buried with the lord, thus accounting for the presence in the tomb of the North Women and their relative heterogeneity?

Ancestor worship was a multigenerational practice. Some tombs remained open for ritual reasons, and this may explain why there appears to have been a lapse of time between death, burial, and the closing of the tomb. In central Andean tombs, individuals were buried in the same chamber as their antecedents. Thus one would expect an accumulation of grave goods reflecting veneration by different generations over time. The memories of commoners and nobles alike often went back ten or eleven generations.

For high-status individuals there was no difference between their tombs and lineage temples or sacred ritual spaces, structures that Shimada et al. tend to separate. There is no direct testimony on a positive correlation between an individual's status and the closeness of his burial to the sacred center, but documents do show that at both the lineage and the imperial level, the closer a person's kinship ties to the personage occupying the sacred center of the cult hierarchy, the higher that person's socioreligious status.

The polity under the paramount lord Jayanque (now Jayanca) had at least five administrative (socio-religious-political) levels: the curaca, his second-in-command, *principales* (nobles), *mandones* (overseers), and *mandoncillos* (little overseers). Lordships passed from brother to brother before skipping down to the next generation. This may account for the uncle-nephew (second-order) relationship suggested for the tie between the principal personages of the East and West Tombs.

Sicani was one of ten *principales* of the curaca and was given, along with the curaca and three other lords, in encomienda to a Spaniard when the polity was divided into halves in 1534. If Sicán was the dominant polity in Middle Sicán times, how did its status decline?

In the myths of the Central Andes, the founding ancestor wandered the world, often stopping to rest atop a nearby mountain where, seated, he ordered the world. Seated on a stool, the curaca was worshipped as the embodiment of the divine ancestor. Could the importance of being seated to order and civilize the population account for the seated position of the four elite burials

mentioned here? Might not the ubiquitous truncated pyramids be representative of the mountains from which the founders and gods ruled?

The orientation of the face of the principal personage in burial 1, looking west, may indicate his watchful awaiting of a successor god or lord coming from that direction. Cabello Balboa notes that the prince Naymlap came from the sea to rule over the people of Lambayeque.

The Inca claimed to be the direct descendant of the sun god, and central Andean leaders claimed to be direct descendants of their founding ancestral heroes. Such genealogical legitimacy claims accord with Shimada et al.'s conclusions that "a 'divine' connection was invoked in legitimating and aggrandizing the elite that ruled Middle Sicán society" and that the central personage was "likely to have been perceived as an earthly alter ego of the omnipotent central deity of the Sicán religion."

This effort does indeed show "the breadth and depth of information . . . secured from a focused, sustained investigation that integrates a multitude of analytical perspectives and methods." I lament that the collaborative interpretation of the tombs' contents invited the participation of the historian last.

Reply

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We are grateful for these stimulating and informative comments from a variety of perspectives.

Nelson informs us of significant differences in pre- and postprimary interment treatments between Moche and post-Moche burials. This is a topic that should be a major consideration for anyone who excavates burials either by design or by chance. Pathbreaking in this regard is the work of Gisela and Wolfgang Hecker (1991, 1992), who were the first to document the formal, temporal, and spatial variability of these treatments on the north coast. Comparing the treatments documented among the Moche (e.g., Millaire 2002, Franco, Gálvez, and Vásquez 1998) and other cultures before and after them in different areas of the north coast (e.g., Klaus 2003, Nelson 1998), one observes differences, as Nelson notes, but also some persistent practices (e.g., placing a copper or copper alloy object in the mouth) that may represent the "emblemic style" associated with an ethnic group (Wiessner 1983) as opposed to styles derived from status, class, gender, or culture (Klaus and Shimada n.d.).

With regard to the wealth = health relationship, we hypothesized a positive, not an a priori correlation between them. More specifically, we were following Goodman's (1994) hypotheses for explaining the varying frequencies of stress indicators in different individuals or populations: (1) some individuals are more susceptible to stress; (2) early stress can damage certain systems and cause greater susceptibility to disease and stress later; and (3) differences in stress indicators are all status- and resource-accessibility-related. The majority of studies suggest that a combination of these factors (especially 2 and 3) is responsible for the uneven distribution of stress indicators and related illness in the world's populations (see Nguyen and Peschard 2003). Trends in the health status of modern people are also consistent with a model of accumulation of health risks over the individual's lifetime (Power and Matthews 1998, Strickland and Shetty 1998). This framework is useful for the interpretation of stress indicators in both past and modern populations and has yielded correlations between increasing amounts of stress (measured by enamel hypoplasias) and reduced life span in several Andean populations (Farnum 1996, 2002). Strong links have been found between child poverty/malnutrition, ill health, and enamel hypoplasias in modern populations (Goodman 1994, Goodman et al. 1992). Despite an imperfect correlation and many complicating factors, the wealth = health generalization (Goodman and Leatherman 1998) remains broadly applicable. Therefore, it is unlikely that the osteological paradox can account for the systematic differences in stress indicators found among the various Sicán groups.

It is not surprising that the 19 "weaving women" from Túcume diverged in developmental health indicators from the South Women of the Huaca Loro West Tomb. The North Women are closer to the Túcume women, both groups perhaps representing a number of disparate populations, developmental histories, and environments. The excavator (Narváez 1995:93) identified them as *acllas*, young women from the provinces selected for service, sometimes in distant places, by the Inca state (see, e.g., Cobo 1979[1653]:236, 245; 1990[1653]:25; Polo de Ondegardo 1990[1571]:97–103). Uhle (1903:84–87) had corroborated these historical descriptions with his excavation of *acllas* in the cemetery near the base of the Sun Temple at Pachacamac. The possibility that the North Women were the Middle Sicán counterparts of the *acllas* is worth exploring. Generally, in comparing the groups mentioned by Nelson with those of our study we must make a clear distinction between inherited and acquired social status. We suspect that the inferred *acllas* at Túcume had acquired a new high social status at an age by which many of the developmental health indicators had already been established. As noted earlier, adverse effects of stress early in development linger (Nguyen and Peschard 2003).

Nelson and Castillo have a valid point in their criticisms of sample size and representativeness. As we noted, they are, in Nelson's words, the "eternal banes" of bioarchaeology. Large numbers of burials are often found when they are least expected, creating serious problems of documentation, analysis, and conservation, not to mention elucidation of local and regional contexts, as in the case of the more than 2,200 burials recovered during an emergency excavation at the Purucucho-Huaquerones Inca cemetery on the eastern edge of the city of Lima (Cock 2002). At the same time, a problem-ori-

ented mortuary study such as ours typically finds it difficult to acquire a large, representative burial sample for the reasons we explained. As Nelson points out, the relatively young women in the West Tomb represent a nonrandom sample of Sicán society.[2] However, all we can do is hope that they represent some sort of typical sample of that stratum of females. Since the excavation of the West Tomb we have learned more about Sicán burials through the excavation of 12 individuals at Huaca Sialupe (Klaus 2003) and collaborative analysis of 84 additional burials excavated by members of the Bruning Regional Archaeological Museum at Illimo (lower La Leche Valley) and Cerro Cerrillo (lower Lambayeque Valley [Klaus, Centurión, and Curo 2004]). An understanding of background biological variability can realistically be achieved only through long-term regional study.

Nelson questions the adequacy of the evidence for some of our basic claims. Space limitations forced us to focus on the burials at Huaca Loro and be selective in the presentation of findings. Relevant data and analysis from other sites are presented in Farnum (2002), Klaus (2003), and an edited volume in preparation (Shimada n.d.).

Dudar points to bioarchaeological studies employing multiple data sources that we failed to acknowledge. The publication by Dudar, Waye, and Saunders (2003) was not yet available when our article was written. An integrated study of mortuary practices entails not only integration of multiple analytical methods and perspectives but also an assessment of the results in their historical and social context. For those without access to written texts this can be achieved only through sustained regional study, and, although there are welcome exceptions (e.g., Buikstra 1995), this type of study is still rare. The location of the East Tomb at Huaca Loro had been known since 1978, but we did not devise a detailed plan for its excavation until we felt that we had sufficient command of the regional Sicán chronology, material culture, sociopolitical organization, and burial customs, as well as a proficient excavation crew and a team of complementary specialists (see Shimada 1995:42–45, 179–81).

Dudar touches on various concerns regarding mtDNA analysis about which we commented in the article. What can be gained from ancient DNA (aDNA) analysis depends almost entirely on the quality of the DNA that has been preserved in sampled materials. Dudar, Waye, and Saunders (2003) were able to reach convincing conclusions regarding the kinship relationship of burials excavated at a historically documented nineteenth-century cemetery based on analyses of nuclear DNA and other genetic materials preserved in excavated bones. Our study differed fundamentally from theirs with regard to the quality of DNA sample used and the availability of textual information. Degradation of genetic materials resulting from 1,000 years of interment 12–15 m below the surface made it practically impossible for us to emulate their exemplary study. We were confined to analyzing mtDNA and illuminating possible maternal linkages among sampled individuals. Similarly, because the quantity of mtDNA that can be recovered is minute there is substantial risk of contamination. Since our analysis begins with amplification of extracted mtDNA by polymerase chain reaction, we must suspect that the resulting sequence data have been affected by some postdepositional aging. Only those sequences that were verified by repeated experiments were utilized, and therefore we are confident that they represent authentic human sequences.

With regard to the haplotype 5 females, it is important to recognize that we know very little about mtDNA distribution for the pre-Hispanic north coast of Peru or, for that matter, much of the pre-Columbian New World. We included the haplotype 5 data in our study in the belief that haplogroups other than those documented for modern Amerindian populations may well have existed in the pre-Hispanic world. We still feel that "it is prudent to remain open-minded on the subject" (n. 5).

As Dudar notes, in the mtDNA D-loop region that we analyzed for our study, many modern "Caucasians" (i.e., Europeans and Euro-Americans) possess the Cambridge Reference Sequence without having known common ancestry. However, Amerindians and their presumed ancestral group(s) in northern Asia do not possess this sequence, and therefore his comment seems to us inappropriate.

We do not know what factors led to the placing of one or, alternatively, two individuals in a given pit. Pit size is apparently not one of them. The individual B6 in pit 2 may have been sacrificed in situ immediately preceding interment, while the two individuals (B9, B10) in adjacent pit 4 appear to have been brought in bundled and mummified. We were unable to elucidate situation-specific decisions or paternal relationships that may have influenced the placement of the women in the West Tomb. We cannot assume that maternal kinship ties were the determinant as Dudar seems to suggest. Rather than focusing on the question of whether women with the same haplotype occur in the same pits, it seems more important to note that the North and South Women did not share a single haplotype in spite of the diversity of haplotypes identified among them, suggesting that these two groups were derived from at least two populations with distinct genetic histories. It was the matching spatial bipartitioning of artifact styles that led us to suggest two distinct ethnic groups.

We hope that the strontium isotope ($^{87}Sr/^{86}Sr$) analysis of bone samples now under way will help us to differentiate local from nonlocal individuals. The analysis determines the area-specific $^{87}Sr/^{86}Sr$ composition of bone samples that incorporated strontium compounds through food and water intake (Stos-Gale 2000). Nonlocal individuals would be expected to be different in terms of their haplotypes. Our analyses of additional burial samples excavated at sites in different parts of the north coast and pertaining to different time periods and archaeological cultures are slowly but steadily clarifying the haplotype dis-

2. The pre-Hispanic culture and associated art style called Sicán in this article is sometimes called Lambayeque. The latter is neither the first nor the only designation given to them. Other names include Northern Chimú (e.g., Ravines 1980, Valcárcel 1937) and Etén (Uhle 1949). The reasons for our use of "Sicán" are presented elsewhere (e.g., Shimada 1995:6–13; 2000:49).

tribution, and the expanding aDNA data bank should allow us to carry out more detailed and conclusive analyses.

We concur with the general thrust of Kaulicke's critique of the state of mortuary analysis on the north coast. Castillo offers a more generous assessment. As Kaulicke laments, many of these tombs are inadequately documented and analyzed. Commoner burials or those with few or no associated grave goods are marginalized in terms of documentation, conservation, and analysis. This reflects a narrow conception of the information potential of mortuary analysis as well as limited integration of complementary specialists (including conservators) in and out of the field and insufficient knowledge of the regional context. Encouragingly, along with the increasing popularity of bioarchaeology we are seeing increasing participation of physical anthropologists in burial excavations, but more could be done to maximize the information potential of major tombs.

Kaulicke feels that our treatment of the ritual and symbolic dimensions of the Huaca Loro tombs is "often reduced to functional interpretations." Some correlations between material and bioarchaeological evidence were found, but each line of evidence was generated and treated independently; these correlations did not drive our interpretive effort. Echoing Pader (1982), Hodder (1980), and others, Kaulicke also speaks of the importance of a "close 'reading' of the interrelated items" including "position, direction, number, color, kind of material, etc." Some of the relevant data and discussions have already been published elsewhere (Shimada, Gordus, and Griffin 2000, Shimada et al. 1999). Unfortunately, the murals preserved atop the Huaca Loro mound are limited to a few detached and incomplete representations of the front-facing, standing Sicán Deity (Florian 1951), and their overall iconographic composition and theme can only be speculated upon.

Kaulicke emphasizes the need to explore the process through which a deceased leader becomes a revered ancestor. A thorough discussion of these topics will be part of the collection in preparation (Shimada n.d.), but we wonder whether the "complete understanding of complex and ritual networks" that Kaulicke seeks is feasible. In his recent book (2000:288) he recognizes the difficulty of the task and justifiably criticizes the analogy-based approach or backward projection of ethnohistorical documentation of the beliefs and ritual practices of immediately preconquest times (also see Shimada 2003:90). Rather than addressing the thorny issue of alternative approaches to analogy-based speculation, however, he focuses on the role of ancestors and their worship in the pre-Incaic Andean world. Critical examination of the ancestor cult that he proposes is timely and much needed, as we also argue.

In his book, Kaulicke assumes the widespread and long-standing existence of the ancestor cult and identifies inferred ancestors in iconographic representations (e.g., centrally placed personages). This approach carries the risk of circularity and is inseparably bound to information on the Inca and their contemporaries culled from Spanish written sources. In other words, Kaulicke's approach to pre-Incaic mortuary practices and the ancestor cult relies on a narrow range of information and has its own weaknesses. His approach complements our multilineal, contextual approach, however, and will be explored in the book in preparation (Shimada n.d.).

We are puzzled by Castillo's comment that we "reject the 'representationist approach' to funerary data and call upon new approaches developed by the postprocessualists." Nelson's assessment of our work as a demonstration of the importance of "integration of many aspects of processual and postprocessual theory" accurately captures our intent. In fact, we discussed the strengths and weaknesses of each school and argued that each has much to contribute to the archaeological study of mortuary practices. One point highlighted by the processual-postprocessual debate is that every interpretation is implicitly or explicitly underlain by biases, assumptions, and theoretical stances, even if one is "uninterested in theoretical disputes." In reality, our study rests on a belief that the representationist position is effectively "applicable to complex societies with institutionalized social and economic inequalities" such as the Middle Sicán. How our approach is labeled is of less concern to us than demonstrating the complementary character of these two schools and the importance of contextualized analysis.

Ramirez provides welcome support for a number of our interpretations and various thought-provoking comments. At the same time, we have reservations about her (as about Kaulicke's) comments because we question the extent to which ethnohistorical data on the Incas and their contemporaries can productively inform archaeological studies of earlier times and different areas. Historical data can broaden or narrow the range of plausible interpretations to be considered. A seeming match between a historical description and an archaeological find may reflect a homology or a convergence, requiring careful assessment of the relevant contextual data and additional lines of evidence. In addition, we must guard against the disjunction of form and meaning (e.g., Kubler 1970). Thus, without a clear indication of cultural continuity and in-depth contextual understanding, we are hesitant to rely on historical information, however explicit it may be. The watercolors of pre-Hispanic burials and their grave goods in Martínez Compañón y Bujanda's eighteenth-century manuscript (1978–93 [1781–89]) show Chimú and Chimú-Inca (ca. 1470–1532) burials that are most likely ethnically distinct from those of the Sicáns. Nevertheless, we find Ramirez's information and questions stimulating and food for future thought.

Overall, we share the optimism about mortuary studies expressed by the commentators and hope that our article will contribute to realizing their potential.

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